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Report of the UNDP/UNIDO Mission



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Prepared for the United Nations Industrial Development
■ Organisation on behalf of the Government of Cyprus ■

Institute of Development Studies

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THE CYPRUS INDUSTRIAL STRATEGY

Prepared for the United National Industrial Development
Organisation on behalf of the Government of the Republic
of Cyprus

By

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ABSTRACT

After a decade of rapid growth, Cypriot manufacturing remained stationary in 1986, as export markets fell and domestic consumption grew more slowly. This slower growth is likely to continue, and be coupled with increased competition both from low cost mass producers in the third world, and a new design intensive competition from the first world.

Cyprus is faced with a choice between a strategy of low cost mass production or one of flexible specialisation based on flexible production systems, design, and across the board improvements in working capital productivity. This report argues that it is the second of these which offers the best hope for Cypriot industry.

For it to succeed, however, there needs to be a re-orientation of corporate and government industrial policy, with a new emphasis being put on design, product development, stock minimisation, quality control, multi skilled labour, and new forms of industrial relations. It will also need a framework enabling firms to provide common services for themselves, an expansion and re-direction of development banking, the establishment of a Strategic Planning Council, a revised incentive scheme, and a range of new publicly funded infrastructural services.

PREFACE

Terms of Reference

The purpose of this study is to examine the prospects for Cypriot manufacturing, its current characteristics and possible strategies for its restructuring in the light of trends in international competition.

The detailed terms of reference are reproduced in Appendix I of the Main Report. A synopsis of the main objectives as prepared by UNIDO runs as follows:

- (1) A critical techno-economic study and analysis of the present structure, pace and pattern of growth and constraint of the manufacturing sector and sub-sectors, particularly textiles and garments; footwear and leather products; wooden furniture; metal-working industry; and food processing industry sub-sectors.
- (2) Identification of industrial sub-sectors and products/product groups with higher development potential and comparative advantage in export markets particularly in the EEC countries.
- (3) Formulation of a plan and programme of industrial restructuring/rationalisation in the medium and long-term, with a clearly defined objective, direction and strategy, such as improving and strengthening the structure, efficiency and competitiveness of the manufacturing sector and sub-sectors; promotion of inter-and intra sectoral linkages and interdependencies; greater technological orientation; promotion of investment, employment and manufactured export etc.
- (4) Recommendation of industrial policies and policy instruments and regulations required for the implementation of the

country's industrial restructuring and development plan and programme and realisation of the objective and target thereof.

- (5) Review of the existing machinery and mechanism of industrial planning, development and promotion and consideration of ways of optimising co-ordination and involvement of existing relevant institutions and agencies in the country's industrial restructuring/rationalisation tasks with a view to improve and strengthen institutional and operational capability for industrial development.

Structure of the Report

The report is in eight parts:

I The Main Report

- A. **Prospects.** The first two chapters consider the prospects for Cypriot manufacturing the light of its development since 1974, paying particular attention to the possible effects of Cyprus entering a Customs Union with the EEC.
- B. **Strategic Approach.** Chapter 3 outlines the sector strategic approach to industrial policy.
- C. **Characteristics.** Chapter 4 analyses the present characteristics and problems of Cypriot manufacturing.
- D. **International Competition.** Chapter 5 outlines the two main trends in international competition: volume production and flexible specialisation.

E. **Strategy.** Chapters 6 and 7 outline a strategy for Cypriot manufacturing and what is needed to put it into practise.

II **A Simulation Model of Manufacturing within the Context of the Cypriot Economy**

In order to understand the growth of manufacturing and its sub sectors related to the overall economy, the mission developed an economic model which extended and disaggregated the general equilibrium model currently in use in the Planning Bureau. This part of the Report presents the structure of the new model, computes the present levels of protection, and estimates the likely effects of the Customs Union, and of a programme of industrial restructuring, on manufacturing, on the five main manufacturing sub sectors and on the economy as a whole.

III **Knowledge Intensive Industries**

With respect to new industries, the Mission concentrated on knowledge intensive industries which could build on Cyprus's high level of technical know how, and the island's existing and potential specialisation. The report covers in particular development opportunities in the field of water management, renewable energy, computer software, and bio technology.

IV-VIII The bulk of the report comprises detailed sector studies of the five main manufacturing sectors, Food, and Beverages, Clothing, Footwear and Leather Products, Furniture and Wood Products, and Metal Working. Together these accounted for 78% of manufacturing employment and 77% of manufacturing value added in 1986 (see Appendix II of the main report). Each sector study analyses the trends in international competition in the industry, the structure and performance

of the sector in Cyprus, and outlines a strategy for industrial restructuring.

The Mission Team

The team which undertook the report was as follows:

Robin Murray Team Leader. Fellow of the Institute of Development Studies, University of Sussex, formerly Lecturer at the London Business School, and Director of Industry at the Greater London Council.

Michael Best Furniture Sector. Professor of Economics at Amherst, Massachusetts. Formerly furniture specialist at the Greater London Enterprise Board, and currently Board member of the Massachusetts New Product Development Corporation.

David Evans Simulation Model. Fellow of the Institute of Development Studies, University of Sussex, specialising in Input-Output modelling and Trade Policy.

Jan: Humphries Footwear and Leather Products sector. Fellow of Economics at Newnham College, Cambridge, and specialist in the footwear industry, and labour market and gender issues. Member of the editorial board of the Cambridge Journal of Economics.

Raphie Kaplinsky Knowledge Intensive Industries. Fellow of the Institute of Development Studies, University of Sussex, specialising in new technology and development.

James Rafferty Metal Working sector. Managing Director of SME Services, a division of Eurofi (UK) Ltd. Also Lecturer in Business Policy at the University of Buckingham. Formerly with General Motors (UK), Granada (head of Corporate Planning), and Broomhill Electronics (where he was Managing Director).

Peter Snell Food and Beverages sector. Food Technologist and Economist with the London Food Commission, formerly plant manager with Unilever.

Jonathan Zeitlin Clothing sector. On the faculty of Birkbeck College, London, specialising in the clothing industry, and industrial policy in Northern Italy.

The team was assisted by Harriet Lamb in research, and by the administrative and support staff at the Institute of Development Studies.

The Preparation of the Report

The mission team visited Cyprus during January 1987, with three follow up visits by individual team members in March, May and June/July. The bulk of the time was spent in talking to enterprises, both through factory visits, and evening meetings with groups of industrialists. A list of those enterprises visited is given in Appendix III of the main report. The team also held extensive discussions with employers organisations and their sectoral associations, who kindly organised and participated in the evening meetings, as well as with the principal public and private banks, and with the trade unions.

We also held meetings with Ministers and officials at the main Government Ministries, and with the quasi-public institutions involved with providing services for industry. (see the list in Appendix III).

To all those in private and public organisations who took out time to talk to us, provide us with information, and help us in our research, we would like to extend our warmest appreciation.

Members of the team worked throughout the project with a counterpart, as follows:

Team Member	Counterpart
R. Murray	P. Koutourousis, (MCI) Director of Industry and responsible for the mission on behalf of the Cyprus government.
M. Best	S. Zavros (MCI)
D. Evans	M. Jensen (Planning Bureau)
J. Humphries	H. Paikos (HTI)
R. Kaplinsky	S. Kasinis (MCI)
J. Rafferty	P. Pantelis (MCI)
P. Snell	P. Hadjiluca (MCI)
J. Zeitlin	S. Labrianou (MCI)

as well as with Bambos Charalambous, principal support officer for the Mission's visits. Each of the counterparts, and Bambos Charalambous, played a central role in the work of the mission, and we owe a major debt to them as to the Minister of Commerce and Industry and to the Director General of the MCI, both of whom were generous of their time and support.

There were many others in the Ministry and Commerce and Industry - both officers and support staff - as well as in the Planning Bureau, the Department of Statistics and Research, the Ministry of Finance, the Exchange Control Department of the Central Bank, the Company Registry, and the Hotel and Catering College, who worked with us on one or more aspects of the study, and to whom we are also most grateful.

Finally the UNDP office itself has exemplified the United Nations Technical Assistance programme at its best, from the drivers and support staff, to Luis Gomez, until May 1987 the UN Resident Representative in Cyprus, Sean Finn, who succeeded him in June, and Krishno Dey, the Deputy Resident Representative. We would like to acknowledge, too, the advice and assistance of Arjun Upadhya from UNIDO.

To them and to all those with whom we have worked - as well as to the families in Cyprus and elsewhere whose patterns have been affected by the work of the mission - we express our thanks.

THE CYPRUS INDUSTRIAL STRATEGY

GENERAL SUMMARY

Past Growth and Prospects

1. After a decade of sustained growth, Cypriot manufacturing is facing and will continue to face increasing difficulties during the second half of the 1980s. This is quite apart from the possible impact of the Customs Union. The two main warning signs are:

- manufacturing exports ceased to grow in the 1980s. In real terms, the average value of domestic manufacturing exports in the four years 1982-5 was down by 9% on 1981 values.
- real manufacturing growth which had averaged 10% between 1976 and 1980, fell to an average of 4% between 1980 and 1985, and to zero (a marginal decline) in 1986.

2. The causes of the pressure on manufacturing were largely the weakening of the growth markets which had underpinned the post invasion manufacturing boom:

- the resettlement construction programme.
- a slow down in the rate of growth of resident private consumption.
- a sharp fall in the level of Middle East demand (between 1982 and 1985 Saudi Arabia's imports from the rest of the world fell

by 70% in current prices, Libya's by 63%, Lebanon's by 59% and Kuwait's by 42%).

With static export markets, internal demand was sustained (if not at pre-1980 levels) by an expansion of non resident consumption. Of the overall growth of private final consumption in Cyprus between 1980 and 1984, non residents accounted for 43%, nine tenths of it coming from tourists.

3. Over the next four years, Cypriot manufacturing is likely to encounter increasing pressure. Partly this will be because of the further weakening of growth in its main markets:

- Middle East markets may expand relative to 1986, but they are unlikely to return to the pre 1982 levels.
- resident domestic consumption will be linked to the overall growth of the national economy, which is itself slowing down.
- tourist demand will continue to expand but at less than half the rate it did in the first half of the 1980s. This is partly because of a likely slow down in the number of tourists, and partly because of a decrease in spending per tourist.

4. The dynamic factors in the Cypriot economy which are still sustaining a rate of growth greater than that of most advanced industrial countries have little immediate impact on manufacturing as did the construction boom of the 70s and the tourist boom of the 80s. Of the £18.7 million spending by offshore companies, only C£2.5 million was on fixed assets (little of that on the products of Cyprus industry) and C£1 million on paper and printing. The Free Trade Zone is still in its early stages. The growth of business services offers little in the way of demand for Cypriot intermediate products, save

through construction. Of the internal development factors which are still strong in Cyprus - commercialisation, urbanisation and motorisation - their direct effects on manufacturing are largely confined to construction related sectors and to a lesser extent to 'metal servicing' production.

The evidence suggests that the slow down in Cypriot manufacturing growth is largely the result of a decline in the growth of its key markets rather than a loss in market share. This is true of the Middle East as of domestic demand. Until 1985 Cypriot market share held up surprisingly well in the main Middle East markets, while on the domestic market, the proportion of imports in Cypriot final consumption was 24.8% in 1984 as against 24.3% in 1980, only a marginal increase. By the second half of the 1980's however, manufacturers were reporting increased competition both at home and abroad, to an extent which has yet to be reflected in published figures. On the evidence of our visits and of the broad movements in international competition in those sectors of principal importance to Cyprus, it is probable that the market shares of Cypriot manufacturers will be threatened irrespective of the Customs Union.

The Customs Union

In the absence of a programme of restructuring, the Customs Union will further weaken Cypriot manufacturing. A cut in tariffs on the terms provisionally agreed would be likely to cut manufacturing output by 13% by the end of the transition period.

Of the five main sectors under study, some are liable to suffer more than others, specifically:

- clothing is likely to be affected chiefly by the entry of fashion goods at the higher end of the market, which will work their way down to the middle market ranges as the transition

period proceeds. At the cheaper end of the market we see Cyprus remaining competitive. This is based on a comparison of wage and productivity levels between a sample of 15 Cypriot clothing firms and the main European competitor countries.

- footwear will be more heavily hit, since for its quality Cypriot footwear is not price competitive in Europe.

- furniture will also be heavily hit. The industries problems are: low production efficiency: lack of product specialisation low capital productivity (high stock turns), lack of collective services and specialised management.

- food processing will be only marginally affected.

- metal products too will only minimally lose, because of the service sub contract character of the industry.

Most industrial products have free access to the European market, hence immediate gains for Cypriot industrial exports will be slight. One potential beneficiary is the fruit juice industry. Another could be quality clothing producers who - in the event of successful restructuring - would face ceilings were Cyprus to join the Union. The Spanish clothing industry - which has followed the Italian model - has had a large increase in exports to the EEC following Spanish accession in 1986. At the moment, however, Cyprus does not reach her clothing export ceilings.

A number of secondary factors should be taken into account:

- a cut in the price level following tariff reductions.

- the impact on the labour market and the government budget of a proportional loss of employment.
- the exchequer loss of import duty, and of tax on lost output.
- the balance of payments effects of a worsening industrial trade balance.

The simulation model

The simulation model confirmed the main features of these forecasts. It showed overall growth in the economy slowing down in the period until 1991, being particularly sensitive to the terms of trade, tourist spending, and the pace of manufacturing productivity growth, and much less so to reductions in wages, and the level of protection. It showed the Customs Union having a modest negative effect both on manufacturing and on the economy as a whole, and confirmed the point that it was the rate of growth of productivity rather than the Customs Union that was the major issue for Cypriot manufacturing at the present time.

Two forms of international competition

Cyprus currently faces twin pressures. On the one hand there are the low wage mass producers, particularly those from the Far East who have faced restrictions in the EEC and the USA, and who have looked to third country markets in partial compensation. They are an important presence in the Middle East.

On the other hand, there is increasingly sharp competition from high wage producers, particularly those who have managed to combine design, quality, and new forms of flexible production to cut working

capital costs and improve response times. In a number of the manufacturing sectors of significance to Cyprus - clothing, footwear, furniture, machinery and food - old forms of mass production are losing out to what has come to be called flexible specialisation.

Flexibly specialised production is often found in small units sited close together in industrial districts and co-ordinated by co-operative distribution companies or advanced retailers. Thus in Italy, which has become the largest net exporter of textiles and garments in the world, specialising in medium and high priced fashion garments, the average size of firm is 5.5 workers. Average wage costs per direct employee are twice those in Britain, four times those in Hong Kong; and nearly 20 times those in Sri Lanka. Between 1971 and 1981 while clothing employment in the UK fell from 338,000 to 216,000 in Italy it rose from 416,000 to 443,000. There is a similar story in footwear, where Italy with an average employment of 14 per firm, has grown while other European competitors have declined. In spite of new competition from Brazil, Italy still holds over a third of world export markets for leather, rubber and plastic shoes (1984 data). In furniture, while the German furniture industry (centred on advanced mass production) saw its share of world export markets fall from 28% to 18% between 1976 and 1984, Italy's share rose from 14% to 22% over the same period. In certain food products, agricultural and food processing machinery, jewellery, tiles and speciality steels, the industrial districts of the so called third Italy (the region defined by Venice, Florence and Ancona) have been similarly successful.

Other regions with similar structures have also been points of growth: Jutland in Denmark, Smaland in Sweden, the Rhone Alps province in France and Baden Wuerttemberg in Germany (where the specialised textile machinery firms have prospered at the same time as their large scale competitors in the USA are declining). In some industries - automobiles for example flexibility, design, working capital efficiency, and close links to consumers have been married to mass production (the so called flexible automation) and have underpinned the success of Japan. In each of the cases it is the

design and quality of the product, coupled with high degrees of capital productivity, rather than scale and labour costs which have determined competitive outcomes.

In the long run this 'new' competition poses the greatest challenge to Cypriot producers. Not only is it expanding in Western European markets at the expense of low cost imports (in clothing the share of developing countries in UK imports fell from 46% in 1980 to 39% in 1985, while Western Europe's share rose from 26% to 36% over the same period). But it is also extending to the medium income markets as well. Exporters to Saudi Arabia, and Kuwait report a new concern for quality, while in Cyprus itself, design intensive, flexible firms like Benneton and Next are importing in spite of the height of the tariff.

The choice for Cyprus

The key issue for Cypriot manufacturing - irrespective of the Customs Union - is whether it can meet the new competition by lowering costs and increasing productivity in line with the mass production model, or whether it can re-orient itself and adopt the principles of flexible specialisation.

In our view, there is little long term hope for Cyprus in competing through volume production. Its situation as a small island economy on the margins of the EEC works against such a strategy. The small internal market is the principle factor underlying many of the recognised weaknesses of Cypriot manufacturing: low capacity utilisation, lack of specialisation, limited sources of locally produced inputs, and fragmented ownership structures. Its narrow labour market means that there is an in built tendency for a labour shortage and wage increases, in periods of sustained growth.

The 'proto mass production' industries which have managed to grow on the basis of low wages, and high rates of protection, now find themselves undercut in third country markets by economies whose costs Cyprus can never hope to match, and are liable to find even their small internal market being eroded as protection falls. In Europe, Cyprus still does have low wages relative to the EEC, and a number of clothing and footwear firms have followed a strategy of acting as low cost sub contractors to EEC firms. But the margins are tight, and the scope for independent expansion limited, so that further wage drift is liable to lead to a shift in sourcing to cheaper North African locations, a similar displacement to that which took place in labour intensive industries in Ireland.

With flexible specialisation the prospects are more promising. Many of the characteristics which under mass production are a limitation can be positive factors within the context of flexible specialisation.

- small firms, have been one of the key features of successful Italian industries, allowing for flexibility and encouraging innovation. In furniture, clothing and footwear, the size of Cypriot firms is not out of line with Italy.

- Cyprus has a close family based culture which provides a means for networking between small firms.

- the emphasis on high quality training, which has left a surplus of unemployed graduates, provides an important resource for skill intensive flexible production.

- the Cypriot domestic and tourist markets, while small, are fashion conscious and demanding. They can thus be a stimulus for design led strategies in consumer goods sectors.

- the fluctuations in overseas markets put a premium on flexibility, while penalising inflexible volume production.

Furthermore, during the course of our mission, we visited a number of firms who were moving in the direction of flexible specialisation. Industrialists, particularly in the clothing industry, have been investing in design, emphasising quality and skills, and adopting - within their limited means - flexible production systems. A number of these firms have used the home market as a testing ground for their products, before expanding overseas, notably in Europe. They have developed their own brand names, independently of foreign firms, contracting overseas designers to work for them rather than vice versa. Their existence and high standard of performance shows the potential which exists. Each sector report confirmed the general picture of the difficulties of mass production, and the potential for flexible specialisation. In none of the sectors was the path to flexibility easy, but it was the more promising strategy in the light of the development of international markets, and Cyprus's particular characteristics. This is the first major recommendation, therefore, that Cyprus adopts a policy of upgrading Cypriot manufacturing according to the principles of flexible specialisation rather than attempting to compete through volume production and labour cost cutting.

Europe versus the Middle East

There has been a tendency to equate a policy of upgrading with a shift of orientation from the Middle East towards Europe. While in 1986 a relative shift has taken place, this is not necessarily associated with upgrading. Part of the increase in manufacturing exports to Europe has taken the form of low wage sub contracting, where the designs and often the materials are supplied by the European contractor, while the Cypriot firm is confined to low margin labour intensive production. Similarly there has been a growing demand for more design intensive products in the markets of the Middle East. What is required therefore is not the abandonment of

the Middle East for Europe; Cyprus will for some time have a particular advantage as a bridgehead between Europe and the Middle East. Rather what is needed is market planning, distinguishing at least three phases:

- product development within Cyprus for domestic consumers and tourists

- expansion in targetted European markets to gain direct experience of quality competition at source

- expansion to Middle East markets.

The aim should be to upgrade products in both the European and the Middle East markets rather than shift from one to the other.

Sector priorities and new products

Faced with increased competition in traditional sectors, some countries have decided to allow old sectors to run down, in favour of new industries. But as the Germans and the Italians have underlined, there are no old sectors - only old processes and old products. Shoes, clothing and furniture will still be required. What is at issue is how to produce them.

We recommend that Cyprus does not abandon her traditional industries. They represent a body of knowledge and experience which it takes time to build up. Rather the priority should be to transform them, before embarking on diversification. Nor would we give a priority to any one existing industry. Some are more advanced, or more vulnerable, than others, but all are capable of becoming competitive through upgrading. It will depend centrally on the industrialists, and the

government should be willing to help those who help themselves. In this way priorities will be settled in practise.

Where diversification does take place we believe it should be 'organic', that is to say it should start from an existing industry or point of expertise rather than aim to set up a manufacturing enclave from scratch. In metal working for example there is scope for 'reverse engineering' to produce components for incorporation in upgraded machine production. Other examples are given in the sector reports. The starting point may be a non manufacturing industry, such as water management or energy conservation systems, much of which could be developed in Cyprus in such a way as to expand the manufacturing sector. Computer software has already led to the manufacture of electronic displays. Bio technology opens up new possibilities in food processing. Retailing and distribution, catering, and the leisure and cultural industries all have potentially close links with manufacturing and require further study. In each case the task of an Industrial Strategy is to bring out the implications for manufacturing of potential developments in the primary and tertiary sectors.

Putting Strategy into Practise

In order to encourage the adoption of flexible specialisation the following steps are required:

1. **Industry Consortia.** The starting point for any change must be the industrialists themselves. They need not only to re-orient their business strategies where they have not already done so, but also to consider how certain necessary services could be provided, which small firms cannot afford by themselves. One answer favoured by the employers organisations and the government has been that firms should grow bigger and merge. But in spite of the incentives provided, firm size has decreased. The share in output firms with more than 100 workers has fallen from 41% to 34% between 1981 and 1985, while that

of firms with less than 20 workers has risen from 27% to 34% over the same period. Given the resilience of small firms, industrialists should seek to provide the necessary services on a co-operative basis, ranging from joint CAD systems, to joint export marketing, overseas design and market intelligence, training, technical and managerial consultancy, joint purchasing of inputs, plus common business facilities such as computers and telex machines. The Italian consortia provide one model, the Swedish export co-operatives or the German export cartels another. What is important is that these services are provided by institutions which are largely financed and managed by the member enterprises.

2. **A Strategic Planning Council.** Currently there is little strategic planning capacity within the Government. This is an essential government function in the context of a programme of restructuring. What is needed is a body with not only a strategic capacity, but the power to co-ordinate the different Ministries and Departments whose work has bearing on a sector, and to implement decisions. We propose that a STRATEGIC PLANNING COUNCIL be established, composed of the relevant Ministers, and including industrialists, trade unions, banks, and the quasi-publics. It should be assisted by a small SECRETARIAT of secondees, and one off work teams brought together to develop sector strategies and produce other policy documents.

3. **The Ministry of Commerce and Industry** should be the key Ministry in government charged with assisting the implementation of the Industrial Strategy, with specific reference to technology, management standards, and industrial approvals. It, too, needs to expand its strategic planning capacity, and to establish itself as a model of modern administration. Proposals are made in the main report to meet these ends.

4. **Development Banking.** One of the key institutions for strategic implementation is an industrial bank with the financial and technical capability for sectoral restructuring and long term finance. The

Cyprus Development Bank has a hands-on ethos, and the basis of a sectoral approach. However, it has lacked the funds to adequately finance its development objectives, and has thus been forced - like development banks elsewhere in the world - to diversify into financial supermarketing as a way of maintaining its position in competition with the commercial banks. It is important that the CDB's role be re-interpreted in the context of industrial restructuring, that it can be adequately financed to fulfill this role and that it can be expanded. Consideration should also be given to the establishment of a second development bank, to be known as the Cyprus Industrial Bank, which would be jointly owned by the main commercial banks on the model of the British 3I's, and financed by the priority funds. Side by side with an expanded and restructured CDB this would provide front line support capacity for the task of sectoral restructuring which lies ahead.

5. Revised Incentives. The current system of tax incentives is geared to investment in hardware. We propose that the system be revised to encourage investment in software - design, marketing, management information systems, training - all of them central to successful flexible specialisation. The review of the existing system should also consider the effectiveness of tax allowances, and the potential benefits which would follow from allocating at least some of the finance through special purpose grant funds.

6. Foreign Investment. We do not believe that flexible specialisation will be carried forward through foreign investment as such, for design intensive or computerised retailing firms tend to substitute license or purchasing contracts for direct ownership. The transfer of technology takes place through different channels in flexible specialisation than it does in import substituting or export oriented mass production. What is important in any contract with an overseas technology supplier is that the Cypriot firm can learn through the contract, rather than being constrained to act as a low margin sub contractor, with little scope for development. There are examples of both types of contract in the clothing industry. Government policy should encourage the former.

7. **Design.** The great majority of Cypriot firms have inadequate design capacity. One remedy can be sought through industrial consortia. A publicly financed Design fund should also be established which encourages individual and joint investment in the hardware and software of design. At the same time, measures need to be taken to encourage a new design culture in Cyprus. To this end we propose the establishment of a CYPRUS COLLEGE OF ART AND DESIGN offering courses to 120 students at any one time, both foundation and post graduate courses, as well as refresher courses for those already working in industry. The College should be the core of a complex which would also include small start up workshops, design facilities for industrial firms and a Cyprus Museum of Contemporary Art and Design. The College, initially at least, should be linked to one or more leading Design Colleges in Europe, and together with the museum should be responsible for encouraging a design culture through exhibitions, annual prizes, work with schools, and visits.

8. **Technology Centres.** To encourage the use of equipment and the provision of information and technical advice, we propose that the government encourage the setting up of a network of technology centres. These would be sited in the premises of industrial consortia, at the Higher Technical Institute or the Cyprus College of Art and Design. They would ordinarily provide common services on the model of the Leather and Footwear Testing Unit at the HTI, together with advice on machine purchase, and technical consultancy. We specifically recommend that the HTI be considered as a site for such units in Food Technology, Footwear and Leather (through an expansion of the current testing unit) and Metal Working, with an accompanying prototype workshop.

9. **Labour and Training** A re-orientation of industrial relations practises, working conditions, and terms of employment is a central requirement of a policy of industrial upgrading. The current pilot schemes on Quality Circles being undertaken by the Cyprus Productivity Centre are of central importance, and should be expanded. A Fund should be established to provide incentives to adopt the new approach, and to contribute to any costs of so doing.

This should include the improvement of the facilities at the workplace, the provision of childcare facilities, and the adoption of health and safety at work codes. Training is equally important, but here the ITA is already operating productively. What is important is to recognise that in the new competition the key asset of a firm is its labour: it is labour which innovates, ensures quality, and permits the flexibility that is at the heart of a just in time system of production.

10. **Management** In spite of extensive training provision through the CPC, and more recently the ITA, the general level of management in Cypriot manufacturing still remains strikingly deficient. This may be partly due to firm size, and partly to generation. Whatever the cause, it is essential that the overall average level of management be raised in the early part of the period of restructuring. To this end we propose the establishment of an Emergency Management Unit in the MCI, staffed by consultants and government counterparts, who will be responsible for establishing model systems in particular firms and promoting a programme of management upgrading. This should be complemented inter alia by a management consultancy fund to be administered by the Cyprus Development Bank which would contribute matching finance for management consultancy services, particularly those aimed at improving management systems.

11. **Industrial Districts.** In a small firm economy, geographical proximity is an important basis for informal co-operation between firms. Although there is a small industrial district in old Nicosia, the majority of Cypriot firms are not clustered by sector. We propose that the MCI in planning its long term strategy for Industrial Estates consider how sector clustering could be encouraged, particularly on the unused section of the Lanarca Free Trade Zone were this to be transferred for use by domestic producers.

12. **Integration of production and retailing.** In the domestic market, firms in the furniture, footwear and clothing sector have

established their own retail outlets. For many this has meant the production of a full product range with resulting inefficiency. It is important that wherever possible firms establish joint outlets or other arrangements which would allow them to specialise, and at the same time develop the necessary systems (including Electronic Point of Sales systems) which would facilitate the rapid adjustment of production to sales in order to minimise stocks. In overseas markets, such co-ordination is more difficult though it should be retained as a long term aid. In the meantime, firms should form consortia to fund the gathering of overseas market intelligence and market representation, in conjunction with the Export Promotion Organisation.

13. **Raw materials and intermediate supplies.** One of the handicaps of Cypriot manufacturers is that they have to draw so large a proportion of their inputs from abroad. The result is large stockholdings, delays, and unpredictable prices. Each sector report commented on the need for domestic investment in key intermediate supplies. Some of it could be undertaken by a consortium of users. In other cases, the Development Bank(s) would be the appropriate initiator(s). We propose that a Strategic Industry Fund be established to finance the difference between the normal market rate of return, and the rate of return in projects which have been recommended by the Strategic Planning Council as desirable for the efficiency of the user industries.

14. **Timing.** The first phase of the Customs Union transition period covers ten years, while increased competition in domestic and overseas markets underlines the urgency of the formulation and implementation of an industrial strategy. To this end we propose an initial four year timetable for the extended revision of the Industrial Strategy, the production of a Technology Strategy and a Cyprus Labour Plan, and for the first round of institutional and

policy changes. The current report is intended to be a first stage in the process of discussion and common agreement which is a necessary component for the successful implementation of a programme of this kind.

The events of 1974 led to a major restructuring of the Cypriot economy. The prospects for Cypriot manufacturing require as profound a change, and a similar common purpose to that which lay behind the reconstruction and growth of the post 1974 period.

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AN INDUSTRIAL STRATEGY FOR CYPRUS

INTRODUCTION

In 1986, for the first time since the immediate aftermath of the events of 1974, manufacturing value added fell. This brought to an end a decade of unparalleled industrial growth. Between 1975 and 1985, real value added of the Cypriot manufacturing industry grew by 137%. Two thirds of this growth occurred between 1975 and 1980, and in spite of a slower and more erratic rate of growth since then, the expansion of Cypriot manufacturing performance has remained a remarkable development performance at a time of slow international growth and de-industrialisation.

During the 1980's a number of studies questioned whether this performance could be sustained. They pointed to the increasing uncertainty of Middle East markets, the lack of competitiveness of non food industrial products in West European markets, the decline of Cypriot wage competitiveness, as well as the continuing low labour productivity, small size, and lack of innovation of Cypriot manufacturing firms. On top of this, the prospect of entry into a Customs Union with the EEC promised - in the words of the most substantial industry study - "no decisive impulses for industrial exports", but rather "heavy competition" for clothing, knitwear and footwear, and negative effects, too, for furniture, paper and paperboard products, and the chemical industry. The industrialists and the employers organisations echoed many of these forecasts and assessments from their own experience. The overall picture has been one of the fragility of much of Cypriot manufacturing. To those reading these numerous, often highly critical studies afresh, the striking thing is how well Cyprus has performed in spite of its weaknesses.

The negative growth in 1986, and the imminent entry into Customs Union has now brought the issue of industrial strategy to a head. Its importance is not merely to be seen in terms of the industrial sector itself, but in relation to the contribution of manufacturing to Cypriot growth as a whole. Between 1975 and 1985, Cypriot real gross domestic product grew by 121%. Although it is too limiting to see this growth as a manufacturing-led growth, and even more so to see it as predominantly led by manufacturing exports, nevertheless, manufacturing has played an important part in overall growth, contributing 18% to the increase of value added over the decade 1975-85. Hence any substantial decline in manufacturing would have a significant impact on the performance of the national economy, not least on employment where manufacturing accounts for 20% of the jobs in the formal economy.

In successive plans, the Cypriot government has resisted any suggestion that manufacturing should be allowed to run down, not least because of the dangers of overdependence on what is seen as a potentially vulnerable, and volatile international service economy. The current fifth emergency plan, like the fourth one just ending, thus sees manufacturing as one of the three priority sectors for the economy, along with agriculture and tourism. An effective strategy for industry has thus become one of the most urgent issues facing the Cyprus economy during the next four year planning period.

Fortunately there has already been substantial discussion and experience of strategic public intervention in support of Cypriot industry during the 1980's. Many of the recommendations of earlier consultancy reports have been and are being put into effect. Policies have been followed to increase capital intensity, encourage larger firms, extend export marketing support, and training provision, provide incentives for foreign investors, and stimulate professional management. Overall - if we are to judge by manufacturing performance - these policies are not yet having the effect required. This may be because it takes time for them to work - this is true in the training field for example. It may be because they have not been adequately implemented, or that some necessary

earlier recommendations have not been implemented at all. Or - learning from those policies which have not worked as much as from those which have - it may be necessary to approach what it generally agreed as a problem - the fragmented industrial structure for example - from another angle, or look for the appropriate point of intervention elsewhere.

The purpose of the current report is to extend previous work on the Cypriot manufacturing industry, and of public policy towards it. This involves the following:

- assessing the overall context of industrial growth and its likely development over the period of the fifth plan (1987-91).
- examining the principle sectors of Cypriot manufacturing - food processing, footwear, clothing, furniture and metal products - to assess their sectoral prospects and the value - if any - of government policies directed at specific sectors.
- considering these sectors in the context of the international competitive developments in those sectors, particularly in Western Europe.
- outlining potential avenues for industrial diversification in particular with respect to knowledge intensive industries.
- in the light of the above, and the experience of industrial policy to date, assessing the direction and instruments of industrial policy as they currently exist, and providing both a framework and detailed proposals for furthering an effective industrial strategy for Cyprus.

- estimating the impact - through the use of a sectorally disaggregated model of the Cyprus economy - of the Customs Union on Cypriot manufacturing, and of alternative policies open to the Cyprus government aimed to improve manufacturing performance.

There are two distinct areas of strategy with which we are concerned. The first is the appropriate industrial strategy for the five principal sectors, considered from an economic point of view. The second is the appropriate administrative strategy for the Cyprus government to pursue in order to make its support for the industrial strategy effective. These two issues are often elided, with the first being given greater emphasis than the second. Success in both areas, however, will be required, if an industrial strategy for Cyprus is to achieve the aims set down for it by the government.

The report is in five parts. The first looks at the factors external to the industry which lay behind its rapid growth, and assesses the prospects for the development of these factors over the next five years. This will provide the context within which Cypriot industry will have to plan.

The second outlines the sector strategic approach to industrial policy, and considers the question of priority sectors and diversification.

The third examines the present state of Cypriot manufacturing, in particular the five main sectors under study.

The fourth analyses the main trends in international competition relevant to Cypriot industry.

The fifth considers existing and potential industrial strategies in the light of the above, and suggests ways in which industrial policies and institutions can be changed and developed in order to implement the recommended strategy most effectively.

I

THE DEVELOPMENT AND PROSPECTS OF MANUFACTURING INDUSTRY IN CYPRUS

There have been three main periods in the development of manufacturing industry in Cyprus in the period since independence. The first was from 1960 up to 1974; the second ran through the second half of the 1970s; and the third through the first half of the 1980s. Current evidence suggests that Cyprus is now at the beginning of a fourth phase.

1.1. 1960-1974

The first period was characterised by an initial modest growth from a low base, with a quickening in pace in the early 1970s. By the end of the 1960s, manufacturing contributed little more than a tenth of GDP, and only a fifth of commodity exports (21% in 1970). Of those manufactured exports the great bulk were processed foods and beverages (78%) or processed raw materials (13%). Processed food and drink, building materials and a variety of light consumer industries made up the bulk of manufacturing output itself (see Table 1).

From 1970 there were signs of an industrial take-off. In the four years 1970-73, manufacturing value-added went up by more than 50%, and there was a growing diversification away from agricultural and primary product processing. New factories were started, new industrial areas developed north of Nicosia and in Famagusta and productivity was rising sharply. Production was still largely geared to the home market (89%).

1.2. 1975-1980

The events of 1974 left 45% of manufacturing capacity - including the new industrial estate - in the Turkish Cypriot part of the economy in the north of the island, outside the control of the Government. Output in the rest of the island dropped proportionately. In 1975 manufacturing value-added in the southern part of the island was 45% down on the 1973 figure for the whole island (see Table 1). Within four years industry was restored. Output (in real terms) and employment in the Greek Cypriot economy exceeded the pre-1974 levels for the whole of Cyprus. During the second half of the 1970s real manufacturing growth averaged over 18% a year.

In the aftermath of the events of 1974 the government adopted what in the development literature would be called a 'big push' programme of economic reconstruction. Its main features were the following:

- a programme of emergency housing for the refugees.

- a social security programme which guaranteed a minimum income for all adults, a decision which - in the light of initial unemployment levels of 40% and reduced productive capacity - involved one third of the government budget being directed to social security.

- a programme to encourage labour-intensive manufacturing, through:
 - the setting up of a capital fund for priority sectors, which required the commercial banks to allocate a proportion of their deposits to a fund which could only be lent to priority sectors.

- the provision of government guarantees.
- the continuation of a 9% ceiling on interest rates
- the introduction of a regime of tax incentives, notably large depreciation allowances.
- capital programmes and allowances to encourage two other priority sectors: basic infrastructure, and tourism (80% of hotel accommodation had been in the North), as well as incentive schemes to encourage business services (consultancy, legal and accountancy services).
- a strategy of government deficit financing, with supporting foreign aid, to provide funds for the programme as a whole.

The action to expand manufacturing capacity meant that the consumer boom was largely met by domestic production. Although private final consumption doubled in real terms between 1975 and 1980, the ratio of imports to final consumption was the same, 24% (Table 16).

In part, the success of domestic manufacturing can be explained by protection, which had been traditionally high. In part, it was due to the direct stimulus to domestic producers provided by the construction programme. During this period the government built 20,000 emergency dwellings. This provided a secure demand for building materials - from cement, to wood, roofing materials, a multitude of metal fixtures, as well as tiles. The rapid growth of non-metallic mineral products, as well as metal manufacture, can be largely explained in terms of the building boom. In addition, each house had to be furnished. Bulk orders were placed for chairs, tables and beds - and as with the building materials - orders were distributed in order to encourage the expansion of many firms, and

not merely the largest. Public sector purchasing policy played a critical part in manufacturing expansion at this time.

The construction firms also became the centre of a number of new economic networks. Being involved in not only housing but also hotel and office construction, some of them set up their own furniture firms (the Lordos group, for example). Others developed long term relationships with particular domestic suppliers, and a number of furniture firms became specialists in the furnishing of hotels - providing furniture, fittings, curtains and a measure of interior design.

The importance of the construction boom in the overall development of the economy in the second half of the 1970s is clear from Table 3. It contributed around a quarter of GDP growth in 1977 and 1978, and its influence was wider - stimulating not only the high rates of growth in the building materials and furniture sectors in manufacturing (Table 2), but also the sharp increase in rents and property values reflected in the growth of real estate (Table 3).

The construction industry also played an important part in the expansion to Middle East markets, which had taken off after the oil price rise in 1973. A number of Cypriot construction firms obtained large contracts for building military installations, ports, road, airports and housing. Firms like J&P - bankrupt by the events of 1974 - became systemic planners of a whole Cypriot sub-contract economy, of technical services, and supervisory labour, which was used to design and carry through these contracts. In 1976 some 12,000 Cypriots were working abroad in Greece and the Middle East, many of them linked to Cypriot construction projects. Not only were their remittances an important part of the economy's foreign exchange earnings, but they, like the unskilled Asian workers on the construction sites, also formed a market for the export of Cypriot consumer goods.

The construction contract network provided an informal channel which allowed Cypriot manufacturers to respond rapidly to the growing Middle Eastern demand for clothing and footwear. There were cases of construction companies being asked for introductions to Cypriot manufacturers of substance. Through these and other means, Cypriot manufacturing exports to the Middle East took off. Between 1973 and 1976 the value of exports from Cyprus to the Arab countries rose ten fold - from C£5m to C£49m in three years. By 1980 they had risen further to C£92m, of which 90% were manufactured goods, mainly clothing and footwear (Tables 10 and 11).

The remarkable growth of Cyprus' Middle East market has led some economists to talk of an export-led boom. Certainly for the shoes and garment sector this is an accurate picture. Two thirds of its increased output went to export, primarily to the Middle East. For manufacturing as a whole some 35% of the increased output in real terms went to exports, 70% of it to the Middle East. Industrial products destined for the Middle East alone accounted for more than a fifth (22%) of the increase in manufacturing output between 1975 and 1980. Whether or not we call this an export led boom is immaterial. If by using such a phrase we are led to underestimate the importance of the home market then it is misleading. On the other hand, exports clearly made a major contribution to growth, both in certain sectors and in certain years (Table 5).

One significant part of the Middle East market where exports were not directly linked to the oil price rise was the Lebanon. The eruption of the war there took place at the same time as the oil price rise and the events in Cyprus. One result was a disruption of domestic production, and Cyprus was in a good position to fill some of the gaps. Cypriot exports to the Lebanon rose from a level of around C£1m in the early 1970s to C£18m in 1976 (or 17% of total exports) (Table 10). A second consequence was the emigration to Cyprus of significant numbers of Lebanese entrepreneurs, especially traders and bankers.

Thirdly, and alongside the exodus of Lebanese, part of the function that the Lebanon had performed as a regional services centre was displaced to Cyprus. The fourfold increase in the volume of re-exports between 1975 and 1980 (Table 6) in part reflects this, the doubling of employment in the business services sector likewise. Just as the growth of South Korea cannot be understood without recognising its role as an industrial supply platform for the war in Vietnam, so the Middle East war has had its effect on the economic growth of Cyprus.

In summary we can see the second half of the 1970s in Cyprus as marked by sharp increases in demand, internal as well as external, which acted as a strong pull factor for industrial expansion. On the supply side the existence of a nucleus of industrialists who had established themselves before 1974 was important, even where they had lost their assets as the result of the events of that year. The government - which played such a central role in the provision of housing for refugees and the sustaining of internal demand - limited its action on the industrial supply side largely to the creation of favourable conditions for private capital growth - cheap loans, public guarantees, an advantageous tax regime, and protection of final goods from foreign competition in the domestic market.

As far as other productive factors were concerned, the increase of exports and the inflow of foreign aid and emigrants' remittances allowed the necessary technology (mainly machinery) to be imported from abroad. With respect to labour, between 1974 and 1977 there was a substantial surplus of the semi and unskilled labour required for the expanding light industries. For two years the unions had accepted a 20% cut in wages as part of the reconstruction effort, while the record of industrial disputes remained low until the end of the decade. The result was a period of high profitability and re-investment. In 1976 the proportion of income going to capital was 47%. In 1980 it had fallen to 39% but this was still much higher than comparable figures for Western European economies.

Much of this was re-invested. Gross capital formation averaged 33% of GDP between 1976 and 1980. In manufacturing the figure was lower, averaging 23% of manufacturing GDP over this period, with metals, chemicals and non metallic minerals all showing higher rates, and food processing (16%), textiles, clothing and leather (14%) and wood and furniture (11%) much lower ones. For these industries, expansion was extensive rather than intensive. Employment expanded only a little more slowly than real value added (40% as against 49% between 1976 and 1980), with value added per worker rising by only 1.5% per year. This was as planned. Light manufacturing had been encouraged precisely because of its labour intensity and its capacity to contribute to the return to full employment. Once full employment was achieved, however, labour supply began to become an issue, with the rate of increase of average rates of pay and the share of wages and salaries in manufacturing GDP rising by the end of the decade.

While demand was strong and profitability buoyant, problems on the supply side acted as a break on the rate of expansion rather than a threat to expansion itself. Already by 1979 manufacturing was facing raw material shortages, higher fuel costs, a tighter labour market, and in some cases capacity constraints. By 1980 it was recording much sharper competition in export markets as well.

1.3. 1980-1985

During the first half of the 1980s, a number of the factors which had contributed to the boom became markedly weaker:

- a) domestic manufactured exports - in spite of a good year in 1984 - had actually declined by 10% in real terms in 1986 by comparison to 1980.
- b) the once-and-for-all effect of the rehousing and re-equipping the 160,000 refugees from the North was weaker in the early

1980s, the level of dwellings completed falling sharply after 1983.

- c) as a result, there was a sharp downturn in the construction industry - with construction registering negative growth in four of the five years between 1982 and 1985 (Table 3).
- d) the growth of final consumption which had been running at an average of 10% a year between 1975 and 1980, fell to an average of 5% a year between 1980 and 1985.

Set against this were a number of newer growth areas. First and foremost was the expansion of tourism. To some extent tourism did for manufacturing in the 1980s what the refugee programme had done for it in the 1970s. While there had already been an earlier growth in tourism (the number of arrivals doubled between 1976 and 1980 to 353,000) the pace of expansion accelerated even more in the next six years (with 550,000 more arrivals in 1986 than in 1980). From 12,800 licensed beds in 1980 the number expanded to 31,300 in 1986. If unlicensed accommodation is added the total number of beds has risen to over 50,000. Expenditure also increased from (in 1981 prices) C£213m in 1976, to C£720m in 1980, to C£256m in 1986.

The impact on manufacturing was in part direct. The hotels required concrete, wood and numerous forms of metal for their construction. They needed tiles, and fittings, and they needed to be furnished. Some of this material had to be imported - air conditioning equipment for example. A number of hotels imported their furniture and fabrics, too, notably from Italy. But it is striking how even the 3-5 star hotels were often fitted out by Cypriot manufacturers, including one furniture maker who specialised in copying Italian designs.

There were also direct purchases by the hotel and catering industry to provide for tourists. Table 18 shows that in 1984 the industry spent C£47m in direct production costs, the greater part of it on food and beverages. No data exists on the breakdown of these purchases between domestic production and imports. The hotel managers we talked to indicated that they purchased the following from the domestic market: beverages, juices, fresh vegetables, bread and cakes, processed meats and for the most part, jams. Beef and lamb were often imported, as were cheeses, butter, some fish, frozen vegetables and small quantities of specialist wines and spirits. The smaller the establishment, the lower the import content is likely to be. If we assume the same import propensity of 17% as holds for final private consumption of these products in the economy as a whole, then hotel and catering spending on Cyprus raw and processed products would be C£24.8m, or about 10% of total consumption of Cypriot primary and processed output in the food and beverages sector. For many processing sub-sectors the proportion would be considerably higher.

Thirdly there is the indirect effects of tourists' shopping expenditure. The most up to date estimates we have for this are for 1981, when it was estimated that 21% of tourists' spending went on shopping. If that is applied to the 814,000 tourists who visited Cyprus in 1985, and spent an estimated C£284 per person, then this represents C£49m spending in shops, some of it on clothing, footwear and leather goods, whose overall sales in the domestic market in 1985 were C£73m. A number of firms we visited in this sector confirmed the importance of tourist demand, one indicating that 40% of his Limmasol sales were to tourists, while others ranged from 5-30%. Without more detailed survey information we can be no more precise at this moment, other than to register the significance of tourist spending for sectors such as this, as well as wine and jewellery.

Overall, we can put an order of magnitude on tourist spending and its significance. Table 17 presents figures for total private consumption in Cyprus, and the proportion represented by non-resident households. The latter includes spending by foreign military and

United Nations personnel, diplomats and tourists. At the end of the 1970s non-resident consumption accounted for 13% of total private consumption. By 1984 this had risen to 26%. Between 1980 and 1984, whereas Cypriots' final consumption grew by 28% in real terms (7% p.a. on average), non-residents' consumption grew by 91% or by an average of 23% per annum. Of the overall increase in private consumption during those years, no less than 43% was accounted for by non-residents' demand. Of the latter tourists were responsible for nine tenths, or 38% of the real increase in total private consumer spending. Thus, while the markets abroad for Cypriot products were falling, this was made up for by the spending of foreign residents in Cyprus. This is the central fact about the demand for Cypriot manufacturers in the 1980s.

Two further developments had less significance for manufacturing. The first was the rise of re-exports, reflecting the continuing war in the Lebanon. In real terms they expanded by 95% between 1980 and 1986, rising from 16% of total exports in 1980 to 30% in 1986 (see Table 6) This has tended to mask the decline faced by Cyprus in the export markets for its domestically manufactured products, without providing any significant stimulation to domestic manufacture save in potential transport and trading economies.

The second is the expansion of offshore companies and the development of an Industrial Free Zone. By January 1987, there were 4,095 offshore companies registered in Cyprus, the majority of them brass plate companies. There were records of 560 of them having established local offices, spending C£18.7m a year in Cyprus, with brass plates accounting for another C£6m and non resident shipping companies (more than 1,000 active ones) accounting for a further C£3m.

Overall the offshore sector is now estimated to inject C£35m into the Cyprus economy - a significant boost for the business services sector which had gross output of C£30m in 1984. Its growth is one reflection of the displacement of the Lebanon's regional business

service function to Cyprus - half the active offshore companies being Arab owned, the majority of them Lebanese. However, their impact on manufacturing is minimal. Of the C£18.7m local expenditure, only C£2.5m is on fixed assets and C£1m on paper and printing. The remainder was spent on a variety of services, wages, taxes and fees.

The Lanarca Free Trade Zone on the other hand was specifically directed at manufacturing. It was created on the basis of a 1975 law, amended in 1981, and was intended to be an export processing zone on the model of those operating in the Far East, or Ireland. It was not until 1985 that the first factory started operation, and by early 1987 there were nine factories operating there, employing 100 workers. They included the Japanese company YKK, one of the world's leading zip manufacturers, a bakery machine company, a reproduction furniture company, a Lebanese manufacturer of high quality chocolates, a printing machinery producer and a Yemeni producer of non-alcoholic perfume for the Islamic world. With less than 0.25% of manufacturing employment, the zone is as yet of minor importance.

In summary, the significant new boost to manufacturing during the 1980s came from the growth of tourism. In addition a number of the original conditions of the 1970s boom remained, notably government deficit financing to sustain internal domestic demand, and high rates of protection (in a number of cases the tariffs had been increased). This ensured that the end of export growth did not leave manufacturing becalmed. It did mean that it was now centrally dependent on the growth of tourism, the maintenance of protection, and the overall growth of the Cypriot economy. The first two of these held through into 1986. Domestic growth, however, though fluctuating, ran at a considerably lower level in the 1980s than in the second half of the 1970s and in 1986 showed its lowest rate of increase for a decade. The results were reflected in the declining growth of private consumption - which had averaged 10% p.a. between 1975 and 1980, fell to an average of 5% p.a. between 1981 and 1985, and to 1.8% in 1986. It was in 1986 that manufacturing showed a negative growth rate for the first time since 1975.

The forces of demand that had pulled Cypriot manufacturing to its feet in the 1970s had therefore changed, declined in strength but not disappeared by the mid 1980s. The slower rate of growth that resulted caused attention to be switched to the supply side, and the extent to which the fall off in industrial performance was due to rising costs and declining competitiveness.

Labour continued to be in short supply, in spite of a 10% increase in the employed population in Cyprus between 1980 and 1984, and a similar increase in manufacturing employment. Real average earnings in manufacturing rose by 23.5% during this period, higher than the rate of growth of productivity, but lower than the average earnings rise for the economy (26.3%). Studies of unit labour costs in manufacturing indicate a worsening competitiveness relative to Spain, Korea and the EEC, but an improvement with respect to Portugal and Greece.

Other than labour, supply conditions remained similar to those in the 1970s: the interest rate was still pegged at 9% (though rising in real terms as inflation fell), government incentives were maintained and in some cases improved, restrictions were rarely enforced against the import of capital goods, and the commercial banks priority funds continued.

In export markets manufacturers reported increased competition from the Far East, particularly in the Arab countries. Yet by and large the evidence does not suggest that a major cause of the slow down of manufacturing growth has been a loss of Cypriot market share. In the home market, imports as a proportion of final consumption reached a record 29% in 1982, but fell back to 25% in 1984 (Table 16). In the clothing sector, the proportion of imports in domestic consumption was at the same level (17%) in 1984 as in 1980. Imports as a whole fell back from 33% of aggregate demand in 1984 to 30% in 1985, and 26% in 1986.

Overseas there is a similar picture. In the critical Middle East markets, notably the three most significant ones for Cyprus (Saudi Arabia, Libya and Lebanon) the Cypriot share in total imports held up or actually rose after 1982, (Table 12). The central fact in the main oil producing markets was the decline in the oil price and the consequent reduction of imports. Table 14 shows that Saudi Arabia's imports fell by 70% in current prices between 1982 and 1985, Libya's by 63%, Lebanon's by 59%, and Kuwait's by 42%. At the level of individual products, the effects of sharpening low wage, high volume competition may well be evident. Clothing exports to Saudi Arabia, for example, fell 69% between 1982 and 1985, but the losses were outweighed by large increases to North Yemen, Egypt and Libya. In footwear, volumes increased to Saudi Arabia, North Yemen, Dubai and Egypt, even though the margins may have been squeezed.

The important point to note is that declining market share does not appear to be at the heart of the slow down of Cypriot manufacturing growth. The fortunes of Cypriot manufacturing in the first half of the 1980s, as in the second half of the 1970s, were largely determined by changes in the volume and pattern of demand, both at home and abroad.

1.4. Prospects: 1987-91

The prospects for Cypriot manufacturing depend principally on the following factors:

- a) developments in the Middle East markets.
- b) the continued growth of tourism.
- c) the overall growth prospects of the Cyprus economy and Government policy towards it.

1.4.1. The Middle East

In 1985, domestic manufacturing exports amounted to C£150m, 61% of which went to the Arab countries. The 1986 figures are likely to be significantly lower because of the fall of the oil price from \$27 a barrel in 1985 to \$10 a barrel in 1986. Since then it has recovered to \$18 p.b., though at the cost of reduced output. Although another major oil price rise could take place, the events of the 1980s have encouraged many Arab countries to cut their public budgets, and re-orient them towards internal development. The Saudi Arabian Fourth Plan, for example, places greater emphasis on the development of domestic manufacture (in addition to petrochemical production). Libya has cut its planned budget sharply. Kuwait has a commitment to expand manufacturing, and introduced a new system of industrial protection in August 1985. In Oman, manufacturing grew at an annual rate of 31% between 1980 and 1984, and the expansion of light industry is a central feature of the 1986-90 development plan. Qatar similarly aims to diversify its industry from the heavy petrochemical steel and cement sectors, to medium and light industry.

Thus, while there is likely to be a recovery in the overall level of Middle East demand relative to 1986, the prospects are that overall levels of import demand are unlikely to reach those of the early 1980s in real terms by the end of the decade. In addition, Cyprus manufacturers are likely to face increasing competition from protected domestic industries as well as other foreign suppliers.

There is a further important fact, however, with respect to the Middle East markets. It is that they are still very large and that Cyprus has only a tiny share of them, even for those products which have been most successful there. Table 12 shows that even in the Lebanon, Cypriot exports counted for only 2% of total Lebanese imports in 1985. In Libya during the good year of 1984 the figure was only 1% and for Saudi Arabia in all years since 1979 it has been less than two thousandths. Table 13 presents a more detailed breakdown of Saudi Arabian imports from Cyprus by product. Only biscuits, cakes,

cheese, potatoes and grapes showed more than a 1% share in 1985, with potatoes highest at 3.7% Cypriot clothing - where it had any presence at all - made up a maximum of 4 thousandths of the Saudi market, completely dwarfed by imports from the Far East. What this table also makes clear is that the principal competition is not merely from the Far East. Only in some food products are third world countries among the two major suppliers. For the rest, in food, wood, and metal products it is advanced industrial countries who dominate.

Hence, while Middle East markets cannot be expected to 'pull' Cyprus industry forward in the next four years, the overall downturn and the volatility of these markets are not on their own sufficient cause for either Cypriot industry or the Cypriot Government to abandon the Middle East from their central strategic focus. The increased concern for quality which has been a feature of some of these markets (notably Saudi Arabia) parallels longer term changes in European markets, but in no way constitutes a reason for switching out of the Middle East into Europe. European markets for Cypriot manufactured goods have themselves been falling (in money terms as well as in constant values), and are in general even more demanding than those of the Middle East. What will be required in both cases is less a switch in region, or in sectors, but in the strategic direction of existing sectors.

1.4.2. Tourism

The expansion of tourist income since 1980 has been, like industrial growth in the 1970s, extensive rather than intensive, that is to say it has come from an increase in the number of tourists rather than in the amount spent per tourist. In 1986 the average tourist spent 10% less in real terms than in 1983. The strategy of the Cyprus Tourism Organisation, confirmed in the Fifth Emergency Plan, is to upgrade tourism and increase real spending per tourist as a result. Present evidence is that the trend is going the other way, and that it is

unlikely that any marked increase in the average per capita spending will take place by the end of the decade.

The major question is then one of numbers (bed-nights), and how far the increases of the 1980s can be sustained. The CTO assumed a 6% per annum increase in numbers as against an annual average of 18% between 1977 and 1985. In absolute terms this means a rise of 313,000 to 1,127,000 between 1985 and 1991, compared with a rise of 564,000 between 1980 and 1985. The feasibility and advisability of the CTO target has been questioned on a number of grounds: a slowdown in the growth of short haul international travel; saturation of existing tourist centres in Cyprus, with the exception of the west coast; water shortages; labour constraints; and a medium term limit on bed capacity to an estimated 1,040,000 visitors. If this is the medium term limit, then the growth of tourist numbers to 1991 would be less than half of that - in absolute numbers - which occurred in the first half of the 1980s. With 1986 arrivals up to 900,000, it seems likely that this limit will be exceeded. But the constraints to expansion are real, and, together with the decline in real spending per tourist, they imply a substantial medium term weakening in the external contribution to internal manufacturing demand, with an even more severe dampening of expansion in the 1990s.

1.4.3. Overall growth prospects of the Cypriot economy

In 1986 real GDP grew at 3.2%, the lowest rate since 1975, though still above national growth rates for many European countries. A number of factors which have contributed to earlier high rates of growth are now weaker, and are likely to remain so in the foreseeable future: construction, exports, and traditional manufacturing itself. Tourism, though positive, will be less dynamic than previously.

Set against this is Cyprus' continuing role as a regional services centre. The growth of the offshore companies is one reflection of this. The directors of the offshore companies include substantial

numbers of business managers and accountants as well as journalists, the last reflecting the fact that Cyprus has become a regional news centre, specialising on the Middle East. A number of multinationals have moved their regional offices to Cyprus (NCR, Johnson Wax and Pepsi Cola for example), while others organise their principal regional Middle East meetings in Cyprus. The growth of the business service sector - from 1,411 employees in 1976 to 4,305 in 1985 (nearly 10% of manufacturing employment) - must also be understood in part within the regional context. The Cypriot construction firms serving the Middle East have been of particular significance in this regard, though they have recently been severely hit by the downturn in Middle East capital projects. Similarly the growth of re-exports - with a spin off in terms of trading employment and transport value added - is another side of the regional role of the Cypriot economy.

Apart from the offshore companies, it is difficult to give precise estimates on the growth rates and quantitative economic significance of these regional functions. One partial measure is the increase in international telecommunications: the number of international call minutes went up from 5.4 million in 1976 to 12.2 million in 1980 and to 24 million in 1984, with telex traffic growing at a similar rate. Like airport traffic and shipping tonnage, these figures also reflect developments in the tourist industry on the one hand, and domestic commodity imports and exports on the other. All we need to register at this point, however, is the macro significance of these parts of the economy. Communications, transport and business services all grew faster (in real terms) between 1980 and 1984 than they did between 1976 and 1980. Together they accounted for 22% of the increase in GDP in the marketed sector between 1980 and 1984. Growth in finance and insurance, in trade, and in non-residential real estate (including offices as well as hotels and shops) accounted for a further 37% of the increase between 1980 and 1984, and have some element of Cyprus' regional role contained within them.

They also reflect internal development processes within Cyprus itself. Commercialisation, urbanisation, and 'motorisation' all provide a sharp developmental impetus, which has not yet run its

course. The growth of retailing and finance has been slower in the 1980s than in the 1970s, but was still significant, trade and finance together contributing 25% of the growth of market sector GDP between 1980 and 1984. The effects of urbanisation are shown in construction, real estate, and expenditure on furniture and other household goods. While construction growth was negative in the 1980s, both furniture and owner-occupied real estate continued to rise (the latter by 25% between 1980 and 1984, contributing 7% of all GDP market sector growth). The growth of motor vehicles has also been sustained, their numbers doubling between 1977 and 1984, with a 24% increase in real consumer spending on personal transport equipment between 1980 and 1984, and complementary increases in road construction. Given the slow down in various internationally traded activities, it is important to note the continuing internal developmental dynamic within Cyprus.

With the exception of construction, public works, furniture, and a small amount of metal 'servicing' production around transport, the bulk of the internal developments, and of regional service activity has had little direct impact on manufacturing. Their main significance is indirect, via employment and the overall level of growth. They represent the material dynamic which underlie the various changes in the financial aggregates of macro economic analysis.

The financial aggregates themselves may act as constraints on potential growth. Three macro economic issues are of particular concern at the moment:

- a) the balance of payments. Cyprus has had a growing trade imbalance, which in 1986 amounted to 171% of exports. This imbalance has been covered partly by a positive balance of the invisible account, and partly by capital inflows (see Table 4). On the invisible account, tourism is the key growth item, though invisible payments were also rising, notably interest payments on foreign debts whose C£39 million increase between

1980 and 1984 was 45% of the increase in all domestic exports over this period. On the capital account, government borrowing has been increasing during the 1980s reaching C£97 million or 41% of domestic export receipts in 1984.

Short term forecasts as of early 1987 suggest:

- a small upturn in the low 1986 level of exports, due to a rise in manufacturing exports.
- a sharp increase in the value of imports reflecting volume and import price rises.
- a continued increase in tourist earnings, but with lower rates of growth.
- reduced emigrants remittances reflecting depressed conditions in the Middle East.
- increased payments for service imports, mainly freight and insurance payments rising in parallel with the import of goods.
- an increased capital outflow
- a cut in Government foreign borrowing, following government commitments to finance its borrowing domestically.

- a continued depreciation of the Cypriot pound against a basket of currencies of Cyprus' major trading partners.

The Government has some leeway, in that although external debt is some 40% of GDP, comparable to the levels of Brazil and South Korea, the debt servicing ratio in 1986 was relatively modest at 13%. Nevertheless, for the medium term, a decrease in tourist earnings would have an immediate balance of payments effect as would a significant increase in private consumers' propensity to import. Critical to the outcome will be the extent to which Cyprus' role as a regional centre will encourage invisible earnings and private capital inflow sufficient to offset a worsening trade balance and slower growing tourist receipts. The probability is that by the end of the 1980s the balance of payments will for the first time be a constraint on Cypriot growth, with the performance of manufacturing in export and domestic markets being one of the key variables determining the severity of the constraint.

- b) the Government resource gap. There has been growing pressure on the Government to reduce its deficit, which averaged 7% of GDP during 1983-5. In both 1985 and 1986 there was a positive current balance, while capital spending was financed principally by domestic borrowing (1985) and foreign borrowing (1986). Between 1984 and 1986 the overall balance as a proportion of GDP fell from 5.6% to 3.7%. Difficulties on the balance of payments may increase the pressure on the Government to cut back, and thus affect the level of internal demand. For the immediate future, however, it appears that the Government will continue its policy of sustaining the expansion of the overall level of demand.
- c) the increase in private credit. During 1986 the private banks expanded credit by an estimated £100m against a Government target of £60m, largely through an expansion of consumer credit and hire purchase. Private consumption nevertheless increased

in real terms by only 1.8% in 1986 (as against 4.6% in 1985) in part because of an increase in the savings ratio.

In conclusion, therefore, there are still dynamic forces stimulating growth in Cyprus, though not at the rate of the last decade. Most of them have little direct impact on manufacturing, save through the construction industry and the private consumption of those whom they employ. We may expect growth to continue at existing modest rates through to 1991, subject to possible balance of payments constraints, with private consumption running in line with growth.

1.4.4. Growth Prospects and the Simulation Model

As part of the mission's terms of reference, we were asked to develop a simulation model which would relate the manufacturing study to changes in the macro economy. In spite of the limitations of the data and the model assumptions - which renders it inappropriate for precise quantitative forecasting - the model does effectively highlight some of the structural elements of the Cypriot economy which are significant for long term growth.

In particular what the model highlights is:

- the central role of demand in providing the dynamic to Cypriot growth.
- the sensitivity of the growth forecasts to projected changes in tourist expenditure
- the major impact of changes in the terms of trade on a small, open economy like that of Cyprus.

- the limited impact of wage reductions on the growth rate, in part because of the consequent dampening of internal demand, in part because a lower wage rate increases employment and leaves the aggregate wage bill much the same.

For the period between 1984 and 1986, there was in fact a 6% improvement of the terms of trade, principally because of the fall in oil prices. The windfall gain to Cyprus was largely passed on to workers, and although the private savings rate increased, higher wages did expand internal demand. When added to the rise in tourist spending, this offset the fall in fixed investment and exports, and helped maintain growth at a rate above 3%.

The oil price, however, is likely to rise - if not to its early 1980's level. Tourist spending, too, is due to slow down. If exports and private investment also remained depressed - the latter reflecting declining profitability - then government action will be required to maintain growth in the range of 3-4% per annum.

The model shows how this might be done, by increased public investment, transfer payments and Government consumption. The result, as might be expected, is a worsening of the Balance of Payments and an increase in foreign capital inflow.

If the Government wishes to avoid such a deterioration, it will have to settle for a lower growth rate, or attempt to increase tourist spending. The latter may be possible in the short run - for tourist numbers still appear to be buoyant. The medium-term question remain, however, of the number of bed spaces in peak periods, occupancy rates, the island's 'leisure capacity', and the labour constraint.

The manufacturing sector is unlikely to be able to act as a source of renewed dynamism in the short and medium run. Import penetration of key consumer goods has been gradually increasing, and exports of the

two main subsectors - clothing and footwear - are likely to remain static, according to the model.

1.4.5. Summary of prospects

The fourth phase of Cypriot manufacturing development is therefore liable to be distinguished by the following:

- declining rates of growth - and in some instances absolute declines - in a number of key markets, at home and abroad.
- for the first time a significant loss of market share in the home market as the result of the cut in protection, and potentially in the Middle East markets as well.
- for the first time a sustained tightening of Government capacity to maintain levels of internal spending by the end of the decade, together with the first signs of balance of payments problems.
- a decoupling of the growth sectors of the economy (the role of Cyprus as a regional service economy) from manufacturing.
- a period of static or negative growth for manufacturing.

These are the tendencies. How quickly they come about is not certain. Events in the Middle East, and the movement in oil prices will have a bearing on the immediate prospects of Cypriot industrialists. What seems likely is that Cypriot manufacturers will face increasing pressure from competitors and that dynamic market growth will not pull them through.

1.5 Summary and conclusion

This chapter has analysed four stages in the development of Cypriot manufacturing. The main characteristics are presented in the accompanying chart, and can be summarised as follows:

- the first phase, 1960-74 was characterised by:
 - the predominance of primary product and raw material processing.
 - production geared to home market (87% of output).
 - exports principally to Western Europe
 - acceleration of growth in the early 1970s with development of consumer and construction related light industries.
- the second phase, 1975-80:
 - rapid recovery from effects of partition, with average real growth rates of 14% over the period.
 - the main factors behind this growth were:
 - the resettlement of the refugees from the North

- the government emergency programme to restore industrial consumption

- the oil price rise and its impact on Middle East demand

- the civil war in the Lebanon.

- exports, principally clothing and footwear for the Middle East, accounted for 35% of output growth.

- in the internal market the construction boom, centred on the Government's rehousing programme played a central coordinating role for the revival and expansion of manufacturing.

- growth was extensive rather than intensive, with employment expanding in line with the growth in value added.

- profitability was high, and real investment rose to a level of 23% of value added in the late 1970s.

- by the end of the period supply constraints were beginning to limit the pace of growth.

- the great bulk of the growth was in consumer goods and construction-related industries.

- manufacturing was a central engine in domestic

expansion, contributing an annual average of 19% to national growth during the period.

- the third phase, 1980-1985:
 - manufacturing growth fell to an annual average of 4%
 - the real value of manufacturing exports fell in absolute terms by the end of the period.
 - construction activity and the rate of growth of Cypriot final consumption both declined, lowering the growth of indigenous domestic demand.
 - tourism replaced exports as the sector of dynamic demand for manufacturing. Of the growth of overall final consumption in Cyprus during the period, 43% was accounted for by non-resident demand, 90% of which was that of tourists.
 - growth continued to be largely extensive, though with a small upward trend in value added per worker.
 - profit margins fell, as did the share of manufacturing profits in value added from the high levels of the 1970s, as well as the level of investment.
 - by the latter part of the period (1983-85)

manufacturing was contributing less than 10% to the overall growth of the national economy.

- the fourth phase, 1986-91:
 - in 1986 manufacturing experienced negative growth for the first time in a decade.
 - the prospects are that this period will be one of zero or negative manufacturing growth for the following reasons:
 - continued lower level of Middle East demand.
 - slower growth of tourism and indigenous consumer spending in the domestic market.
 - loss of market share in the domestic market, with increased quality demand and consumer durable imports;
 - potential loss of market share in the Middle East as a result of import substitution, international competition, and quality demands by the Arab market.
 - inability of Cyprus government to offset falling rates of growth of private consumption and domestic market share by deficit financing, because of potential balance of payments constraints.

- the growth sectors of the economy - business services, offshore investment and transportation, will provide little direct stimulus to manufacturing.

- profitability and investment are liable to remain depressed.

- manufacturing employment is likely to fall, as growth stops, and productivity increases.

The above phases are not water-tight compartments. Tourism was growing in the 1970s, just as exports could still make a significant contribution to sales as in 1984. Nevertheless the pattern is clear. Cypriot industry had established its foundation before 1974. Without that the demand-led boom of the post partition period would not have been possible. The growth of the first half of the 1980s was slower, but belied some of the warnings issued by those who had surveyed the supply side of the industry, and questioned its competitiveness. In the event, Cypriot manufacturing broadly sustained its market shares at home and abroad, and its fortunes were determined more by shifts in the overall level of demand (downwards in the Middle East, upwards in the tourist sector) rather than losses in market share.

By 1986, however, it appears that competition was eating into home and overseas markets. This marks an important turning point for industry and government. For a decade, the key issue for both had been how to meet the expanding demand. Concern had been expressed about competitiveness, but only now has it become of necessity the central issue.

To a problematic future has now been added a further factor. In May 1987 the Government came to a provisional agreement with the EEC on the formation of a customs union. As of June 1987, the agreement

awaits approval by Parliament, but its terms are now by and large settled. The main beneficiaries of the Customs Union will be agricultural producers. With policies as they presently stand, the main problems are liable to be faced by industrial firms, for Cypriot manufacturing goods have had effectively free access to the Community since 1978 and are now being called on to remove the protection they have enjoyed against manufactured imports from the EEC. To the slower growth of internal markets, and the collapse of Middle East demand, is now to be added additional competitive pressure from the EEC. The direction, intensity and timing of that pressure is the subject of the next chapter.

Figure 1

Cypriot manufacturing: phases of development

	I	II	III	IV
Growth factors	1960-74	1975-80	1980-85	1986-91
Primary product processing	expanding	slow growth	slow growth	potential expansion
Domestic demand:	expanding	strong	less strong	weaker
construction and resettlement programme		strong	declined	
local consumer demand	modest growth	strong	significant	shift to durables
tourism	starting	developing	strong	growth slower
government deficit financing	strong	strong	weaker	weak
protection	high	higher	higher	potential reduction
International demand:				
Middle East exports	insignificant	strong	static	falling
EEC demand	modest	modest	static	static
regional service centre function		modest	growing	strong
Free Trade Zone			starting	limited expansion

Table 1
Sectoral growth in manufacturing 1968-75
constant 1980 prices

	1968	1973	1975	Change 73-5 %
Food drink and tobacco	21.0	34.3	19.0	- 45
Textiles, clothing, footwear and leather	10.8	20.7	13.3	- 35
Wood and furniture	4.1	9.3	4.1	- 56
Metal products and machinery	9.3	24.7	9.2	- 63
Paper and publishing	3.1	6.0	3.9	- 36
Chemicals, rubber and petroleum	2.6	10.0	6.0	- 40
Non metallic Minerals	7.1	11.8	8.0	- 34
Total	59.5	118.8	65.2	- 45

Source: Statistical Abstract
Economic Report

Table 2

Sectoral growth in manufacturing 1976-84
constant 1980 prices

	Value Added			Percentage Change		
	1976	1980	1984	76-80	80-84	76-84
Food, drink and tobacco	29.3	36.6	46.1	25	26	57
Textiles, clothing, footwear and leather	19.3	31.2	35.4	62	13	83
Wood and furniture	6.4	12.0	17.7	88	48	177
Metal products and machinery	7.0	15.2	18.8	117	24	169
Paper and publishing	5.3	8.6	9.5	62	10	79
Chemicals, rubber and petroleum	9.6	10.7	16.7	11	56	74
Non metallic minerals	8.4	14.7	11.2	75	-24	33
Total	89.0	132.2	159.7	49	21	79

Note: Table 2 is not exactly comparable to Table 1 because of changing sectoral definitions.

Source: Economic Report

Table 3

Sectoral contributions to growth 1976-86
(GDP at constant market prices)
% of growth by sector

	Agric.	Man.	Const.	Trade & Hotels	Trans. & Comm.	Finance & real estate	All growth in 1980 prices. Cfmillion
1976	8	21	14	25	10	11	85.0
1977	-	18	23	22	7	14	76.0
1978	- 5	17	28	15	11	18	51.3
1979	4	17	19	30	1	19	64.0
1980	10	24	8	19	7	13	41.2
1981	- 2	33	-43	27	15	65	26.5
1982	1	17	- 1	31	10	27	45.4
1983	- 2	6	- 1	27	20	6	41.0
1984	10	14	2	22	14	20	65.3
1985	- 1	9	- 1	22	25	14	34.7
1986	2	- 1	3	27	21	18	31.0
76-86	2	15	7	24	12	20	481.6

Note: 1976 figure is GDP at constant factor cost (1973) = 100), with growth figure expressed in 1980 prices.

Source: Economic Reports.

Table 4

CYPRUS : Balance of Payments 1974 - 1986

C.£m

	Exports (fob)	Imports (fob)	Trade bal- ance	Trade deficit as % of exports	Invis- ible receipts	of which: gross travel of foreign visitors in Cyprus	foreign military expendi- ture	Workers remit- tances	Official aid	Invisible payments	of which: interest payments	Invi- sible bal- ances	Current Account bal- ances	Net Capital Mvts	Central Govt borrow- ing	Private Capital Short & long
1974	52	138	- 86	165	104					- 45		60	- 27	19	1	18
1975	52	111	- 59	113	86	5	28	4	21	- 41	4	45	- 14	3	2	1
1976	103	163	- 61	59	112	21	28	7	20	- 56	5	56	- 4	21	10	11
1977	124	228	-104	84	138	24	33	14	24	- 70	6	68	- 36	36	16	20
1978	122	255	-133	109	150	33	31	17	17	- 76	8	75	- 59	57	13	44
1979	150	321	-172	115	197	50	38	19	16	- 98	12	99	- 73	54	12	42
1980	173	381	-208	120	246	72	43	22	14	-120	16	125	- 83	79	31	48
1981	214	439	-225	106	311	102	51	24	15	-147	25	165	- 61	86	24	62
1982	238	518	-280	118	391	139	54	26	22	-183	36	208	- 72	109	52	57
1983	231	576	-345	149	455	175	62	29	27	-204	45	252	- 93	87	26	61
1984	308	721	-413	134	535	212	71	31	13	-238	55	297	-117	147	50	97
1985	255	687	-432	169	582	232	72	31	11	-253	58	331	-100	70		
1986	222	602	-380	171								360	- 20			

Source: Department of Statistics

Table 5

Manufacturing output and domestic exports
£ million (current prices)

		Gross Output	Output for home market	Exports	Exports as % of output
1975		108	84	24	22
1976		162	114	48	30
1977		208	143	65	31
1978		258	188	70	27
1979		322	236	86	27
1980		404	297	107	26
1981		489	346	143	29
1982		535	394	141	26
1983		581	446	135	23
1984		663	491	172	26
1985		686	436	150	22
% change	75- 85	535	538	525	

Source: Industrial Survey.

Table 6

Domestic Exports and Re-exports
CE million

	Total Exports	Domestic Exports	Re-exports	Re-exports % of all exports
1975	56	49	7	13
1976	106	86	21	20
1977	130	111	19	15
1978	128	106	22	17
1979	162	135	27	17
1980	188	157	31	16
1981	235	201	34	14
1982	264	205	59	22
1983	261	189	72	28
1984	337	244	93	28
1985	291	211	80	27
1986	260	181	79	30

Source: Statistics of Imports and Exports

Table 7

Manufacturing Exports and their contribution to total exports.

C£ million

	Manufactured domestic exports	All domestic exports	Manufactured exports as % of all domestic exports
1973	14.9	54.0	28
1974	18.3	46.4	39
1975	24.0	48.8	49
1976	47.7	85.2	56
1977	65.2	109.5	60
1978	69.9	103.6	67
1979	86.3	127.6	68
1980	107.3	148.5	72
1981	143.2	193.3	74
1982	140.6	196.5	72
1983	135.3	189.0	72
1984	171.5	244.3	70
1985	149.8	210.7	71
1986	126.2	181.1	70

Source: Economic Reports
Industrial Survey
Monthly Economic Indicators

Table 8

Growth of Cyprus exports 1975-84
in constant 1980 prices.

	Total exports	Total exports to EEC	Total exports to Middle East	Domestic exports to Middle East
1975	60,553	28,951	17,213	n.a.
1980	188,036	57,727	92,464	75,892
1984	221,742	61,207	111,532	81,876
Change in %				
1975-1980	211	99	437	n.a.
1980-1984	18	6	21	8

Source: Economic Reports

Table 9
Share of Cyprus Exports by area

	EEC	Arab Countries	Other	Value of Exports in Cf m.
1973	63	8	29	60
1974	55	17	28	55
1975	48	28	24	56
1976	35	47	18	106
1977	37	48	15	130
1978	34	47	19	128
1979	35	44	21	162
1980	31	49	20	188
1981	29	51	20	235
1982	31	49	20	264
1983	28	48	24	261
1984	28	50	22	337

Source: Economic Reports

Table 10

Exports to the Middle East

CE million (current prices) FOB

	Total exports	Exports to: Arab countries	Saudi Arabia	Libya	Lebanon
1973	60	5	.3	2	1
1974	55	10	.4	3	3
1975	56	16	1	4	2
1976	106	49	6	6	18
1977	130	62	16	7	12
1978	128	60	12	6	13
1979	162	71	12	8	15
1980	188	92	14	16	19
1981	235	120	20	23	15
1982	264	128	24	5	32
1983	261	124	22	14	36
1984	337	169	25	39	48

Source: Economic Reports

Table 11

Composition of Cyprus domestic exports to EEC and Middle East, 1979-84

	% of product exports going to region			
	1979		1984	
	EEC	M. East	EEC	M. East
Primary agricultural products	73	13	73	14
Processed agricultural products	45	25	43	26
Other non primary manufactures	26	68	18	75
All exports	42	44	35	53

These figures exclude shipstores and re-exports

Source: Economic Reports

Table 12

Cyprus share of major Middle East markets 1979-85

US\$s million

Saudi Arabia	All SA Imports	SA Imports from Cyprus	Cyprus share of all SA Imports %
1979	24,465	42	.17
1980	30,165	47	.16
1981	35,269	64	.18
1982	40,644	54	.13
1983	39,197	50	.13
1984	33,696	48	.14
1985	23,816	39	.16

Libya	All Libyan Imports	Libyan Imports from Cyprus	Cyprus share of all Libyan Imports %
1979	5,311	23	.43
1980	6,777	23	.34
1981	8,382	19	.23
1982	7,175	12	.17
1983	7,392	29	.39
1984	6,732	71	1.05
1985	n.a.	41	n.a.

Lebanon	All Lebanese imports	Lebanese Imports from Cyprus	Cyprus share of all Lebanese Imports %
1979	2,916	47	1.6
1980	3,807	58	1.5
1981	3,792	39	1.0
1982	3,471	73	2.1
1983	3,726	75	2.0
1984	2,940	89	3.0
1985	2,184	46	2.1

Source: Direction of Trade Statistics Yearbook.

Table 13

Cyprus share of Saudi Arabian Imports: selected commodities 1985.

Saudi Riyals millions						
	All SA Imports	M from Cyprus	Cyprus as % of all SAM	Shares of major importers into SA.		
<u>Food products</u>						
Biscuits	218	1.8	1.8	UK	21%, Turkey	18%
Chocolate	101	0.2	.2	UK	36%, Holland	19%
Cakes	39	0.9	2.2	France	25%, Kuwait	24%
Orange & other citrus juice	138	0.4	.3	Japan	78%, USA	6%
Vegetable and fruit concentrate	79	0.2	.3	USA	61%, Denmark	14%
Milk (unsweetened solids)	344	0.1	-	W. Germany	41%, Holland	21%
Cheese	307	5.0	1.6	Australia	44%, France	20%
Toffee, turkish delight, nougat	45	0.4	.9	UK	21%, Spain	17%
Potatoes	45	1.7	3.7	Egypt	55%, Holland	10%
Oranges	138	0.9	.7	Swaziland	44%, Morocco	13%
Grapes	44	0.5	1.2	Chile	55%, Spain	9%
<u>Clothing</u>						
Mens & boys outer garments:						
- synthetic or re-generated material	889	1.4	.2	Taiwan	33%, China(PPR)	9%
- other woven fabric	156	0.6	.4	Taiwan	17%, S. Korea	16%
Womens, girls & infants outer garments:						
- synthetic & regen.	970	1.7	.2	Taiwan	30%, S. Korea	11%
- other woven fabric	147	0.2	.2	Taiwan	16%, UK	12%
<u>Wood</u>						
Non pine wood	274	0.2	.1	Sweder.	17%, Austria	14%

Cyprus share of Saudi Arabian Imports: selected commodities 1985/continued

Saudi Riyals millions

	All SA Imports	M from Cyprus	Cyprus as % of all SAM	Shares of major importers into SA.	
<u>Metal Products</u>					
Locks & padlocks	112	0.4	.3	Italy	41%, USA 20%
Lamps & lighting	282	0.2	.1	Italy	16%, USA 14%
Agric. pumps	251	1.8	.7	USA	63%, France 14%
Other pumps	187	0.1	.1	USA	36%, Japan 19%
Industrial fans	44	0.1	.3	Italy	41%, Japan 29%
Domestic refrigerators	279	1.3	.5	Japan	38%, USA 22%
Other refrigerators	106	0.1	.1	USA	37%, Italy 24%
Agric. fire extinguishers and sprays	219	0.5	.2	USA	75%, Spain 8%
Centrifuges, filtering & purifying machinery	160	0.1	.1	USA	40%, Japan 24%

Note: approx 7 Saudi Royals = C£1

Source: Saudi Economic Survey, 1986, (various issues)

Table 14

Middle East Imports 1980-85

US\$ m.

	Saudi Arabia	Libya	Lebanon	Iran	Kuwait	Oman	Qatar
1980	30,166	6,776	3,807	n.a.	n.a.	1,800	1,400
1981	35,268	8,382	3,792	15,300	6,736	2,200	1,500
1982	40,653	8,437	3,471	13,400	7,811	2,600	2,000
1983	39,181	7,572	3,726	21,000	6,892	2,400	1,500
1984	33,695	6,854	2,940	18,000	6,705	2,600	1,100
1985	23,816	5,186	2,184	17,000	5,519	n.a.	n.a.

Source: Direction of Trade Statistics Yearbook
Lloyds Bank

Table 15

Private Consumption Spending 1980-84
in 1980 constant prices.

	1980		1984		Change in %
	C£	%	C£	%	
1. Food	140	23	173	21	23
Beveridges	21	3	25	3	22
Tobacco	12	2	14	2	15
Food, Beverages & Tobacco	173	29	212	26	23
2. Clothing	43	7	80	10	87
Footwear	11	2	18	2	63
Clothing and footwear	54	9	98	12	82
3. Gross rent, fuel & power	47	8	73	9	56
4. Furniture & other household expenditure of which: furniture, fixtures, carpets etc.	66	11	100	12	51
of which: furniture, fixtures, carpets etc.	17	3	29	4	78
5. Medical care	10	2	18	2	72
6. Transport and communication	133	22	141	17	6
7. Recreation, entertainment, education, & cultural services	40	7	56	7	40
8. Other goods and services of which: expenditure in hotels, restaurants & cafes	84	14	110	14	31
of which: expenditure in hotels, restaurants & cafes	44	7	72	9	65
9. Total	607	100	809	100	33

Source: Economic Reports.

Table 16

Share of Imports in Final Consumption 1975-84

%

	1975	1980	1984
Food, Drink and Tobacco	17	17	17
Clothing	44	17	17
Footwear	9	13	19
Furniture	23	26	32
All final consumption	24	24	25

Source: Economic Reports

Table 17

Non residents component in total final consumption
current prices

C£ million

	Total final consump- tion	Direct purchases in domestic market by non- residential households	Non resident purchases as % of all final consumption	Tourist receipts	
				C£	as % final consump- tion
1974	264	45	17		
1975	231	29	13		
1976	295	39	13		
1977	379	47	12	24	6
1978	437	60	14	33	8
1979	547	71	13	50	9
1980	607	111	18	72	12
1981	715	149	21	102	14
1982	806	188	23	139	17
1983	943	231	25	173	19
1984	1,062	277	26	210	20
1985			229		
1986			256		

Source: Tourism, Migration & Travel Statistics 1985
Economic Reports.
Cyprus Tourist Organisation, Annual Report 1985
Cyprus Tourist Organisation, Expenditure Survey 1980, 1985

Table 18

Direct Production Costs of the Cyprus Hotel and
Catering Industry, 1984

	C£m		
	Hotels	Other Catering	Total
Food and beverages	7.4	22.5	29.9
Linen, other material and replacements	2.2	0.8	3.0
Fuel	1.0	0.9	1.9
Electricity	4.6	1.7	6.3
Payments for services by others	2.2	0.2	2.4
Other	3.1	0.8	3.9
Total	20.5	26.9	47.3

Source: Services Survey, 1984.

II

THE CUSTOMS UNION AND MANUFACTURING INDUSTRY

The provisional agreement between the Cyprus government and the EEC was initialled in May 1987. It covers 90% of exports and 80% of imports, and provides for the reduction of protective barriers in two phases: the first lasting 10 years upto 1997, and the second a further four or five years beyond that. It requires the dismantling of all tariffs by the end of the first phase, the gradual adoption of the Common Customs Tariff by Cyprus, and the abolition of all quotas on EEC goods. Though there are significant exceptions, there is no doubt that the Customs Union constitutes a major change of direction in Cyprus' industrial trade policy from a closed to an open domestic economy.

2.1. The Structure of Protection

The extent of the change can be judged by considering the present level of protection and the proposed rates under the Customs Union. We should note the following points from the data presented in Tables 1 and 2.

- a. Cypriot consumer goods have enjoyed high levels of nominal protection, reaching 174% in the case of tobacco.
- b. nominal rates on consumer goods have been increasing steadily over the last twenty years, with the exception of tobacco. On intermediate goods, however, nominal rates have fallen.
- c. with Cypriot manufacturing contributing a relatively low proportion of value added to the final product, the effective

rate of protection is much higher. By effective rate we mean the nominal rate as applied to that proportion of the value added in Cyprus. In the case of wood and wood products for example a nominal rate on final goods of 33% is an effective rate of 114%. Thus if we assume that Cypriot and overseas producers can both obtain their intermediates at the same price, Cypriot producers of wood and wood products have a 114% rate of protection against foreign producers on the final production process undertaken in Cyprus.

- d. in addition to tariffs, imports of many products into Cyprus are banned, or subject to quota restrictions.

- e. the Customs Union would not only lead to a major reduction in tariffs and quotas with respect to EEC goods entering Cyprus, it would also lead to lower duties against third countries. This can be seen by comparing the level of the Common Customs Tariff with the previous general tariff level. In some cases, such as clothing, the EEC themselves operate quota restrictions against third countries, and these would also serve to protect Cyprus industry.

- f. on a number of raw materials currently imported into Cyprus from third countries without duty, the CCT will raise the cost of inputs for Cypriot producers after the first phase. The carton manufacturers, for example, are likely to face a 4-6% increase in total costs as a result of the CCT on their materials. Suitcase manufacturers estimate that CCT will add 13% to total costs once the drawback and relief system is phased out.

2.2. the Impact on Manufacturing

In assessing the likely impact on manufacturing we have considered four sources of evidence: the terms of the provisional agreement; the assessment of earlier studies; the Mission's five sector case studies, and the results of the model simulation. Each suggest that the impact of the agreement will be less severe than was originally feared.

2.2.1. the Provisional Agreement

As far as the agreement itself is concerned, we should note the following:

- a. petroleum products (which make up 9.4% of industrial output) and 15 other vulnerable products (constituting 8.2% of industrial output) are excluded from the Customs Union. The excluded products are primarily from the food processing and beverage sector, plus black cement, chipboard, the turbine pumps.
- b. the bulk of processed food products are regarded as agricultural rather than manufactured products by the EEC, and since Cyprus is not demanding privileged entry for them into the EEC, they too are omitted from the agreement. These include meat processing, coffee, dairy products, animal feeds, raw tobacco and a number of bakery products, and together account for 11% of industrial sector output.
- c. at least 5% of industrial output is composed of service-type output, such as printing and repairs, and will therefore be unaffected by levels of protection.

- d. at least 16% of industrial products enjoy natural protection, (such as hand made ceramic tiles, wooden windows, and structural steel products) or are geared almost entirely to export markets and will not therefore be affected by an opening up of the home market (bentonite, umber and commercial refrigerators).

Thus some 50% of industrial output lies largely outside the potential impact of the Customs Union, and the figure - particularly among small-firm producers in furniture, metal working, and clothing - is probably higher.

For the rest:

- e. there are 48 product categories which will be permitted to lower their tariff rates and quotas more slowly than the norm, as well as introduce quotas which may be allowed to continue during the second phase. They account for 27% of industrial output, while another 32 categories (10% of output) are also to be allowed slower transition rates than the norm.
- f. where the impact of the customs union is too severe, Cyprus will be allowed to reintroduce tariffs of 20-25% on upto 15% of imports from the EEC
- g. in clothing, during the second phase, Cyprus will share the EEC's protective measures against clothing imports from third countries, and will no longer face quotas on men's and boy's outer garments while the rules of origin restrictions on these items will only be applied in terms of Cyprus exports having to be under a different tarriff heading than they were when imported from third countries.

The above does not minimise the potential damage that may be done to some sectors. But it is clear that the agreement has been drawn up to limit the damage, particularly in the short and medium term. Its long term significance may indeed be less in relation to existing Cyprus industry, than to industry which Cyprus might seek to develop behind protective walls.

2.2.2. Studies

The removal of protection does not of course mean the necessary destruction of industry. Much will depend on the industry's competitiveness, and the extent of natural protection which it enjoys. Two earlier studies have considered the question. The GOPA report - whose main survey was done in 1981 - saw the likely results as follows:

- knitwear, clothing and footwear would be most seriously affected, and to a lesser extent furniture, paper products and chemicals.

- there would be minor negative effects on leather and leather goods, chipboard, rubber soles and shoes, battery production and car assembly

- much of the metal sector, electrical machinery, transport equipment, wood and rubber products were service type industry and would be unlikely to be seriously hit.

- there would be little impact on exports - since the great majority had free entry into the EEC, and those facing quotas (such as mens and boys outer garments) may not have filled their quotas. Only if there was an upgrading of products,

improving their competitiveness in European markets, would entry significantly expand opportunities.

A more recent survey was undertaken by a consultant provided by UNIDO. His results are summarised in Table 3. His findings were in line with those of GOPA, with the main impact being on the clothing, footwear, furniture, paper products and chemicals. He considered that losses in the plastics sector would go further than GOPA suggested, that travel goods would be hit by the CCT on materials, and that jewellery, cement, pumps and plywood would also be negatively effected. In the field of food (which GOPA had excluded) the report considered that the more durable food products (chocolate, sugar confectionary, macaroni, biscuits, and cakes) would be adversely effected, as well as vegetable oils and margerines. On the export side, he saw a potential benefit for canned fruit juices and canned vegetables, and confirmed that the quota of 525 tons a year for men and boys outerwear (without rules of origin requirements) had been unfilled.

2.2.3. Sector Studies

The broad contours of this assessment were confirmed as the result of the present mission's visits. Our work was confined to five principal sectors. For them our main conclusions are:

- the clothing industry is likely to be affected principally by the entry of Italian and other fashion goods at the higher end of the market, which will work their way down to the middle market ranges as the transition period proceeds. At the cheaper end of the market we see Cyprus remaining competitive. From an analysis of wage costs in Cypriot clothing firms relative to clothing industries elsewhere, Cyprus wage costs (including social costs) were below those of Switzerland, (73% less) Malta (72%), West Germany (71%), Italy (70%), Britain (44%), Spain (37%), Greece (32%) and Ireland (29%). They were

157% above those of Portugal, as well as Egypt (85%), Tunisia (87%) and Morocco (409%). For the 15 leading Cyprus firms visited, output per head in 1986 was 74% below the level of intermediate clothing firms in the UK, and 60% below the level of large British firms.

These results support judgement of previous consultants that productivity in Cyprus clothing firms is 65-75% of European levels, and that wage cost advantages should be discounted by 25-35% to take account of lower productivity levels. In the case of the UK, this still leaves Cyprus with an advantage of 29-33% in unit labour costs. These calculations were confirmed by estimates of cost differentials made by the clothing industrialists. The expansion of subcontracting from European firms to Cyprus also indicates that Cyprus is competitive in cost terms and thus could be expected to hold its own at the lower (and initially the middle range) of the market. We estimate therefore that Customs Union entry could double the rate of import penetration (from 17% to 34%), though it might well be less. Some of the firms might go out of business, and exports could thus also be affected, as they could by a cut in domestic output (of 20%). Given the possibility of domestic manufacturers switching their attention to exports, the overall loss of exports might be closer to zero. The erosion of exports markets by European competition and mass producers from low wage countries is a more serious threat to exporters than the effects of the cut in protection on the Cyprus producers.

- the footwear industry could be more seriously affected. Independent evidence (Incubon 1986) suggests that for its quality, Cypriot footwear is not price competitive in European terms. This is confirmed by estimates of productivity, which shows Britain with a 40% productivity advantage over Cyprus, set against a 46% wage differential in favour of Cyprus: but this comparison must take into account Cypriot disadvantages with respect to design, delivery dates and material costs relative to the UK, and the fact that Britain is itself losing

out in international competition. With free entry of European footwear, we believe that as much as 30% of output could be affected, import penetration rising to 40% of the domestic market, with knock-on effects on exports. It is not merely a question of the larger factories, for many of the smaller firms depend on the larger ones for sub-contract work and they, too, would be affected.

- the furniture industry is also likely to be seriously hit. On the basis of visits to 15 of the leading furniture firms accounting for a quarter of the industry's employment in Cyprus, we believe the great majority of them are highly vulnerable to imports - particularly from Italy and Greece. The fundamental problem was low production efficiency: labour costs as a proportion of output varied from 20-43% whereas furniture makers even in high wage countries commonly get direct labour costs down to around 15% of total costs. 30% of value added in this sector (1985) was accounted for by firms with less than 5 employees, and we found no evidence of a widespread system of sub-contracting for larger firms operating here. Assuming that these small firms may be less vulnerable to foreign competition, we estimate that as much as 50% of the industry could be lost as the result of Customs Union.

- the impact on the food sector will be slight, given the terms of the provisional agreement.

- in the metal sector likewise, the effects will be marginal on the bulk of the small firms engaged in job shop service type work. Of the traded goods, turbine pumps are exempt. Air filters could, however, be severely hit, while aluminium extrusions are currently under threat from cheap imports from Greece.

In Table 4 we present the results of our quantitative assessment of Customs Union entry on the basis of our estimates, and the earlier studies where appropriate. The results suggest that when the full impact of the Union is felt, output will fall by 13%.

This excludes measures which firms or the government could take to offset this decline. It also excludes a number of secondary factors, notably:

- the reduction in the cost of living due to lower prices, particularly of consumption goods, though this may be counteracted by the introduction of VAT.
- the public finance implications of a loss of import duty revenue and of taxation on the firms and employees who are affected by the increase in exports.
- the balance of payments effects of the increase in imports and a potential loss of exports, which would be balanced against the expansion of agricultural exports.
- the terms of trade effects of export price reductions by firms facing increased competition in the home market.
- the effect on the labour market and the government budget of a loss of 6,100 jobs (assuming a fall proportional to output).

These secondary factors, when taken together, will not in our view alter the message of our direct conclusions. This is that the Customs Union will involve losses, but on a scale which is less than we had originally expected. In the medium term the effect will be

even less - certainly for the 5th Emergency Plan period upto 1991 - unless the mere fact of entry leads to a fall in investment as manufacturers plan to switch out of those sectors most liable to decline.

2.2.4. The Customs Union in the Simulation Model

While too much weight should not be put on the detailed projections the simulation model confirmed the orders of magnitude of the above discussion. For the economy as a whole, the model forecasts a fall of 3.5% in GDP for the period upto 1991, relative to the base year. That is to say, the economy will still grow (by an annual average of 3.4%) but at a slower rate than without the customs union. The gap will in practice be smaller because of the delayed reductions in tariffs for a substantial number of products, but it remains negative principally because Cypriot producers, facing a loss of domestic market share, attempt to increase exports by cutting prices thus turning the terms of trade against themselves.

In the manufacturing sector, clothing and textile output falls by 13% to 1991 and footwear and leather by 29% with little change in either food processing or metal products. All these are in broad line with our earlier estimates. Furniture and wood are less severely hit in the model projections, principally because the way in which tariff reductions are measured underplays the likely effect on the furniture sub sector itself.

2.3. Comparative experience

The effects of EEC entry on other peripheral economies in Europe suggest that Cyprus should expect a substantial impact on formerly highly protected domestic manufacturing. In Ireland, which first joined a Customs Union with the UK in 1965, and then the EEC in 1972, much of the traditional manufacturing which had developed under an

import substitution regime since the 1920s has been undercut by imports.

In Greece, there have been serious effects of accession on manufacturing, with the Greek government intervening to support threatened firms, (the government formerly owned 10-15% of Greek industry; that share is now reported to have risen to 50%). The Government negotiated extensions of the transition period, but by 1986, the full impact was being felt. Between 1983 and 1985 the trade deficit with the EEC grew from 200 to 324 mrd drachmas, with average monthly rises of 34% in the deficit relative to a year before being registered in the first 11 months of 1986. Imports have risen particularly sharply in 1986.

Portugal and Spain have only recently joined the EEC with the first stage of reductions taking effect at the beginning of 1986. During the year, Portugal has shown a 21% increase in exports to the EEC (11% for all countries) and a 37% increase in imports from the EEC (compared to 7% for all countries).

Spain has traditionally been a highly protected market, and in this it is similar to Cyprus. Under the transitional arrangements, import barriers have to be removed in seven stages, with the first 10% in 1986. The movement of trade is shown in Table 5. Non energy exports declined by 4% while imports rose by 4%, with manufactured goods up by 31% and consumer goods by 44%. With the EEC, exports rose by 7% and imports by 32%.

Among particular industries, 'durable' food products have been severely hit. In the first half of 1986, biscuit imports rose to 1,900 tons from 142 tons a year earlier. Chocolate was similarly affected. On the export side, there has been a significant growth of clothing exports, though in other fields it has proved difficult to expand. A number of industries in Northern Spain - textiles, steel, shipbuilding, and car assembly - have found difficulty in getting

into crisis cartels which have been formed within the EEC to limit market shares and stabilise competition. Similarly in food products - processed tomatoes and wine for example - Spain has faced a European market suffering from overcapacity, and a Commission anxious to restrain further investment. The same has happened with Greece and olive oil.

Part of Spain's difficulty appears to be the timing of entry - in a period of generalised recession in some sectors, and over production in others. Part, too, stems from the fact that for many products, Spain like Cyprus has had preferential access to Europe as the result of her Associate membership of the EEC, so that a once and for all potential for expansion has been largely exhausted. On the other hand, full membership has meant the dismantling of her previously maintained import barriers, and the sharp increase of imports as a result. More detailed sub sectoral analysis of the trade figures will be required to determine how far the rise in imports have been at the expense of Spanish domestic production, and how far they have consisted of additional commodities - for instance capital goods, where there has been an increase in imports as the result of a rise in investment. Initial results suggest, however, that even quite small reductions in protection can lead to a rapid and substantial increase in imports. The same appears to have happened with Greece and Portugal.

2.4. Summary and conclusion

Entry into a Customs Union with the EEC on the terms as provisionally agreed in May 1987 promises to be of less significance for the bulk of Cyprus industry in the short and medium term than the declining growth rate in the home market, the shrinking of the Middle East market, and the increasing intensity of competition both at home and abroad. Those industries which have won exemption from the Customs Union will not be exempt from these other pressures. Those industries which stand to lose protection from European competition in the home market, are already facing that competition abroad, and

even - despite the height of the tariffs - in the Cyprus market as well. If Cyprus industry faces a difficult period over the next five years, it will not have been primarily caused by the Customs Union.

Nevertheless, for individual sectors and firms the medium and long term consequences of the Customs Union are liable to be severe. Clothing, footwear and furniture - the three largest consumer goods sectors other than food processing, - all stand to lose significant shares of the home market. Furniture is particularly vulnerable, as are sections of the paper and chemical industries. But furniture is already facing increased import penetration, up from 26% to 32% of the home market between 1980 and 1984. For them, the Customs Union focusses attention on what was anyway necessary - the need to restructure production and sales.

None of these sectors should at this point be written off by Government policy. Those we have studied have developed rapidly, have gained substantial experience on the way, and are now in a position to benefit from restructuring. In other words there is the basis of an industry to restructure. The danger of the Customs Union is that it could lead to a sense of defeatism in firms which are already feeling the pressure, and a redirection of investment into the distribution of imports, into tourism, or even abroad. For the individual industrialist this might make sense. For the economy as a whole it does not. It will be one of the principal tasks of the government at this moment to ensure that the potential gains from restructuring are not passed by because of the lack of collective institutions and resources to achieve them. If the Government cannot achieve this, the Customs Union which has been spoken of as the midwife to a new industry may serve only as a gravedigger for the old.

What is true for manufacturing is also true for the economy. A restructured manufacturing industry could provide an important stimulus to Cyprus's rate of growth. Perhaps the most significant result to emerge from the model simulation was that losses from the

Customs Union are more than outweighed by increased rates of productivity growth in the manufacturing sector. If manufacturing productivity grows by 2% a year more than is assumed in the base projection, then the growth rate of the economy as a whole - even with the Customs Union - increases by 12% above the base rate projection upto 1991, and by 25% upto 1996.

What the model suggests is that the rate of growth of the Cyprus economy shows a much greater response to changes in industrial productivity than to changes in wages or the rate of protection. The need for Cypriot manufacturing to improve its productivity is therefore not merely to offset any negative impact which the Customs Union may have on the manufacturing sector. It is also to restore the dynamic role that manufacturing has played in the overall economy - but on this occasion through the intensive growth arising from the application of new technology rather than the 'extensive' growth of the decade after 1974.

Table 1

Nominal and Effective Tariffs by Major Industrial Group

Industry	1967		1984		Customs Union Nominal
	Nominal	Effect-	Nominal	Effective	
Food	13.8	81.3	20.9	)	19.1
Beverages	29.3	58.1	70.1	) - 155.99	48.0
Tobacco	281.9	-296.2	174.0	)	76.5
Textiles	40.0	123.8	53.9	)	8.9
Clothing & footwear	45.0	151.8	71.9	) - 451.6 *	5.8
Leather	15.5	73.6	55.7	-1694.2 **	2.7
Wood & wood products	15.8	62.0	1.0	)	0.4
				) 33.2	
Furniture & fixtures	41.6	148.4	62.8	)	0.8
Paper & paper products	17.8	190.9	12.9		2.6
Rubber products	23.2	90.9	19.6		0.9
Chemicals and chemical products	37.5	132.4	9.1		0.2
Non metallic mineral products	16.5	30.9	13.6		4.2
Metal products	18.8	58.8	10.7	)	2.0
Machinery (except electrical)	13.7	24.9	6.6	) 43.3	0.1
)	
Electrical machinery	31.8	77.9	10.5	)	1.7
Transport)	
Equipment	20.9	64.7	15.2	)	1.8
Miscellaneous	29.9	163.6	79.0	) 176.0 ***	2.9

* excludes footwear

** includes footwear

*** includes paper products, rubber and chemicals and non-metallic minerals

Source: Demetriades, The Measurement and structure of protection of manufacturing (for 1967 figures)

Planning Bureau and MCI data for Nominal 1984 & Customs Union figures. Mission for EP for 1984

Table 2

Current protection for selected products and proposed EEC/CCT levels

	Current protection %			Customs Union	
	EEC	General	Other	EEC	CCT
<u>Food</u>					
Biscuits	54	65			
Macaroni	16	20	Banned		
Chocolate & sugar confectionary	65	75		Proposed exemption	
Ice Cream	10	16	Banned		
Yoghurt		Free	Banned		
Refined oils	6	8			
Margerine	16	20			
<u>Beverages</u>					
Beer	C£ 1.79 per gallon	C£ 2.0 per gallon			
Spirits	C£46.38 per gallon	C£49.72 per gallon			
Soft drinks	37	45			
<u>Tobacco</u>					
Cigarettes	£25.63 per thousand (Ave. production value in 1984 £9.37 per thousand)	£			
<u>Clothing</u>					
Knitwear & clothing	80	93	Selective bans		15
<u>Footwear</u>					
Footwear	70-76	82			6-20
<u>Travel Goods & Handbags</u>					
Handbags	69	85			6-13
<u>Metal products</u>					
Metal furniture	65	75			
Crown corks	29	33	Banned		
Metal containers	26	36	Quota		
Air, oil and car filters	20	30	Quota		
Pumps	Nil	Nil	Banned		
Aluminium doors and windows	16	24			

Current protection for selected products and proposed EEC/CCT levels
/continued

	Current protection %			Customs Union	
	EEC	General	Other	EEC	CCT
<u>Metal products (continued)</u>					
Solar water heaters	16	24			
Dry cell batteries	31	48			
<u>Wood & Furniture</u>					
Wooden furniture	70	80			
Doors & windows	5	8			
Chipboards			Banned		
<u>Paper products</u>					
Paper bags	21	25	Banned		12
Paper boxes other than cigarettes	16	24	Generally Banned		13
<u>Plastics</u>					
Domestic goods	40	50			12
Plastic bags	35	45			12
Plastic sacks	10	15	Quota		12
Plastic containers	16	24			12
<u>Chemicals</u>					
Paints & varnishes	41	42			
Drugs and medicines	8	12			
Cosmetics	133	184			
Detergents	56	64			
<u>Non metallic minerals</u>					
Cement	£ 0.36	£ 0.56	Black cement banned		Exclusion sought
		per ton			
Mosaic tiles	16	24	Banned		
Floor tiles	16	24			
<u>Jewellery</u>					
Jewellery	114	125			4 - 12

Source: Ministry of Commerce and Industry Planning Bureau

Table 3

Impact of Customs Union on Manufacturing: 1985 survey estimates

Industry	Prospects
<u>Food, beverages and tobacco</u>	
Canned fruit, juices and vegetables	Possible expansion because of abolition of remaining EEC tariffs.
Beer, biscuits, macaroni, chocolate and sugar confectionary	Vulnerable.
Spirits	Potential benefit from removal of EEC restrictions, but unlikely to expand
Soft drinks	Little impact
Vegetable oils and margerines	Vulnerable.
Tobacco	Little impact
<u>Clothing</u>	
Textiles	Much of the industry likely to fail
Garments	50% of the industry destroyed
<u>Footwear</u>	
Footwear	60% of the industry potentially destroyed
<u>Travel goods</u>	
Travel goods	Rise of costs through CTT on raw materials, likely to further weaken industry in export markets and threatens survival.
<u>Jewellery</u>	
Italian competition will reduce industry	
<u>Wood and furniture</u>	
Chipboard & plywood	Both vulnerable.
Wooden furniture	Vulnerable to Greek and Italian competition.
<u>Non-metallic minerals.</u>	
Cement vulnerable from Greek & Spanish competition.	

Impact of Customs Union on Manufacturing: 1985 survey estimates
/continued

Metal products

Metal and engineering products

Other than switchgear, turbine pumps, batteries, crown corks, metal pipes, electrodes, not adversely effected.

Paper and packaging

Much of the industry could be destroyed

Plastics

Specialised products, particularly household goods, and joint fittings highly vulnerable.

Chemicals

Except for drugs and pesticides, entire industry could be destroyed.

Source: Report by consultant provided by UNIDO, 1985.

Table 4

Value of Industrial products likely to be
affected by the Customs Union

Products	Impact of EEC	Value of output 1986 C£m	Change as a result of Customs Union
Canned fruit	+ 10%	11.0	+ 1.1
Wines & grape must	+ 20%	13.0 ^e	+ 2.6
Textiles	- 40%	21.2	- 8.5
Clothing	- 20%	87.0	- 17.4
Footwear	- 30%	29.1	- 8.7
Furniture	- 50%	29.1	- 14.6
Wood & wood products	- 10%	32.1	- 3.2
Travel goods	- 15%	6.1	- 0.9
Paper and Paperboard	- 60%	16.3	- 9.8
Chemicals other than drugs and pesticides	- 60%	24.0	- 14.4
Plastic products	Selective losses	20.2	- 5.0
Metal products	- 10%	85.7	- 8.6
Jewellery	- 10%	11.8	- 1.2
Net change			- 88.6
Products for which exemption sought		56.4	
Total output		688.8	
Percentage loss			12.9

Note :

e indicates estimate.

Notes on Table 4

The Table looks at the once and for all effect of a full reduction of protection, holding all other things constant. Thus it assumes that nothing is done by industrialists or the government in the face of the fall in protection.

The estimates of loss and gain have been made on the basis of the studies of the five sectors - clothing, footwear, food processing, furniture and metal works - undertaken by the present mission, supplemented by the results of earlier reports by GOPA and UNIDO. In all cases we have worked from the terms of union as of June 1987.

The figures for 1986 industrial output are taken from the preliminary results of the 1986 Industrial Survey, and are liable to adjustment once the full survey is completed.

The output of wine and grape must is estimated.

In each sector we have assumed that exports are affected in parallel with production for the home market. This is a pessimistic assumption. On the one hand a reduction of domestic market share will put some firms out of business, and cut exports as a result. For surviving firms domestic profit rates will be reduced with the fall in protection, and this may not allow a cross subsidisation of exports from domestic profit. If export prices are forced higher as a result this will lead to a loss in overseas markets. On the other hand, there may be a prospect that firms which are strong in the competitive export market are also likely to be the ones to hold their own in an unprotected domestic market. The firms to be first affected therefore would be those with low exports. Hence, a fall in domestic market share for Cypriot producers would not lead to a parallel fall in exports. We have kept the assumptions pessimistic, however, in order to indicate an upper bound of possible losses on the export (and by implication the total output) side.

Table 5

Spanish Imports and Exports. 1984-6

Annual Changes in value %

	1984		1985		1986	
<u>Exports</u>						
Energy products	33		15		-38	
Non energy products	32		10		-4	
Food	35		5		1	
prices		10		8		3
volume		19		-3		-2
Manufactures	32		10		-5	
prices		13		8		4
volume		17		2		-9
Semi-Manufactured products	29		10		-16	
prices		16		6		-2
volume		11		4		-14
Capital goods	35		13		-3	
prices		9		11		8
volume		24		2		-10
Consumer goods	34		10		6	
prices		12		9		9
volume		20		1		-3
All Exports	32		10		-7	
<u>Imports</u>						
Energy products	4		4		-49	
Non energy products	15		13		21	
Food	4		6		23	
prices		11		2		-3
volume		-10		8		18
Manufactures	16		17		31	
prices		7		5		-1
volume		8		12		32
Semi Manufactures	17		15		31	
prices		10		6		-6
volume		7		9		39
Capital Goods	20		19		21	
prices		7		3		-
volume		12		15		22
Consumer goods	9		19		44	
prices		5		5		4
volume		4		14		39
All imports	11		10		-4	

Source: Sintesis Mensual de Indicadores Economicos, February 1987.

III

THE STRATEGIC APPROACH

3.1. Sector strategy

In considering a strategy for Cyprus manufacturing we have followed a sector strategic approach. Since this differs from some other approaches to industrial policy, we begin by setting out its main characteristics before looking at its implications for Cyprus.

The starting point is the sector. This is the arena in which firms find themselves competing. It is a particular market place, with its own structures and contours. Just as in warfare, a military strategy involves general principles applied to a particular terrain, so in the economy, an industrial strategy requires general principles applied to the specific characteristics of the sector.

Thus the sector is defined not as a statistical category but in terms of a competitive 'space'. The French refer to it as a 'filière' - the thread along which competition runs. Let us take the food industry as an example. There is a food chain which runs from agriculture through food processing to catering and retail distribution. At one time the primary, secondary and tertiary sections of this chain were relatively separate. In the first half of the 20th century the major productivity gains were made in food processing; in the second half it is the primary and tertiary sectors where the greatest changes have been taking place. Agriculture itself is commonly integrated into processing. Equally food processing can no longer be considered apart from retailing and

distribution from a sector strategic point of view. The thread has extended itself across manufacturing and services.

Not all firms are organised around sectoral expansion. Conglomerates for example are multi-sectoral, and emphasise financial and managerial disciplines at the level of their constituent firms. This, however, is the exception. Most firms, or divisions of large firms, operate according to a sectoral logic. The sector is the primary level for corporate strategic planning.

It is also the level of the most successful national strategic planning. In Japan the Ministry of International Trade and Industry (MITI) is organised on a sectoral basis. In close conjunction with industry, it has developed detailed sector strategies, and orients its foreign trade technology, and finance policies around these. A similar system of strong sector strategic planning has been a feature of South Korean industrial policy. In Western Europe, it has been the industrial banks which have played the key role of sector planners. In the UK the tradition has been weaker, though it is noticeable that many of the local and regional development banks of the 1980's have been organised on sectoral principles.

The logic for the sectoral organisation of government and financial industrial institutions is similar to that of the industrial firm. It allows the industrial planner, or the industrial banker to develop a detailed knowledge of the sector - where its competitive edges lie, what innovations from other sectors could be introduced, where potential growth areas exist and so on. If every sector has its own distinct economic terrain, then those who wish to compete on it, or influence that competition, must know that terrain. The reason that firms are predominantly organised on a sectoral basis is that there are returns from the knowledge of sectoral detail. The same applies to public or quasi public industrial development institutions.

This explains the importance of the sectoral focus. What of the strategy? Strategy is defined as marshalling one's forces in such a way as to impose upon the enemy the place, time and conditions for fighting advantageous to oneself. It is a word with a military history, but which has become increasingly used in the world of corporate planning. It involves assessing the contours of the sector, assessing the strengths and weaknesses of the competitors, relative to the strategist's own enterprises or industry, and framing a plan of action in the light of these judgements.

Take first the contours. Within a sector there are key points of control. In the food sector these 'commanding heights' have changed from food processing to retailing. In agriculture a new commanding height is the control of seeds. In clothing and furniture it is the system linking production and retailing. In engineering it may be assembly (as in the auto industry). In the cinema and other cultural industries it is the distribution network, wholesaling, cable networks, television channels. In telecommunications and data processing there is a battle for control of the new international integrated systems of communications and data processing involving giants from both camps like AT&T and IBM who formerly remained apart. For them the effective sector has been changed by technology, and so too have the commanding heights.

What is important about controlling the key positions is that it gives the controller strategic and economic dominance within the sector. The British retail furniture multiples can force down the prices of their manufacturing suppliers, thus widening the gap between the retailers' and the manufacturers' rate of return (the case is discussed in the accompanying furniture report). The Italian firm, Benneton, now the largest clothing firm in Europe, need not own its shops (they are franchised to independent retailers), nor the bulk of its manufacturing capacity (it has sub-contract relations with a mass of small and medium size contractors around its headquarters in Northern Italy). Its automated warehousing and dyeing plant, and its international management information system gives it control without ownership.

In some industries it is the control of design and marketing which is sufficient. In industries as diverse as electronics, engineering and clothing, there has been an emerging pattern of designers engaging manufacturers as sub-contractors. The money is to be made in the design of the new product, not the making of it. We came across just such a case in Cyprus, where a French design firm used a Cypriot manufacturer as its main producer for the French as well as the international market.

Thus if - as Saul Steinberg once remarked - it is necessary, for commercial success, to be in the right sector, it is equally necessary to be in the right place within the sector. In the last 20 years manufacturers have too often found themselves as low margin sub contractors, while the higher margins were being earned elsewhere.

The economic landscape is thus uneven. What, then, if an industry or a country finds itself in the lowlands plains rather than on the commanding heights? In other words, what if it lacks sectoral industrial power? This after all is the position of many firms in Cyprus, and of Cyprus itself within the context of the European Community. Strategy means no more than long run planning to improve that relative position. Each day decisions are taken which may entrench a firm's position within the economic valleys, or on the other hand help it climb at least part of the way out. The latter may be impossible for a firm acting on its own. It will have to cooperate with others. It may need the support of government. But its strategy provides the criteria against which individual or collective action can be judged.

The above is merely to set down what is the daily common sense of most enterprises. Not all of them have the time and resources for strategic sector planning. This is one of the economies of firm size, since the large firms can afford to have a specialised strategic planning function in a way that small firms cannot. Yet even if small firms cannot afford a specialist, their owner or manager will adopt some parts of the above approach nonetheless.

What is common sense for the enterprise, is, however, not always common sense for governments. Without sectoral expertise and regular contact with the enterprise, civil servants are at a disadvantage in contributing to the development of strategic planning. The separation of the government from the daily life of production is one of its structural weaknesses in the industrial field. Some have argued that because of this governments should have no industrial policy. But this merely registers one side of the problem, while ignoring the other. For the fact remains that governments do affect sectoral competitiveness in innumerable ways, while in many instances sectoral competitiveness cannot be achieved by firms acting alone. The weaker and smaller the economy, the more this is the case.

The core of the problem of industrial policy can therefore be put as follows: enterprises by themselves may be unable to plan strategically, let alone be successful in following a strategic plan. Yet public institutions which have the resources and can take a broader sectoral view are too often divorced from the detail which their plans must necessarily address. Enterprises require collective support, but the institutions which can give that support are established in such a way that they cannot adequately deliver it. This is the central dilemma of industrial policy.

It is a dilemma not without solution. Indeed, it is a mark of all successful economies that they have found solutions, albeit in different ways. In Japan the key institution has been MITI; in Germany it has been the industrial banks and regional governments; in Italy it has been groups of firms supported by local and national government. Britain, with the worst industrial record of the major OECD countries, has by and large lacked all of these.

A sector strategy approach therefore involves not only strategic planning at a sectoral level, but collective institutions which have the capacity to work with productive enterprises in putting the sector plan into practice. These institutions may be private, public or quasi public, or a consortium of all three. What will mark them

out is a detailed knowledge of the sector, and an agreed strategy towards it.

3.2 Alternative approaches to industrial policy

Sector strategic planning has grown in importance as it has become clear that firms can actively shape the environment within which they operate, rather than having to react passively towards it. By innovation and planning they can move to new product areas, and can shape whole sub economies as the retailers have done in the consumer sectors. From the traditional theory of the firm which emphasised demand forecasting and minimising costs, we have moved to a new theory of the corporation where the emphasis is on innovation and strategic position. From the old theory of the industry centred on arms length price competition we have moved to a new theory of sectors emphasising product competition within intra industry cooperation. From the viewpoint of national industrial policy, we have moved from the theory of static comparative advantage where advantages are conferred by nature or history, to that of dynamic comparative advantage, where the advantage can be planned for and created. These new approaches which have found more fertile soil in business schools than in university economics departments, reflect post war changes in industry and the centrality of innovation.

Much industrial policy still addresses the new issues by proxy. In Britain, for example, the proxy for the restructuring of the engineering industry during the 1960's and 70's was size. Public institutions like the Industrial Reorganisation Corporation concentrated on encouraging mergers and takeovers, only for it to be found that the resulting engineering conglomerates remained aggregations of unreformed firms unfitted for the new forms of international competition.

In France, the proxy has been new technology, with large subsidies to new technology investment but little regard to the organisational

structures within which the investment was made. In the USA, too, firms (rather than governments) have installed new technology as a means of competing with the Japanese and Germans without recognising the complementary managerial philosophies, product strategies, and labour relations which were so important a part of their rival's success (the comparative performance of Flexible Manufacturing Systems in Japan and the USA provides a recent, striking confirmation of this point).

For some countries the proxy has been foreign investment. They have sought to attract it by the availability of cheap labour, or by tax incentives, leaving the strategic decisions to the foreign firms themselves. In this case national industrial policies have been centred on strategies for factors of production rather than for particular sectors. Any country seeking to enter this competition must assess not only the results of the development paths of those countries which have attracted direct investors; it must also assess the likelihood of a new country's success in so fiercely competitive a field.

A third approach, particularly for countries with declining manufacturing industries, has been to abandon the so called smoke stack or sunset industries and shift the focus of policy on to the sunrise ones. In some cases this has meant running down manufacturing in favour of services - one theme of British economic policy in the 1980's. In others it is a matter of stimulating new technology industries, through incentive schemes, technology parks, venture capital funding, and public procurement policies (notably in defense).

Our own view on this is that the choice between old industries and new should be seen in the context of sectoral strategy. Those industries which some class as sunset are in other areas being transformed into sunrises. The decline of large volume shoe production in Northern Europe does not mean that people have stopped wearing shoes. Nor does it mean that shoe production has moved to

cheap labour areas of the world. It signifies rather that those who are competing successfully in the international shoe industry have developed new methods of production and design, so that the issue for North-West European policy makers is whether or not to match the sunrise footwear producers by restructuring the sunset footwear industries they have inherited. There are no old industries only old processes. US policy makers have now recognised this in the concept of 'dematuring' industries.

The issue of new technology industries should be approached in a similar way. One part of a new technology policy should be to see how such technology could be applied to make old industries new. Another might consider how new technology components in use by existing industry could be import substituted (through the development of printed circuit board capacity for example). A third could consider the import substitution of software. In each case, however, we are dealing with a particular sector - software, pcb's, chip production - and each needs to be analysed in terms of sectoral potential, in the same way as any existing industry. There are limits to the concept of new technology as a guide to industrial policy, just as there are to 'manufacturing'. It is not that both are not important. It is that they remain at too general a level for effective policy intervention.

A switch from the old to the new as a guideline for policy is too often a means of avoiding strategic discussion rather than furthering it. If we consider how new industries develop we find that most spring from existing firms responding to new needs in related areas, rather than investing in 'greenfield' products which have little relation to their previous know how. Existing industry needs a policy of diversification - but the aim should be organic growth starting from where an industry is rather than an enclave development which has little connection to what has gone before.

The present report is not the place for a full consideration of alternative policies. In our view, it would be valuable for

industrial policy makers in Cyprus to commission a survey of industrial policies and performance in countries at a similar stage of development. Our concern in this report is to register the existence of alternative approaches, and make clear the reasons why we have followed the sector strategic one. We should also make clear that a sector strategic approach will need to address the issue raised by the other approaches: firm size; technology intensive investment; foreign investment; labour policy; tax incentives; new industries. The point is that we approach the question of strategy by the sectoral path, and ask how these other issues bear on the sector strategy, rather than starting from general topics and then applying them to sectors. The distinction is one between a sector as against a generic approach.

3.3. The relevance of the approach to Cyprus

The Cyprus government has in the past followed a mix of strategies. After 1974 it pursued a sectoral policy, identifying priority sectors, encouraging them through the priority fund, and through government procurement policy. In the mid 1970's the main issue was how to re-establish these industries so that they could supply the growing demand in the Middle Eastern countries and at home. At this time there was little need for detailed sectoral strategy and restructuring.

Side by side with this growth, the government followed a number of general policies: encouraging fixed investment through the incentive system; encouraging the growth of firm size and professional management; expanding training, and establishing an export promotions organisation

With the decline in demand, the prospective formation of the Customs Union, and the increasing intensity of international competition, it is clearly recognised by the government, industry and the trade unions that the question of restructuring has moved to the top of the

agenda. If the decade up to 1985 re-established the industrial structure of Cyprus, the decade up to 1995 will need to restructure that industry if it is to remain competitive. Once the question of restructuring arises, so does sector strategy. For restructuring to be effective it needs to be done in the context of a sector strategy.

We will comment on the existing industrial policies at the appropriate point. We see them as supplementary to, and needing to be redefined in terms of, the sector strategies: not in necessary contradiction to them. We are arguing for an extension and systematisation of policy rather than a sudden reversal. What we would stress, however, is the importance of the discussion of industrial strategy starting from the existing strengths and structures of Cypriot manufacturing, and from the specific character of the rest of the economy. This is what we mean by the need for strategy to be organic. New Cypriot growth will be strongest when it comes from Cypriot stock.

3.4 The procedure of the study

It follows from the above that the kernel of our report lies in the sectoral studies. These have assessed the sectors as they operate in Cyprus in the context of the trends in international competition. Each of them starts with an analysis of the international sector and competitive trends within it. They go on then to consider appropriate strategies for Cyprus at the sectoral level. It is at the sectoral level that the first action must be taken. In terms of the main conclusions of our mission, therefore, they should be sought in the details of the sectoral studies and their 140 recommendations. Summaries of each are attached to this general report.

There are, however, certain issues common to each, and policies which require cross sectoral action. There are also inter-sectoral issues, both in terms of the priority to be accorded to each sector, and in terms of the relationship between different manufacturing and non

manufacturing sectors in the economy. These cross sectoral issues will be the subject matter of this report.

In the next three chapters we consider the strategic choices which now face manufacturing. Having argued for a sector strategy, these chapters go into what that strategy should be. Our starting point is to briefly look at Cyprus industry as it actually exists and in particular at the five priority sectors. Then we shall consider international competition and assess the problems faced by Cypriot industry in following either of the two strategic paths between which both industrialists and government need to choose. Finally in Chapter 7 we make suggestions about what action can be taken both to implement the strategy we recommend and to further the discussion of the strategy among those who will have to implement it.

3.5 Summary and conclusion

This chapter has outlined the advantages of a sector strategic approach industrial policy. This approach is the basis for Japanese industrial planning, which has been so important a part of Japanese industrial growth. It allows the policy maker to understand the specific characteristics of the sector and how they are changing - where its competitive edges lie, what innovations from other sectors could be introduced, who the leading firms are, where potential growth areas exist, and so on. Just as firms need to know about the economy at this level of detail, which is why most firms are organised sectorally, the same is true of governments. For governments can thereby frame policies which are targeted to the specific needs of particular firms and industries.

More general policy issues - such as the size of firms, new technology, foreign investment, the run down of old industries and the encouragement of the new are often most usefully approached through the study of sectors, since what is advisable for one sector may be inappropriate for another.

IV

CYPRIOI MANUFACTURING IN THE LATE 1980'S

After more than a decade of rapid growth, Cypriot industry still has much the same character as it did at the start of the period. It is primarily labour intensive, light industry, geared to consumer markets, operated by family firms, with a predominance of semi-skilled manual labour. Government policy has tried to change these characteristics - encouraging more capital intensive industry, professional management and larger firms with a more skilled labour force, but overall its policy has been more successful in stimulating the expansion of the early model of industry rather than changing its character. In this chapter we look in more detail at this character.

4.1 Manufacturing in an island economy

Cypriot manufacturing structure must first be understood in the context of Cyprus's position as an island economy. Like other such economies, Cyprus has a small internal market, long supply lines for many raw materials, and for servicing export markets. These are the disadvantages of an island economy only partially offset by the measure of protection afforded by the sea. As a result the manufacturing industry of islands share a number of characteristics:

- industries are located in sectors in which scale economies are less significant
- many of them serve home markets which are protected by distance from international competition
- some plants process primary products for export
- the balance of industry is towards consumption goods rather than intermediate or capital goods.

These features are reflected in Cypriot industry as broken down in the accompanying Table. We have distinguished four types of industry. The first is concerned with processing domestic materials for the home and export markets. It includes meat processors, cheese and yoghurt makers, fruit juice and vegetable canners and brewers of wine and brandy. In each there are some modest advantages to volume production, which could put Cyprus at a disadvantage in the international market, but where this is the case tariff and non tariff barriers have arisen to protect the home market, (for example in the dairy industry).

The second and third categories contain industries where there are substantial volume economies, and where, therefore, Cyprus stands at a significant disadvantage to established overseas producers, and to producers with large internal markets. As far as the processors of primarily domestic materials for the home market are concerned (the second category) the protection in part comes from the costs of transport (high weight: value ratios for bread and building materials) and the need for freshness (bread). In the case of bakery products the government also substantially subsidises the grain import prices.

Where the processed materials are imported, substantial tariff and non tariff protection is required. The nominal rate of protection on cigarettes for example is more than 2½ times the unit value of domestic production. On sugar and chocolate confectionary the general nominal rate is 75% on final import values, in an industry where domestic value added is only 27% of output. Soft drinks - which are in any case protected by the cost of transporting a low price water product - in addition receive a 45% rate of nominal tariff protection.

In both categories, therefore, domestic production is only possible with some form of protection, and this means that in general their export ratios are low. What acts as natural protection for Cyprus products in their home market, also acts as protection against Cyprus products abroad. There is some regional export of cigarettes and tobacco, confectionary, plastic products, and particular metal products like turbine pumps, switchgear, and aluminium extrusions, but in most of the sectors exports are 10% or less of total output.

Cypriot manufacturing by origin of inputs
and destination of output, 1984

	percentages	
<u>Processed domestic materials</u> <u>for home and export markets</u>	imported raw materials as % of all raw materials	Exports as % of total output, 1984
Meat products	22	20
Dairy products	7	20
Vegetable and animal oils	-	34
Canning	33	56
Alcoholic drinks	7	47
Cement	-	33
 <u>Processed primarily domestic</u> <u>materials for home market</u>		
Grain milling	32	-
Bakery products	19	4
Non metallic mineral products other than cement (bricks, tiles)	22	11
 <u>Processed imported materials</u> <u>for home market</u>		
Soft drinks	77	1
Cigarettes and tobacco	99	19
Chocolate and sugar confectionary	93	10
Textiles	92	3
Printing and publishing	97	8
Plastic products	100	21
Paints and varnishes	97	1*
Petroleum refinery	100	-
Wooden furniture	61	2
Metal products except machinery	94	11
 <u>Processed imported materials</u> <u>for home and export markets</u>		
Clothing	98	69
Leather and fur products	58	58
Footwear	81	60
Paper and paper products	100	50

Note: the proportion of imports in materials is based on 1976 ratios applied to actual materials usage in 1984.

Source: Industrial Statistics

There is a fourth category, however, which while using primarily imported raw materials, and receiving high rates of protection in the domestic market, nevertheless also exports 50% or more of total output. The great majority of these sales are to regional rather than European markets, where exporters have been able to compete by marrying modest volume production to low labour costs. With a highly protected home market, they have also been able to cover overheads on domestic sales, allowing incremental cost pricing in foreign markets, although at times the foreign markets have been strong enough to offer even greater profits than the domestic market. Yet in general the fortress principle which has been the traditional cornerstone of international trade (high price in domestic market, incremental cost price in world markets) also applies here. It is this principle which stands to be set aside by entry into the Customs Union.

The industries in the fourth category will all be vulnerable to foreign competition, their high export content reflecting the existence of volume economies. In the third category too the majority of industries are vulnerable, with low export volumes commonly indicating the inefficiency of the Cyprus scale of production rather than any natural protection. Some of these industries are to be exempt from the union; others like soft drinks, jobbing printing, small scale joinery and metal work job shopping have a natural protection. Textiles, some plastics, paints and varnishes, wooden furniture, and some of the traded metal products remain at risk. The first two categories, on the other hand, with the exception of cement, will not be vulnerable. From the viewpoint of international competition therefore it is with the third and fourth categories that we need to be particularly concerned.

4.2 A consumer good industry

The small size of the internal market also explains another characteristic of the structure of Cypriot manufacturing. It is that the great bulk of its industry is geared to the consumer market. The following table shows the figures for 1984. 75% of value added was in

consumer goods production. A significant proportion of construction materials was also geared to domestic housing demand. Only 10% of all value added was made up of non construction intermediate products and investment goods.

Manufacturing Activity and Manufactured Imports
by Economic Destination 1984

		%	Value Added	Imports
Consumer goods			75	23
of which:	durable	8		7
	food, drink and tobacco	28		5
	other non durable	39		11
Intermediate goods			20	38
of which:	construction materials	15		
	other	5		
Investment goods			5	12
Transport equipment				18
Processed fuel and lubricants				10
Total			100	100

Source: Industrial Statistics 1984

On the other hand less than a quarter of manufactured imports were consumer goods. The bulk were made up of intermediate and capital goods (including transport equipment). As a result, when we compare the absolute numbers, we find that two thirds of the home market for manufactured goods are supplied by domestic producers. The equivalent figure for intermediate goods is 31% and for capital goods 19%. Thus Cyprus is considerably more self sufficient in consumer goods than in the provision of intermediate or capital goods. In parallel, approximately 75% of Cypriot exports are consumer goods.

The reason for this structure of production is that even in a small market there is a substantial demand for certain relatively standard commodities. There are a number of such commodities which have been resistant to full scale mass production because of the awkwardness of materials and the existence of many labour intensive processes. In the case of intermediates, on the other hand, minimum volume sizes tend to be much higher (compare textile fabrics to ladies clothing for instance, or chipboard to a piece of designer furniture). The same is true of certain investment goods (such as tractors). Some machinery on the other hand is only produced in small batches, but here, too, the extent to which Cyprus can build up the specialised skilled labour force required will be limited by the size of its market. Thus the preponderance of consumer goods in Cyprus is in part the result of the structure of demand and in part because the goods in which Cyprus has concentrated have been ones that enjoy a certain economy of volume production but not too much.

As Cyprus develops we should expect a number of trends. The growth of the market itself encourages volume production. This should in principle favour local producers. On the other hand, productive efficiency may have been developing faster abroad, and together with a tendency for wages to rise relative to countries with slower growth rates, this will put Cypriot producers at a disadvantage. A more recent development has been for consumer markets to become more differentiated with the level of income, again putting producers in a smaller market at a disadvantage relative to more specialised production abroad. Hence we would expect Cyprus to become less competitive over time in consumer goods, save in those products where enterprises have been able to specialise. The gradual increase in consumer goods tariff in the post 1974 period, and the upward drift in import penetration noted in Chapter 1 indicates that such a trend has taken place.

At the same time, we would expect a growth in the proportion of demand for intermediate and capital goods relative to consumer goods, as the production structure 'deepens'. This has happened in Cyprus, and with import substitution more difficult in the non consumer goods sectors,

imports have risen relative to domestic production for the Cypriot market, from 126% in 1976 to 139% in 1984. Imports of intermediate and capital goods which were 90% more than consumer goods imports in 1976, by 1984 were 210% greater. (see Table 1.)

4.3 Labour intensity

If large volumes imply capital intensity, we would expect Cyprus manufacturing to be labour intensive. With the exception of two large cement works, a number of chemical plants and the oil refinery, this is the case. No detailed figures for capital stocks exist after 1981. One proxy is the amount of depreciation per employee. The 1984 figures are given in the table. They demonstrate the labour intensiveness of the two major non food export sectors, with the depreciation for employee in clothing being one twenty fifth of that in industrial chemicals.

4.4 Capital investment and capacity utilisation

In spite of the predominance of labour intensive industry, government policy has attempted to increase capital investment as a path to productivity growth. There have been substantial incentives for capital investment in Cypriot industry over the past decade. They have included:

- investment allowances (up to 45% of capital expenditure incurred is allowed as an investment allowance)
- depreciation allowances (any capital expenditure on plant, machinery and the construction of industrial buildings is allowed as a deduction from income in the year in which it is incurred)
- profit tax reduction from 42½% to 25% on profits set aside for investment in new machinery

- duty free imports of capital goods
- most recently, duty free imports of computers.

Factor intensity in Cyprus industry, 1984

Cfs

Depreciation per employee

Food	525
Food, drink and tobacco	609
Textiles and wearing apparel	197
Leather products and footwear	294
Wood and wood products	317
Paper products, printing and publishing	736
Petroleum Refinery	2,889
Industrial chemicals, (insecticides and pesticides)	4,957
Other chemicals, rubber and plastic products	861
Cement	2,303
Other non metallic minerals	653
Metal products, machinery and equipment	463
Other manufacturing	380
All manufacturing	484

Source: Industrial Statistics 1984

Note: The measure of depreciation against employees can give no more than an indication of capital intensity; a comparison of the depreciation figures with those for the total value of fixed capital (for 1981) suggests, however, that depreciation employee ratio does serve as a suitable proxy for fixed asset employee ratio, as far as ranking is concerned.

Since the depreciation allowance is granted in addition to the investment allowance, manufacturing firms receive an allowance of 145% (or 155% for a public company) on the capital expenditure on plant and machinery and 120% (130% for public companies) on industrial buildings. They can also carry forward losses indefinitely, which means they can enjoy in effect a tax holiday for a number of years. With interest rates controlled at 9% and high profits particularly in the 1970's, the climate for manufacturing investment has been very favourable.

The policy has undoubtedly had its effect. By and large the sample of firms which we visited were relatively well equipped. In some cases the equipment was state of the art, and more advanced than would be customary in firms of an equivalent size in Europe. Nevertheless, there are still a number of common problems:

- (a) much of the machinery, particularly the most modern, was operating below capacity. The meat processing sector was a stark example where five of the firms had modern machines each of which could have supplied the Cypriot market on its own. In part these investments reflected a view that Cypriot producers could remain competitive with the Europeans if they invested in the most modern machines. In part, however, it was the result of careful feasibility studies which - because of the incentive system - still allowed the investments to show target rates of return in spite of over capacity in the industry. From the point of view of the economy, this is over-investment. There were many similar examples.
- (b) one aspect of the over capacity problem was that investments had been made in specialised machines geared to large batch or mass production. For industries like furniture, organised as it is to producing a range of products for the domestic market there is limited scope for full use of such machinery. In export market industries like footwear, the down-turn in the Middle East left a number of firms stranded with specialised equipment which could

not easily be turned over to other uses. In these cases the problem was with the inflexibility of the machinery in the face of fluctuating markets.

- (c) surplus capacity extended to the use of buildings. Particularly in the metal working sector we found firms in premises far too large for them. When taken together with surplus capacity machinery, it led to an often chronic problem of asset utilisation. One measure of this is the fixed asset: turnover ratio. This indicates how often the value of fixed assets turns over in a year. In the case of the metals sector, 90% of the firms had fixed assets of 50% or more of annual sales, with 18% of the sample exceeding 100%. In clothing the figures were 42% and 21%, with one firm having fixed assets of twice the value of sales. In furniture the majority of the sample exceeded 100%. These, moreover, are labour intensive industries with low capital labour ratios.
- (d) in some instances new machines had not been bought because of the current market size. One furniture manufacturer who had decided not to go ahead with a £1 million investment programme to introduce flowline production commented that the investment was 'too small for Europe and too big for Cyprus'.
- (e) in spite of the incentives, Cyprus had relatively little computerised machinery. We found only three firms in the metal working sector with CNC machines. In clothing nearly a third of the sample firms had some form of computer controlled equipment, but this was exceptional. The furniture industry had no CNC or electronically controlled equipment. There was a similar picture in footwear. We found no CAD machines in any of the sectors, nor any of the electronic materials measurement and lay out equipment which has been spreading in the European shoe industry.

Machinery, scale and capacity utilisation

- Meat production Five manufacturers had modern machines, each of which could have met the entire domestic demand by themselves. Consequently they were producing with excess capacity.
- Dairy industry Dated equipment relative to Europe, but appropriate to the volume of Cypriot raw material supplies.
- Bread baking Dated equipment, but appropriate to the size of the Cypriot market.
- Tetra pak juice Modern machinery with excess capacity.
- Knitwear & underwear Machinery designed for long standard runs, with low capacity utilisation. Example of computer controlled knitting machines to give greater flexibility.
- Clothing Levels of fixed assets per worker comparable to UK. All firms in sample had specialised machinery (compared to 73% in ITA survey); 6 out of 19 had some form of computer controlled equipment. More than half the companies had automatic or semi automatic laying up machines, though marker making remained manual, and there was no computer controlled cutting. No CAD equipment in the industry.
- Footwear Footwear technical expert judged that the average quality of equipment in Cyprus compared favourably with Britain and Australia. Sewing machines relatively new. All managers had invested in some form of machinery over last five years, but strongest in late 1970's. Smaller firms complained that they had been misled by suppliers. Even large firms complained that they had bought specialised equipment which required long runs.
- Furniture In many firms modern electro-mechanical equipment for large batch production was idle much of the time. No CNC or electronically controlled machines. One firm had an electro-mechanical mass production panel saw which could have supplied whole industry. Another had idle mass production spraying line. A third had modern kiln drying equipment operating at 50% capacity, whereas many firms had inadequate kiln drying facilities.
- Metal working 3 firms out of a sample of 23 had CNC machines, a total of nine machines in all. They included a computer controlled investment casting foundry, a state of the art aluminium extrusion unit, and a break press, all of which were operating well below capacity.

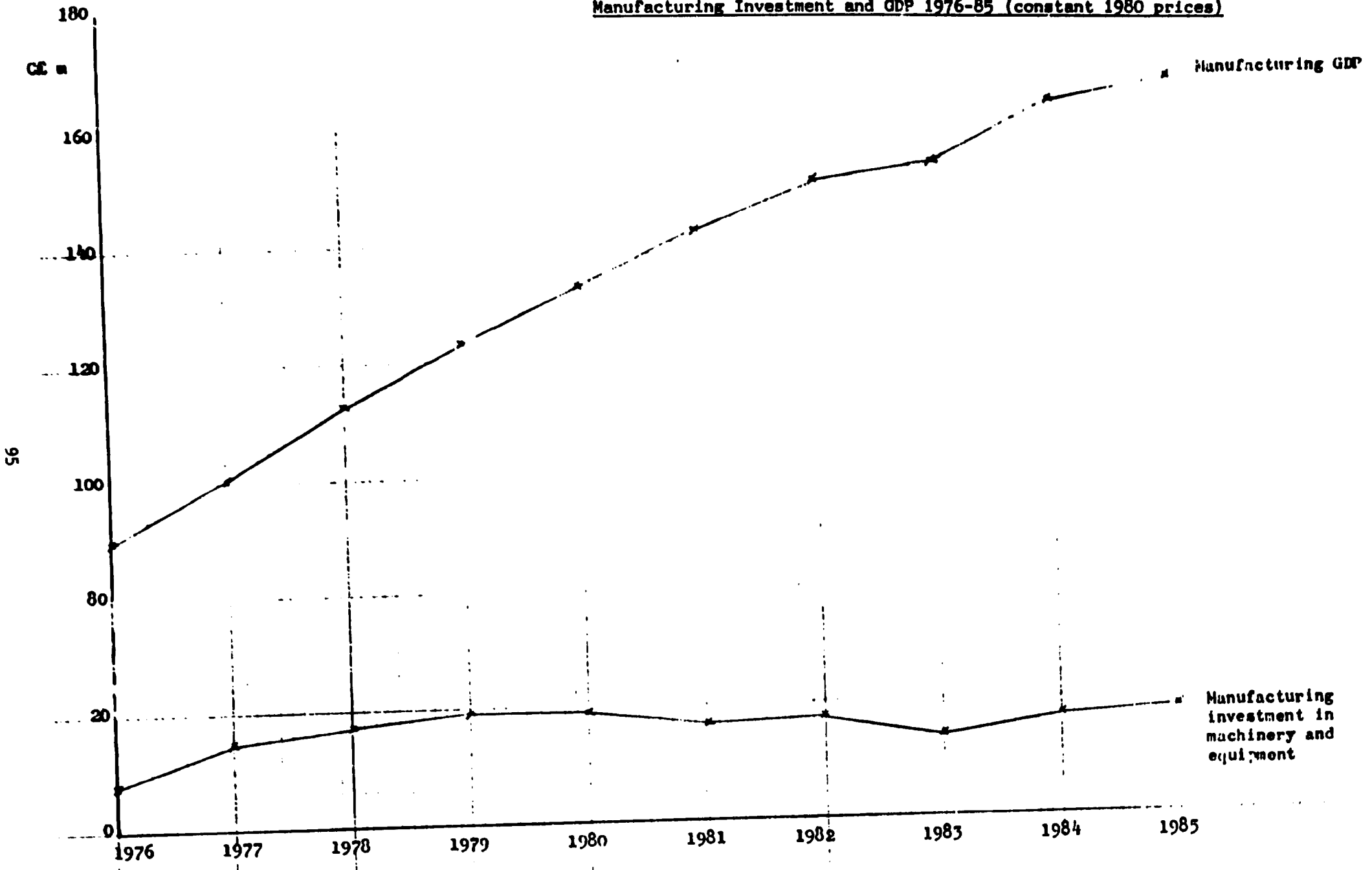
There is the mixed picture, with examples of over investment and under investment as seen from the viewpoint of international competition. The incentive system ensures that the cost of over investment is born by the exchequer rather than the individual firms. In the case of under-investment, its existence in spite of the generous tax allowances only underlines the difficulties which Cypriot firms face in so small a market.

These difficulties may go some way to explaining a disturbing downward trend in the share of investment in manufacturing GDP. As shown in Figure 1, although the level of investment has marginally risen between 1977 and 1985, its proportion of value added has fallen from 15% to 11%, at a time when certain types of equipment - critical for the improvement of productivity - remain unpurchased. Moreover capital investment as a share of gross profit has declined from 60% to 44% in 1985 (see Table 2). The above suggests that the incentive schemes need re-assessing, both in terms of their levels and generality, and in terms of complementary action to help offset the problems of over capacity.

4.5 Specialisation and rationalisation

One feature of Cypriot manufacturing, which compounds the problems of scale and capacity, is lack of specialisation. The issue is particularly evident in the furniture industry, where the practice of a manufacturing firm also having its own showroom (as was the case with 45% of those firms with more than 5 employees) means that each has to produce a full product range. As one industrialist put it, he had to produce 10 bedroom ranges even though only 3 sell because the customer would otherwise ask, 'Is that all you have?' The result is small runs, low productivity, a greater variety of inventories, and larger finished stocks. It was a pattern we found repeated in a number of sub sectors in the metal products industry.

Manufacturing Investment and GDP 1976-85 (constant 1980 prices)



There is an argument which suggests that the lack of specialisation, like overcapacity, or investments too large for any one existing firm, will be overcome through competition. If there is a lack of specialisation, we would expect a firm which specialised to be able to undercut those that do not. If there is overcapacity we may expect rationalisation, as has been happening in the fruit juice industry, with less efficient plant being taken out of production. If computer-aided design facilities are valuable then we would expect a new entrant to provide a CAD service to the industry as a whole.

There are reasons to doubt whether the market by itself will be an adequate instrument for rationalisation in the Cypriot case:

- (a) there has to date been remarkably little rationalisation, in spite of declining profitability in a number of sectors (meat processing for example). Competition has led as much to product diversification as to specialisation.
- (b) the provision of specialist services such as CAD depends on existing manufacturers being aware of the benefits of such systems, as well as on the capacity of the new entrant to persuade them of its value, and to command sufficient risk finance to bridge the period of adoption.
- (c) there are risks of a firm undertaking specialisation individually - as in the case of a C£200,000 single product flow line in the furniture industry - which would be much less if undertaken collectively. These include the risk of demand for the particular product, the problem of sales outlets for a specialist product even if it undercut one item in a competitor's product range, and the loss of flexibility from less dedicated equipment.

Specialisation

- Food processing** In some cases firms have failed to specialise within a single product area, producing fruit juices, frozen vegetables, and canned vegetables within the same factory. In other cases the lack of specialisation is within a single product area, such as meat processing, where firms of 10-15 employees may have sales lists of 50 or more products.
- Clothing** The home market demands variety. Export customers oblige Cypriot firms to accept small orders alongside the large.
- Footwear** Many firms are seriously unspecialised, producing mens, womens and childrens shoes in alternative colours and foot sizes. In some cases this is linked to the need for a full range in their own retail outlets. Others have begun to specialise, producing, for example, high quality ladies shoes with different lines aimed at market segments.
- Furniture** Nearly half those firms with more than 5 employees have their own showrooms. This has meant that manufacturers have to produce a full product range, with resultant short runs and overstocking.
- Metal working** The air filter manufacturer produces a range of more than 1,000 filters.

(d) time is limited for those industries facing increasing international competition, intensified by potential entry into the EEC Customs Union. Rationalisation through the market is liable not to match the time scale of the proposed transition period, particularly in the furniture industry.

4.6 Labour Productivity

Labour intensity, under-utilisation of capacity, and lack of specialisation all contribute to a low level of productivity in the manufacturing sector. We noted in the last chapter that even in labour intensive sectors like clothing and footwear, Cypriot productivity was considerably below that in Europe. However, productivity has recently begun to increase more rapidly. As the accompanying table shows, between 1976 and 1985, real output per workers rose by 19%, with the rate of increase improving from an average of 1.4% p.a. in the second part of the 1970's, to 2.5% in the first half of the 1980's. In 1985 the rate of increase reached 2.6%.

4.7 Raw materials finished goods and working capital productivity

The fact that the great bulk of intermediate goods have to be imported is another aspect of the difficulties of specialisation in a small economy. As with machinery investment, attempts to develop supplier industries within Cyprus have met with problems, even where they have been using local raw materials. Too often finished goods manufacturers have been in conflict with local suppliers, and with the government when protection to local suppliers prevented manufacturers tapping the world market for cheaper or better quality goods.

Labour Productivity in Cyprus Manufacturing 1976-85

		Output per worker in constant 1980 prices C£
	1976	3.139
	1980	3.315
	1985	3.727
Annual average	1976-80	1.4%
change	1980-85	2.5%

Source: Industrial Statistics

In each of the five sectors we looked at, raw materials and intermediate inputs were of major concern. Long supply lines for imported intermediates led to manufacturers overstocking, both because of minimum quantity orders (as in steel) and/or because of the danger of running out of stock if the imports did not arrive on time. In the footwear and clothing sectors, industrialists commented on the danger of fashion obsolescence when material might take 1-3 months to arrive even from Europe. Individual firms in these two sectors had invested, or had considered investing, in intermediate processing plants; the problem was one of the high capital cost and scale of operation required in order to be viable for the individual firm. In the furniture sector there was considerable tension between the furniture makers and the main timber supplier. In food, the problem was with synchronisation of supply and the manufacturers requirements, and, in the case of grapes, with quality.

For Cyprus industry as a whole the issue of materials supply and management is of central strategic importance. Nearly two thirds (65%) of the value of manufacturing output is made up of material inputs. Of these, two thirds are imported materials, so that overall 42% of the value of all Cypriot industrial output represents imported materials (see Table 3). Yet we repeatedly found firms grossly overstocked with

materials, and unaware of the working capital cost of this practice. Similarly, firms with low capacity utilisation, or producing a variety of small batches to make up a product range, tended to manufacture for inventory, increasing their working capital costs, and commonly being forced to mark down obsolescent stock. When added to the high input stocks, the results were stock ratios that put Cypriot producers at a serious disadvantage with respect to their overseas competitors.

In the metal working sector of the 23 firms in our sample (representing 50% of sectoral output in 1985), only 37% had stock: turnover ratios of less than 1.5 times, and for 16% the ratio was less than one. That means that they had more stocks than their entire annual sales. In the furniture industry, of the 15 firms visited, one had a stock turnover ratio of over 6 times, the others were much less, though precise figures were not available since none of the firms kept figures on their working and fixed capital utilisation. In the clothing industry the ratio was better with only one firm in the sample of 19 being below the 1.5 times ratio, with three others being less than 3. In the footwear industry, of the 15 firms for which data was available on stocks excluding finished goods outside the factory, one firm had 1.4 times more stocks than annual sales, and six had stock turns of 4 or less (i.e. stocks turned over once every three months or more). Of a sample of the balance sheets of ten public companies, 50% had turns of 3.5 or less, a further 10% were under 5, while at the other end Pancyprian Bakeries had a turn of 14.9 times, Lanitis Bros of 22.4 times, and Carreras of 31.1 times. For manufacturing as a whole the turnover stock ratio has been worsening, falling from 5.3 in 1981 to 5.0 in 1985 (Table 4).

Raw material and intermediate supply problems

Dairy products Seasonality of milk supply, and particularly shortages of sheeps milk. Linked by manufacturers to system of milk price support.

Vine products Improvement in grape quality hindered according, to manufacturers, by system of grape price support.

Frozen vegetables Frozen varieties of vegetables are not grown locally.

Clothing Lack of fabric supply within Cyprus. Lead times of one to three months for European fabrics, and four months or more from the Far East. Fabric stocks ordered on this timescale risked fashion obsolescence. 2 companies visited were writing down £0.5 million of stock for this reason.

Dyeing, bleaching and finishing capacity. Existing bleaching and dyeing company had some advanced and some outdated equipment. Considerable dissatisfaction registered by a number of firms. Company facing capacity utilisation difficulties because of seasonal demand (50% rather than targeted 80-85%) and pressure to detoxify waste products.

Footwear Long overseas supply lines and danger of unavailability led to overstocking of leather. Existing domestic supplies of leather insufficient. Importance of high quality domestic leather finishing plant expressed by manufacturers. Price and quality problems with monopoly last producer, and with domestic heel suppliers.

Furniture Furniture makers complained about the quality of Cypriot chipboard not being up to European standards, yet they cannot import chipboard because of an import ban. They also complained about the middleman system which prevented manufacturers buying directly from Cyprus Forest Industries. CFI argue that the problem is with the manufacturers production techniques. There is also an issue of the long term domestic sources of supply of good quality, knot free wood.

Metal products The major raw material is steel, which has to be imported in minimum quantities and results, therefore, in overstocking.

long

The evidence from our survey suggests that many Cypriot industrialists underestimate the importance of stock control, and find themselves limited in potential action over inputs. Yet the significance of both may be judged by the following figures. In 1985, the quantity of raw materials used by Cypriot manufacturers was 2.6 times the amount they spent on labour. A 4% reduction in material costs would be equivalent to a 10% reduction in labour costs (a sector breakdown of the relation of labour to raw material costs is given in Table 5). In the same year, the year end stock figure for Cypriot manufacturers was almost exactly equal to the annual labour bill. A halving of stock holding would yield a saving in interest on working capital of 4.5% of the wage bill, assuming a 9% rate of interest.

4.8 Manufacturers and markets

The retailing revolution which has occurred in Europe over the past 25 years has still scarcely begun in Cyprus. The food, clothing, footwear and furniture sectors - all of which have seen the balance of power shift from manufacturers to retailers in Europe - are still firmly under the control of the manufacturers as far as the Cyprus domestic market is concerned. In the food sector, for example, the super markets which do exist are largely family owned single outlet operations. They cannot, therefore, afford the central warehousing, distribution systems operated by the large grocery multiples in Europe nor their computerised systems of stock control and ordering. distribution is rather in the hands of the producers, operating their own expensive van delivery systems. We found examples of the suppliers controlling stock levels within their client shops as well.

In the clothing sector, while an increasing number of manufacturers are opening their own retail shops and in two cases are planning to introduce electronic point of sales system, there are no parallels to the innovatory clothing chains in Western Europe - Benneton, Next, Principles, Richards - except through the presence in Cyprus of Benneton and Next themselves.

Manufacturers and markets

- Food** Distribution system supplier rather than retailer controlled, with salesmen and delivery vans controlling store stock levels.
- Retailing largely by single outlet family owned stores, with no retail own label production. Little use of bar codes.
- No formal links between food and hotel sector associations.
- Exports largely through agents and wholesalers; one case (in dairy industry) of contracts with British retail multiple.
- Clothing** 32% of sample had their own retail shops (compared to 27% in 1983/4 ITA sample). 2 companies planned to instal EPOS (Electronic Point of Sales systems). Others without shops monitoring sales by close contact with major buyers. Some brand name advertising.
- Most exports through wholesalers, commission agents and other middlemen. Only one company with permanent marketing organisation abroad. Substantial sub-contract work on Cut Make and Trim basis for European customers. Also long term sub-contract work for European retailers, manufacturers and designer companies.
- Footwear** 47% of sample had own shops, with 26% having more than 3 shops. Other seeking direct access to retail market. Own brand and independent shoe shops largely archaic. No EPOS.
- Some overseas marketing done by foreign associate producers (Clarks, Ecco) who also provide domestic and overseas advice (Bata).
- Exports to Eastern Bloc through trading companies.
- Furniture** The majority of firms sell either direct from their factory (42%) or from their own retail shops (45%). Little exporting. Sub-contract relations with UK manufacturers/importers of pine chairs.
- Metal Products** Over two thirds (68%) of output is made from stock direct to customer, with 92% of the production of the small firms in the sector undertaken in response to customers orders. Thus 93% of companies sell their products directly from the factory, with only 18% having their own retail shops.

In footwear, one manufacturer had at one time 23 retail shops but had run them down, while other producers who had their own shops (47% of the ITA's sample) had not integrated the distribution and retailing systems in the manner of European footwear chains.

In furniture the integration between retailing and manufacturing had led to less efficiency rather than more (through the lack of product specialisation to which it had given rise), while the metal working sector retailing was much less significant because the bulk of products are made to order.

In Europe the retailers have played a central role in linking product and customer through computerised information systems in order to minimise stocks and maximise throughput. They have also shaped the industry - sometimes positively as in food, or negatively as in furniture. The best food and clothing multiples have established productive relationships with their sub-contractors, providing advice on quality control, product design, and production systems. In turn they have drawn on innovations and new product development from sub-contractors.

In Cyprus no such relationship exists. The producers determine the product range and see retail outlets as a privileged means of selling. The retail outlets are as it were sub-contractors for the producers rather than the other way round.

In overseas markets, some output is in the form of sub-contract work for European manufacturing and distribution companies. Much of it, however, is sold through sales agents and other intermediaries.

One need for Cypriot exporters is to have more overseas marketing capacity. The Export Promotions Council was set up to promote such things. But one of the key points about contemporary competitiveness is

the need to have direct and automated links between retailers and producers. Such links provide the manufacturers with consumer information which will allow immediate adjustment of the production process, and a reduction of finished stocks. Improvements in manufacturing production thus depend in part on improvements in retailing and distribution.

Similarly selling through sales agents and other intermediaries in overseas markets cuts off a producer from the market intelligence gained from first hand experience - of competitors, of changing styles and products, and the context for innovation. In as much as innovation is a matter of tailored response to customer needs - as in the engineering industry - then selling through an intermediary is cutting a link which has become ever more important in modern production.

4.9 Design, product development and R & D

In each of the sectors under review, design where it existed at all was largely geared to imitating foreign design, or it was bought in from abroad. Given the long lead time in developing fashions in the European clothing and footwear markets, the Cypriot practice of copying existing foreign fashion, meant that Cypriot goods tended to be 6-12 months out of date. This weakened their competitiveness in home and overseas markets.

In the clothing sector there was a new wave of firms which gave central importance to design, employing up to 10% of their staff on design, and spending up to 4% of turnover on design costs. Their success in US and European export markets reflect the value of their design intensity. They were, however, exceptional. The majority of clothing firms either had designs supplied to them by European customers, or survived on simple designs and dated imitation.

In the footwear sector designers were accorded an importance within their firms but their numbers were limited and they, too, were primarily concerned with imitation. In the furniture sector, while there were some outstanding examples of design, the bulk of the sector invested little in design, and was facing growing import penetration as a result.

Both the food and metal products sector were production rather than new product oriented. Their designs and products commonly came as a complement to the imported machinery. In both cases there is little if any Research and Development capacity.

In none of the sectors did we find CAD equipment in use, through a number of manufacturers were aware of its advantages and of its cost.

By and large the appearance and packaging of products tended to be inferior to those from developed country markets, as did the interior design of shops selling the products in the domestic market.

In general we were aware of a contrast between a keen sense of design by many Cypriot consumers - reflected in the imports (despite the tariff barriers) of Italian and other design intensive consumer goods - and the lack of strong 'design culture' in the production sector. We understand that a greater emphasis is being put on design in the secondary school syllabus. But this has yet to work itself through to the level of specialised design institutions, and strong professional organisations of designers.

Similarly with research and development. There are no facilities for manufacturing which compare with those built up at the Agricultural Research Institute. This is one area where the small size of the Cypriot firms puts them at a particular disadvantage, particularly in a country without higher level research institutions.

Design product development, and R&D

Food

In meat products, the supply of new continental sausage recipes came large through overseas trade fairs, through the suppliers of ingredients such as spices, and through independent consultants from Germany.

Many other food products have been based on traditional recipes, from cheeses, to vine leaves preserved capers, mosphito berries, herbal teas, rusks flavoured with spice seeds, and sugar free Turksih delight. These have not had to be 'invented' so much as prepared and packaged in a firm presentable to the overseas market. A number of these can potentially supply the health food market (particularly goats and sheeps milk products, carobs, and herbal teas) and it is the design and marketing of these products in relation to that market niche which becomes critical for market expansion.

Clothing

For most Cyprus clothing firms, design means copying foreign styles from fashion magazines, photographs of shop windows or garments purchased abroad. Most medium to large firms had in house design departments, but they concentrated on adapting existing patterns to production requirements and grading, rather than originating new styles. This meant that many firms had styles 6-12 months out of date, which according to market research reports weakened demand for Cypriot products in Western Europe. A number of firms were attempting to go beyond this, hiring in professional designers from abroad, spending up to 4% of turnover on fashion forecasting reports, foreign travel and salaries for in house staff. One firm had a design department of 10 staff, another had one of 7 out of a staff of 80. No clothing firms had been able to invest in Computer Aided Design equipment.

In the CMT and European customer led section of the market, Cypriot firms received designs as samples or patterns direct from the customer.

Footwear

Most of the larger firms employed a designer, usually with an assistant. In many cases the designers were partners, and in some they were the original founders. The predominant design approach was imitation - usually of Italian designs - with some modifications for particular customers. There were no CAD machines in use in the sector.

Furniture

Two of the successful furniture firms are owned by designers trained in England; another has grown on the basis of imitating Italian designs. In general, however, there is little investment in design or the development of new products. The reason given by firms was that any successful investment would be imitated by others, thus negating the value of the design investment to the original firm.

Metal products

The majority of producers rely on product designs which copy foreign products, or are based substantially on foreign designs. There is a tendency in each of these cases for Cypriot products to be underdesigned. There was little research and development capacity, new processes being brought in the form of imported machinery.

The government has recognised the importance of new product development by extending a ten year income tax holiday to manufacturing enterprises investing in a new product development. However, the terms of the incentive are limited to a specified list of standard products, which would have to comprise more than 35% of gross output, and involve investment in machinery of more than C£100,000. This directs the incentive more towards the development of existing products which are new to Cyprus, rather than the development new products and designs on the basis of existing Cypriot manufacture.

4.10 Finance and Banking

There are five distinct issues in the field of industrial finance and manufacturing industry:

- the problems of financing industries with high raw material:
fixed asset ratios
- venture capital funding
- turnaround support finance
- long-term finance
- sectoral restructuring and diversification services

We will comment briefly on each of these.

High working capital requirements. The fact that much Cypriot industry has a low value added: output ratio, means that many firms have substantial working capital needs with little fixed asset backing. In the table overleaf we present the proportion of stocks to fixed assets for 16 public companies. Carreras had stocks valued at nearly four times the value of the fixed assets, Jevtro, the clothing firm, had a ratio of more than 2:1, and in all half the sample had stocks exceeding the value of the fixed assets. From our interviews, clothing firms in

Public Companies: Fixed Assets and Stocks

stock as a percentage of fixed assets
at book value, 1984.

Tobacco	
Carreras	377
BAT	169
Clothing	
Jevtro*	225
Footwear	
Atlas	136
Alfa	119
Bata	97
Textiles	
Covotsos*	80
Wood products	
Cyprus Forest Industries	136
Cement and Non Metallic Minerals	
Cyprus Pipes*	122
Vassiliko*	17
Metal Products	
National Can	106
ALCO	25
Food and Beverages	
Lambrianides Farm Products	64
Labrianides Brothers	42
Pancyprrian Bakeries	24
Lanitis Brothers	15

Source: Company Accounts

particular had found difficulty in raising capital for expansion when the bulk of it was needed to finance increases in working capital.

The problem arises because of a concern by the banking sector to lend on the basis of fixed asset security. The Cyprus Development Bank said that this was not a condition for their loans: they judged the project on the basis of feasibility studies, and once decided they then sought security through floating as well as fixed charges. Their investment manager told us that he could not think of a loan he had not made because of inadequate security. In the course of our interviews with firms, industrialists certainly believed that the absence of collateral made it more difficult to obtain capital, irrespective of the feasibility of the expansion.

Venture Capital Funding. The problem of expansion funds where collateral is lacking is compounded when the venture itself is new, and is engaged in product development. Venture Capital has proved to be a high risk, high profit area in the UK and USA, with required rates of return averaging between 50-80% to allow for failures. The size of risks has led some funds to re-orient themselves towards product development and expansion funding within existing firms, and this may be one avenue to follow for Cyprus. Currently, there is to our knowledge only one private venture capital fund operating in Cyprus, together with a limited venture capital facility at the CDB. For start up the CDB administers a small scale industries loan guarantee scheme, which has been promoted by the Government and the World Bank. 120 firms have been involved to date, though many of the projects failed to perform to target and could not service their debts. We have no information on the proportion of industrial lending going to small firms in the commercial banking sector.

Turnaround support and finance. The strength of Cypriot growth has meant that manufacturing industry has had a low failure rate. Over the next five years this is likely to rise. In some cases, a firm in difficulty may be taken over and reconstructed by another industrialist.

Finance and banking

Food

Finance did not arise as a problem in the course of our discussions.

Clothing

Most of the sample firms had working capital of more than 50% of fixed assets. This reflects the importance of working capital in the sector to finance cash flow problems created by seasonal peaks in sales, and the needs for forward payments on materials and wages. Nearly half the firms had long term loans, (3-4 years for those from the commercial banks, 5-6 years for those from the Cyprus Development Bank). There was only occasional evidence of sample firms having problems in obtaining long-term finance, for the commercial banks were reported as anxious to lend money to manufacturers out of their priority funds. Industrialists did criticise the banks for the heavy dependence of bank lending on disposable assets. The CDB had investments in nine textile and clothing firms (10% of its industrial portfolio) and had a strategic view of the industry's need to move towards a higher value products and more flexible production processes.

Footwear

Access to funds was not a major issue in the footwear sector.

Furniture

Many firms said that finance was a constraint. Yet they had large stocks and low asset turns, suggesting sub optimal use of those funds they had received. When a group of furniture firms approached the CDB with a proposal for restructuring, finance was forthcoming.

Metal products

Large stockholdings put pressure on working capital. Almost all companies were operating at their maximum overdraft limit. Nearly half (44%) were up to the gearing norm of 60:40 for fixed assets loans, and in a number of companies working capital was being used as hard core finance rather than to fund short term cash needs. With the commercial banks evidently lending with particular regard to collateral, some firms had borrowed to a point where cash flow before interest and tax was not sufficient to cover interest and principal repayments. As a consequence there are serious financial difficulties in the sector, but not due to inadequacies in the financial markets. The commercial banks may be overexposed and will find difficulties in asset realisation in the event of continuing depression in the sector.

But there have already been cases where larger firms in difficulties have been threatened with receivership and liquidation, at the cost of overseas export contracts and internal capacity. The key requirement in these circumstances is for a supply of 'company doctors', officers - usually from a bank or business services firm - who are able to play a role in turning the enterprises round. During the 1980's many of the UK clearing banks established first aid departments, principally to preserve the value of their loans via direct management. In Cyprus this resource is still small. The Popular Bank has recently built up a limited capacity in this field, as have the CDB (one of whose staff was responsible for the turn round at Alpha Shoes). All in all this is a facility which will be increasingly called upon in the coming period.

Long term finance. We found a prevailing view among industrialists that the banking system and other private sources of funds suffered from 'short termism'. We were told that private investors looked for pay back periods of as little as 2-3 years, and that even the Cyprus Development Bank sought a 6-7 year pay back on their loans. Certainly a number of the firms we visited were using substantial short term funds to cover long term fixed assets and working capital needs. But other than this somewhat unusual financial structure, we found little clear evidence that the absence of long term funds as such was a limiting factor. The bulk of Cypriot industry is still labour intensive, and would not be subject to long gestation periods before achieving profitability.

Sectoral restructuring and diversification. There is no tradition of industrial banking in Cyprus, providing industrial expertise and the ability to make loans according to a sectoral strategy and not merely in terms of individual projects. This is partly because of the short and dynamic history of Cypriot manufacturing, and partly because of the size of the economy, and the difficulties even for the largest banks of being able to develop such specialist expertise. The Cyprus Development Bank has attempted to develop a measure of sector strategy as a context for its project finance. This was most clearly exemplified in their support and financing of the Limmasol furniture makers, but it is also evident

in the clothing industry and tourism. With gathering pressures on manufacturing, not least through prospective entry into the Customs Union, we may expect a to rise in the number of industrial failures. The issue of how restructuring is to take place if at all is already urgent and will become more so. The absence of a tradition of proactive industrial banking is, therefore, a matter of immediate concern.

In summary the present problems facing Cyprus' industry are not primarily ones of finance. Two of the sector studies - clothing and metal working - came to the view that if anything the private banking system may have been too kind to some of the firms, and was vulnerable to firm failure since the book value of assets on which the loans were secured often considerably overstated the resale value. There were cases of dynamic firms which had found it difficult to raise funds because of lack of collateral, and this may well have a greater adverse effect on industry as now constituted than the absence of long term funds.

4.11 Small firms

Cypriot manufacturing is made up of predominantly small firms. It is an industrial structure which has been remarkably resilient in the face of government policy to change it, and in spite of the potential which might be assumed to exist from mergers and takeovers to bring about economies of specialisation. Indeed during the 1980's, small firms (under 20 workers) have increased their share of output from 27 to 34%, while the output share of those with more than 100 workers has fallen from 41% to 34%, as shown in the Table.

Manufacturing firm size in Cyprus

	1981	1983	1984	1985
Numbers of firms with more than 100 employees	52	54	58	56
percentage of:				
employment	4.1	23.4	23.9	22.2
output	40.9	37.7	38.0	33.8
value added	33.5	28.1	33.7	31.1
Number of firms with less than 20 employees	4959	5174	5274	6184
percentage of:				
employment	40.5	41.3	41.1	43.6
output	26.8	29.7	29.6	33.6
value added	32.4	35.9	33.0	36.2

Source: Industrial Statistics

More detailed figures are presented in Tables 6-9. From these we should note the following:

- There are still only 56 firms in the economy out of 6,616 with more than 100 workers. In a European context these would qualify as being medium sized firms. In the US, where the cut off point for small firms is taken as 500 employees or less, only one Cypriot manufacturer would be classified as not being small. Sticking to the European definition, the 56 medium sized firms accounted for 31% of value added, and 22% of employment.

- Firms with less than 10 workers account for 84% of all manufacturing enterprises, just under a quarter (24%) of valued added, and 30% of employment.

- The furniture sector has no firms with more than 100 workers, and more than half (52%) of its employment, and half (50%) of its value added come from firms with less than 10 workers. The metal products sector is similarly small, with only one firm with more than 100 workers, and 55% of employment, and 49% of value added coming from firms with less than 10 workers. In the food drink and tobacco sector by comparison, 54% of value added comes from the 16 firms with more than 100 workers. In footwear the figure is 38% and in clothing 25%.

- For manufacturing as a whole there is an average of 6.6 workers per firm, with figures highest in the footwear sector (16.9) as against 3.8 for metal products. This reflects a relatively high number of footwear firms with 10 workers or more (38%), and the jobbing shop nature of the metal industry .

- There has been no general upward trend in the average number of workers per firm over the decade: some sector like furniture and clothing show a marginal upward trend, others like food show a downward one, with the overall industry average falling between 1981 and 1985.

- The significance of the larger firms has diminished over the decade in spite of government policy to encourage firm size growth. Though the number of firms with 50 or more workers increased from 87 in 1976 to 142 in 1981 and to 151 in 1985, their share in manufacturing value added fell from 49% in 1976 to 46% in 1985. In footwear and metal products the number of firms of this size fell between 1981 and 1985.

Value
Added
per worker
Cfs

Figure 1 Sectoral Labour Productivity by Firm Size

13,000

12,000

11,000

10,000

9,000

8,000

7,000

6,000

5,000

4,000

3,000

Food,
Drink and
Tobacco

* Metal
Products

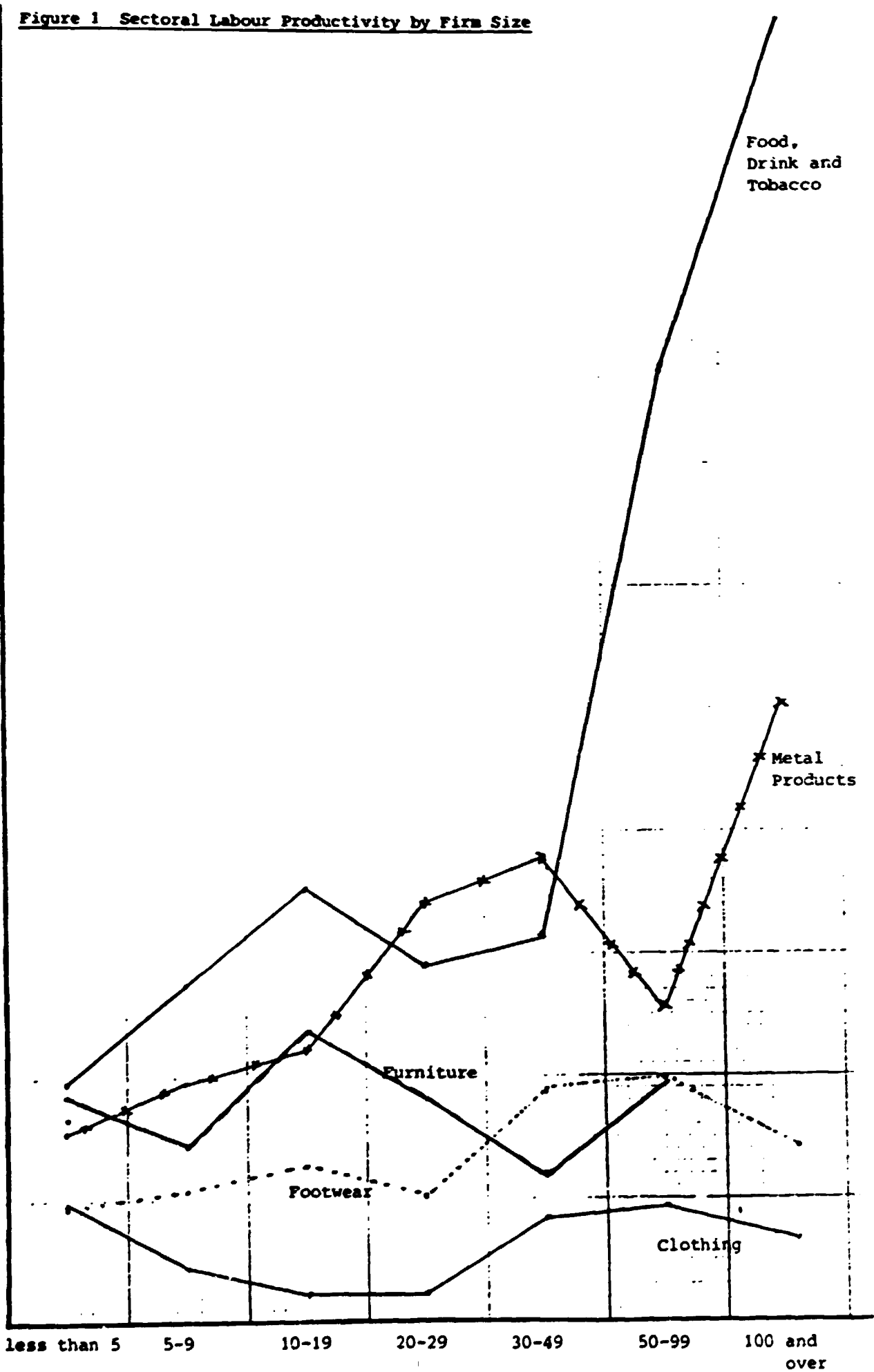
Furniture

Footwear

Clothing

less than 5 5-9 10-19 20-29 30-49 50-99 100 and over

Firm Size by no. of employees.



- There appears to be no consistent relationship between firms size and labour productivity between sectors (Table 9 and Figure 1). In food, drink and tobacco there is a sharp increase for firms with more than 50 workers, principally because of the large drink and tobacco firms. Metal products, too, shows a distinct upward trend. But in clothing and footwear, productivity drops with the large firms, while in furniture the smallest and the largest have the same level

- For the three sectors most subject to international competition following the Customs Union, the industrial structure is similar to that of Italy (Table 8). There is preponderance of small firms, with the average size of firms being markedly smaller than in the UK.

4.12 Family ownership

The manufacturing firms are predominantly family owned. There have been attempts to encourage public companies and an informal stock exchange, but these still account for a minor proportion, some 20%, of the number of firms with more than 50 workers. The family pattern holds for the economy in general. In 1984, the Government's Statistical Department estimated imputed wages, salaries and other benefits of working proprietors and unpaid family members at one third of actual payments to labour, excluding profits. For manufacturing in the same year, the proportion of working proprietors and partners and their share of wages and salaries is shown by sector in Table 10. Furniture and metal products - with the smallest average employment per firm - have the highest proportion of working proprietors and partners. In the case of furniture over a quarter of all workers in the sector fall into this category. Yet even in those sectors like food, drink and tobacco and footwear, with lower figures, our firm surveys indicated that the great proportion of even the larger firms were still family owned and run, and that this had an impact on their operations. Some owners had as important aim the ability to pass on a going concern to their sons. In

a significant number of firms, sons (and in one case a niece) had been sent abroad to develop relevant business and technical skills to apply to the original business. A number of firms used their relations abroad - particularly in Britain - as the main network for exporting.

4.13 Labour and skill

The particular characteristics of Cypriot industry are reflected in its manufacturing labour force. It has the following features:

- (i) it is predominantly a manual labour force with 85% classified as production workers, and 15% as service workers. In Western European manufacturing, the proportion of manufacturing employment made up of service workers has risen to 50% (the figure includes white collar technical and professional workers, managers, sales and clerical staff, and cleaners, caterers, security staff and so on.)
- (ii) in the assembly industries the labour force is largely semi skilled working on fragmented tasks. Some branches of clothing like women's and children's wear demand a higher level of skill than men's wear. In food production and the majority of footwear, semi skilled operatives predominate.
- (iii) in the small scale jobbing industries (as found in woodworking, furniture making, metal working and printing) skills tend to general but unsophisticated. Thus in the furniture trade, the skills possessed are those of a carpenter rather than a cabinet maker. There is a relative absence of high level specialised skill.

(iv) the lack of specialisation is also a feature of management. Just over 1,000 manufacturing workers were classed as managers (2.4%) and only 724 as professional and technical workers, the latter in particular indicating the low technical development of Cypriot manufacturing (Table 11). These two categories combined amount to less than 40% of the working proprietors in manufacturing, indicating the large number of firms owned by artisan workers.

(v) those with accredited skills have often been found working outside their trades, for example in the metal working industry

Occupations in Manufacturing Industry 1985

% of labour force

	Manufacturing	All Industries	Women as % of each occupation
Managers	2.4	1.6	7.5
Professional and technical workers	1.7	11.7	19.9
Clerical workers	5.8	16.1	64.3
Sales workers	2.7	12.2	19.0
Service workers	2.9	14.8	79.5
Primary product workers	-	0.6	-
Production workers	84.5	43.0	45.0
Total employment	100	100	45.1

Source: Registration of Establishments 1985

Labour and skill

Food Manufacturers showed little interest in a proposed HTI food technology manufacturing course. Main basic training required is in food hygiene and equipment maintenance, with specialist skill training in process engineering, marketing and food technology (for recipe development).

Clothing 88.5% of all employees received no formal training in 1985; 1% had served an apprenticeship; 4% had been to private vocational schools; 6% had taken courses at the CPC and the ITA. Only 1% had received in firm training on ITA sponsored courses. With sectoral employment averaging over 10,000 between 1979 and 1986, and with a 24% labour turnover, including women leaving the industry, only 1,732 had received any formal basic vocational training in this period. The number of such trainees fell from 455 in 1984 to 237 in 1986. Industrialists spoke positively of the ITA in house training courses (organised by 10 of the sample firms visited), though noted a shortage of specialist instructors. They felt the CPC courses for machinists and designers needed upgrading.

63% of the sample companies reported labour shortages, with skilled workers being in shortest supply in the Nicosia area. 89% of the employees in the industry are women, 61% of them married. There were no nursery provisions close to the garment factories.

Menswear companies geared to volume production tended to operate sectionalised factories, with highly sub-divided operations and a low skilled workforce. This was a feature of the large knitwear and underwear firms also. Women's wear and children's wear had more flexible production systems with a skilled workforce, more experienced and older, but with recruitment problems. Outwork was a common feature of this sector.

Footwear 60-77% of the labour force is female, with a third of all workers being aged between 20 and 29. There was significant turnover. Firms often relied on a few key workers, and were vulnerable to these workers leaving or being absent. Smaller firms tended to have more multi-skilled employees. Firms with older buildings and poor toilet and canteen facilities had higher turnover rates. There were no childcare facilities linked to the industry. The HTI provides no service course explicitly for footwear, although the industry could absorb 40 vocational training graduates a year. The ITA is operating a number of schemes to upgrade skill levels in the industry. Wages are 92% of the average for manufacturing.

Furniture The industry depends on carpenters using basic tools rather than on cabinet makers. The latter would need a distinct set of skills, and would allow a greater product sophistication than currently exists in the great majority of Cypriot firms. In most factories there is a traditional division of labour, with machine set ups and modification the responsibility of the plant manager rather than the operatives. No skill shortages reported.

Metal working There is a serious lack of a well trained and experienced workforce. In recent years there has been a process of deskilling, with skilled and semi skilled workers leaving the industry and being replaced by newcomers with low levels of skill. In 1985 the quit rate from the industry was 20%, 78% of them skilled and semi skilled. 61% of new entrants had no previous work experience and 17% came from other industries. Of trained workers, few had received training in their current trade. Only one third of the companies in the ITA sample had nominated training officials.

(vi) there has recently been an observed lowering of skill levels in the metal working and furniture industries. In both cases it has been suggested that the reason for this was a concern by the owners to reduce the wage bill. In metal working a quarter of all craftsmen and semi skilled operatives left the industry in 1985, and most skilled trades were being filled by people with no previous experience in the metal industries, or with other metal working skills.

(vii) a further feature of the manufacturing labour force is that it has a large proportion of women workers (45% of total employment). As the following table shows, the structure of employment is one of male proprietors, (89% of them are men) a largely male group of salaried workers, and a wage labour force comprising 55% women.

Employment in Manufacturing industry by category of earning and gender 1985

	Total	Women	Women as % of total
Working proprietors	4,550	494	10.9
Unpaid family workers	426	335	78.6
Salary earners	10,131	3,048	30.1
Wage earners	28,523	15,789	55.4
All employment	43,630	19,666	45.1

Source: Registration of Establishments 1985

4.14 Management and management information systems

One of the features of Cypriot manufacturing is that it is still young. Its owner proprietors often learnt their skills as artisan tradesmen - as butchers, or carpenters, shoemakers or tailors, blacksmiths or mechanics. Many have remained so, but others - within a decade - have built up their businesses, and find themselves in charge of sizeable factories. In some industries - in shoes and clothing for example - the incentives to produce were so strong that some people started firms with little previous experience of that trade - or in some cases of business itself. While demand raced ahead, 'craft' management sufficed. But now it has slowed down, managerial problems have come to the fore.

Reports throughout the eighties, including our own, have registered the problems: a lack of financial systems and accurate price estimation techniques; inadequate stock control; the absence of systematic training provision; insufficient quality control, design and product development; sub optimum plant lay out. A recent CFTC consultant - an accountant who had been asked to provide technical support to firms - reported that many firms did not have adequate manual accounting systems let alone computerised ones.

There are some notable exceptions. One firm was able to produce up to date management accounts from a desk top computer. Another had computer controlled tracking of materials. About half the firms we visited had computers principally for pay role and accounting purposes. Of the 37 computer machine operators employed in manufacturing industry in 1985, the majority were likely to be attached to computers geared to improve managerial efficiency.

So the picture is not uniform. The contrast between old and new can be found in all sub-sectors. One contrast is between traditional owner proprietors, and firms with strong overseas links. The soft drink industry for example, or a handful of shoe firms, are run with a

Management, information systems and strategic planning

- Food** The foreign linked beverage firms stood out, with management training courses, and tight financial control systems. Management information systems were often restricted to monthly or even three monthly profit and loss accounts, rather than daily monitoring against budget of sales and stocks of finished goods. Computers are largely used for wage payment; there is little computer generated management information of an up-to-date nature.
- Clothing** 33% of the sample firm visited used computers in their accounting department (as against 23% in the 1985 ITA study). Three of the firms also used computers for order planning, stock control, product costing and production monitoring. A further 33% of the sample were planning to computerise their operations in the near future. A number of the large firms used rudimentary accounting procedures and were unable to calculate key indicators of performance such as work in progress or stock turnover. Costings were often made on a rule of thumb basis, and few made systematic use of work study methods. Firms reported difficulties in recruiting production managers, technicians and supervisors, while none of the firms had used either domestic or foreign management consultants who were specialists in the garment industry.
- Footwear** There was little specialist management. Considerable savings stand to be gained from the introduction of microprocessors into accounting departments, and into payroll functions and stock control.
- Furniture** There is a lack of managerial specialisation, with the manager (usually the proprietor and family) simultaneously trying to cover marketing, production control, accounting, design, labour relations, product development and materials purchasing.
- Metal products** There was inadequate stock control, production planning, marketing, design, strategic planning, quality control, financial control and job shop estimating.

professional managerial system exemplified in management information systems, marketing, and internal training.

Another contrast is between the first and second generation of industrialists. Those in the second generation had often been sent abroad for technical or professional training. Some had had experience in large European firms, like Mercedes Benz. The experience was not necessarily in the sectors to which they returned in Cyprus, but they have commonly brought with them an attention to the importance of high level management information, and a modern approach to management and labour relations which differs markedly from the craft management of the first generation.

Yet even in the case of the second generation owner/managers, the small size of their firms limits the extent to which they can develop specialised managerial skills, or, if they have them, cannot devote sufficient time to each in order to maintain and update them. Automated management systems help. But other methods need to be found to allow the small and medium sized firms to match the professional competence of their overseas competitors.

4.15 Summary and conclusion

Cypriot manufacturers face a whole series of difficulties:

- capital utilisation
- lack of specialisation
- limited sources of locally produced inputs
- long supply lines for imported inputs
- concentration in labour intensive, low productivity sectors
- lack of direct links to overseas markets
- little design capacity
- high working capital requirements
- restricted industrial banking expertise

- tight labour markets, with lack of specialised high level skill
- fragmented ownership structure

Most of these features - for which manufacturing industry has often been criticised - stem from the small size of the internal market and its isolated location. The major problems of Cypriot manufacturing can be traced to this single fact. Adam Smith's celebrated dictum that the degree of specialisation is limited by the size of the market is no clearer than in the case of manufacturing in Cyprus. The limited domestic market lies behind the capacity problems. It leads to the anomalies of the air filter producer having to make 1,000 different types of filter. It results in monopoly supply industries, and the need to carry large stocks of imported inputs just in case the next load does not arrive on time. It presses manufacturers to produce low volume lines for stock in order to lower unit cost. Any strategy must start from this central limitation facing Cypriot industry.

On the other hand, in spite of its recent origins, and the fact that the broad characteristics of Cyprus remain much the same as they were ten years ago, many of the industries are in some ways stronger now than they were then. The industrial boom has allowed them to accumulate experience. It has allowed them to build a modern capital base, whatever the current capacity difficulties. It has seen the emergence of a new wave of industrialists - who have experimented with new products and designs and are now proving their success in international markets. Firms whose initial task was simply to supply booming markets, are now in the process of making themselves into an industry.

Yet the objective limitations of the Cypriot economy remain. Equally seriously, the downturn in the Middle East and in industrial profitability has led to a number of damaging developments: price cutting in the internal market; downgrading of the labour force; and considerable mutual suspicion between competitors in the industry. We obtained the impression from our discussions with industrialists that they were aware that these short-term responses might damage their long-

term prospects, but they expressed themselves genuinely puzzled about which direction to take.

If Cyprus industry is to pass successfully to a new stage in its development, it needs to see clearly the broad strategic options which are open to it. That will allow each firm to develop a coherent concept and avoid the current dangers of negative response. In the next chapter we outline the two contending concepts which we see operating internationally in those industries of concern to Cyprus.

Table 1

Cypriot Manufacturing activity by
Economic Destination 1976 - 84

%

	Output			Imports		
	1976	1980	1984	1976	1980	1984
Consumer goods	63	60	66	29	25	20
Intermediate goods	33	34	30	43	41	39
Capital goods	3	6*	4	12	16	23**
Fuels and lubricants	-	-	-	15	19	18

Source: Industrial Statistics

* includes repairs

** includes transport equipment and parts

Table 2

Manufacturing Profits and Investment

	Gross Profit before interest, depreciation and tax	Pre tax profit	C&I Capital Investment	Gross Profit as % of turnover
1978	40.3	25.8	24.0	15.8
1980	50.0	29.0	27.4	12.5
1982	52.7	26.7	27.4	10.9
1984	66.7	31.8	30.9	10.2
1985	67.9	30.4	30.0	10.0

Source: 'Manufacturing Profitability'
Hellenic Bank Review, no. 1
1986

Table 3

Value Added and Imported raw materials
as a proportion gross manufacturing output 1984

	Census Valued added as % of gross output	Imported raw materials as % of gross output
Food	27	27
Alcoholic Beverages	4	9
Soft drinks	53	30
Tobacco	69	25
Ten... es	44	46
Clothing	40	56
Leather and leather goods	37	36
Footwear	43	43
Wood and wood products	47	23
Furniture	50	28
Paper, paper products and printing and publishing	49	45
Chemicals	15	80
Plastics	35	60
Petroleum	14	95
Non metallic minerals	36	25
Metal products excluding machinery	41	46
Non electrical machinery	49	44
Electrical machinery	37	53
Jewellery	29	69
All manufacturing	36	42

Source: Industrial Statistics

Note: the proportion of imported materials is based on the 1976 ratios of material origin applied to 1984 material figures, and then related to 1984 gross output.

Table 4

All manufacturing: stock: output ratios

	Manufacturing Output	Closing stocks	Output stock ratio
1981	473,359	88,588	5.3
1984	650,687	127,666	5.1
1985	684,223	136,037	5.0

Table 5

Share of labour costs in output, and as
share of raw materials 1976-85

	Labour as % of output			Labour as % of raw materials		
	1976	1981	1985	1976	1981	1985
Food	11	14	14	16	24	24
Food, drink and tobacco	11	15	15	20	29	31
Clothing	22	25	27	39	47	55
Footwear	22	26	28	40	48	56
Furniture	31	34	32	69	77	72
Metal products and machinery	19	24	24	40	45	43

Source: Industrial Statistics

Tab. 6

Firm Size and Average firm employment in
Cypriot manufacturing, 1976-85

		Number of firms by no of employees					Average no. of employees per firm
		Total	less than 10	10-49	50-99	100 and over	
Food, Drink and Tobacco	1976	570	480	63	14	13	10.0
	1981	689	579	82	13	15	9.8
	1985	966	849	86	15	16	7.8
Clothing	1976	1278	1175	87	15	1	4.4
	1981	1322	1129	157	29	7	6.8
	1985	1306	1100	154	32	10	7.6
Footwear	1976	135	91	35	7	2	14.0
	1981	146	79	52	9	6	21.4
	1985	169	104	52	5	8	16.9
Furniture	1976	463	437	24	2	-	3.3
	1981	726	675	47	4	-	3.5
	1985	774	717	47	10	-	3.9
Metal Products	1976	433	393	37	3	-	3.8
	1981	629	568	57	3	1	4.2
	1985	850	788	59	2	1	3.8
All Manufacturing	1976	4730	4209	434	54	33	5.7
	1981	5613	4796	675	90	52	7.2
	1985	6616	5744	721	95	56	6.6

Source: Industrial Statistics

Table 7

Value added in manufacturing by size of firm
% of all manufacturing value added

No of employees	1976	1981	1985
less than 10	24.3	20.6	24.4
10-49	28.6	30.4	29.3
50-99	11.5	15.5	15.2
100 and over	37.6	33.5	31.1

Source: Industrial Statistics

Table 8

Average employees per firm in Cyprus, Italy and the UK

	Cyprus	Italy	UK
Clothing	41	52	100
Footwear	17	17	110
Wooden Furniture	4	6	n.a.

Source: Sector studies

Note: The clothing figures are for firms with ten workers and above. For all firms, the Italian figure is 6 as against 8 for Cyprus

Table 9

Value added per worker by size of firm 1985 in C£s

	Firms by size of employment							
	less than 5	5/9	10/19	20/29	30/49	50/99	100 and over	All firms
Food, Drink and Tobacco	4,969	5,768	6,523	5,899	6,121	10,792	13,656	9,328
Clothing	3,922	3,425	3,218	3,222	3,824	3,943	3,802	3,694
Footwear	3,911	4,090	4,286	4,004	4,851	4,954	4,413	4,438
Wooden Furniture and Fixtures	4,861	4,425	5,386	4,807	4,188	4,915	-	4,873
Metal Products	4,542	4,973	5,207	6,432	6,789	5,564	8,033	5,341
All Manufacturing	4,674	5,015	4,995	5,057	5,548	5,942	8,183	5,849

Source: Industrial Statistics

Table 10

Working Proprietors and partners
in Cyprus Manufacturing Industry 1984

	% of employment	% of wages and salaries
Food, drink and tobacco	7	8
Clothing	11	15
Footwear	3	4
Furniture	26	29
Metal Products	21	23
All Manufacturing	12	13

Source: Industrial Statistics

Table 11

Numbers in different occupations in Cyprus manufacturing 1985

	Food, Bev. & Tobacco	Textiles, Clothing, Footwear,	Food, Furniture	Paper, Printing Publishing	Chemicals Petroleum Rubber	Non- metallic mineral	Metal Products Machinery	Other Manufac- tures	All Manufac- facturing	%	All Economy	%
Managers	224	378	68	51	133	56	143	11	1,064	2.4	2,872	1.6
Professional and Technical Workers	133	27	11	270	99	64	114	6	724	1.7	21,103	11.7
of which: physical scientists & related technicians	64	-	-	2	39	20	2	-	127		389	
Clerical workers	644	605	148	252	307	164	394	35	2,549	5.8	29,054	16.1
of which: bookkeepers,	236	178	44	61	110	45	143	7	824		8,250	
computing machine operators	19	3	3	7	3	-	2	-	37		288	
Sales workers	567	191	58	65	147	12	74	55	1,169	2.7	21,921	12.2
Service workers	218	836	45	25	36	23	67	1	1,251	2.9	26,670	14.8
Primary Product workers	4	3	1	-	1	1	2	-	12		1,008	
Production workers	5,469	14,642	5,571	1,695	1,879	2,098	4,736	771	36,861	84.5	77,499	43.0
of which: supervisors and foreman and forewomen	185	615	134	56	139	122	154	18	1,423		3,158	
general production	22	60	11	6	30	623	9	105	866		887	
Total	7,259	16,682	5,902	2,358	2,602	2,418	5,530	879	43,630	100	180,297	100

Table 12

Women by occupation in Cyprus manufacturing 1985

	Food, Bev. & Tobacco	Textiles, Clothing Footwear Leather	Wood, Furniture	Paper, Printing & Publishing	Chemicals Petroleum Rubber Plastic	Non- metallic mineral products	Metal Products Machinery	Other Manufac- tures	All Manufac- turing	All Industries
Managers	12	46	-	3	15	-	3	1	80	201
Professional and Technical Workers	29	5	8	57	20	3	18	4	144	8,253
Clerical workers	350	423	118	151	211	77	280	28	1,638	15,738
Sales workers	114	36	16	13	6	-	6	32	223	7,946
Service workers	128	732	34	17	28	8	46	1	994	11,721
Primary product workers	-	-	-	-	-	-	-	-	-	169
Production workers	2,294	11,891	357	593	579	217	458	198	16,587	19,219
Supervisors and forewomen	12	344	4	5	8	2	2	4	381	391
General production workers	20	58	3	4	9	66	5	78	243	245
Total Women	2,927	13,133	533	834	859	305	811	264	19,666	63,247
Total Workers	7,259	16,682	5,902	2,358	2,602	2,418	5,530	879	43,630	180,297
Women as % of all wks	40	79	9	35	33	13	15	30	45	35

Source: Registration of Establishments 1985

Table 13

Composition of Manufacturing Labour Force and
relative wages 1976-84

	Number		Change %	Real average pay in constant 81 prices		
	1976	1984		1976	1984	Change %
Working Proprietors and partners	4,831	4,912	2	1,924	2,516	31
Operatives	18,707	31,631	69	1,254	2,050	63
Other employees	2,671	6,069	127	2,032	2,904	43
All employment	26,792	42,612	59	1,425	2,232	57

Source: Industrial Statistics

**THE NEW INTERNATIONAL COMPETITION: MASS PRODUCTION VERSUS FLEXIBLE
SPECIALISATION**

Any strategy for Cypriot manufacturing must start from an appreciation of the major changes that have been taking place over the last twenty years in the way in which production and distribution is organised. What we have been witnessing is a shift from a traditional model of mass production to a new model which has been called flexible specialisation. It is a change as profound in its implication as was the original introduction of mass production in the early years of this century, demanding new approaches to technology, skill, retailing, firm structure, and managerial philosophy. It underlies the success of the Japanese and West Germany economies, and of other fast growing regions in Western Europe - the so called Third Italy, the 'second' Denmark, and more recently the growth of the Spanish clothing industry and Brazilian footwear.

5.1. Mass Production

The contrast between the two models is summarised in Figure 1. Mass production - or Fordism as it has become known - is distinguished by the following:

- it achieves scale economies through the volume of production of standardised goods, based on the principle of flow line assembly and the continuous production of standardised parts.

Figure 1

Features of old and new production systems

	Fordism	Flexible production
1. Production concept	Mass production. Economies through fixed capital and labour productivity within the production process.	Flexible specialisation/flexible automation Economies through working capital productivity between production processes and in distribution.
2. Technology	Machinery purpose built and dedicated R&D functionally separate and discontinuous	General purpose, adaptable machinery R&D integrated with production and continuous Importance of design.
3. Products	Limited range of standardised products	Product variety and specialisation for for 'niche' markets
4. Inputs	Materials and energy intensive	Materials and energy saving/information intensive
5. Work process and skill	Fragmented and standardised tasks Strict division between mental and manual labour. Semi skilled workers	Open ended tasks/semi autonomous groups and decentralised responsibility/closer integration of mental and manual tasks/core of multi skilled workers linked to sub-contract semi skilled labour
6. Payment systems	Rate for the job Formalised pay bargaining	Payment for the person/rising income for skilled core More informal wage settlement
7. Organisation and management	Managerial hierarchies Centralisation Multidivisional corporation	Flatter hierarchies Centralised information and planning systems with decentralised production. Networks, sub-contracting, franchising.
8. Markets and customers	Domination of manufacturers over retailers, of producers over users. One way relations/mass advertising	Domination of retailing/two way relations between customer and manufacturer/firm rather than product advertising.
9. Suppliers	Arms length/stocks held 'just in case'	Two way relations/stocks arrive 'just in time'
10. Competitive strategy	Competition through full capacity utilisation and cost cutting Tends to over production, stock piling and mark downs	Competition through innovation Response to falling markets through diversification, innovation and sub-contracting or ...

- it uses 'dedicated' or purpose built machines for these long runs; there is thus substantial down time when a factory or line is switched from producing one model to another.

- research and development is discontinuous, focussing on the new model; once the new model is in production, competition is based on cost reductions, maintaining the speed of production, and full utilisation of capacity.

- one consequence of the need to keep the line moving is that products will be produced for stock, and stocks will be held 'just in case', so that shortages of inputs do not hold up production.

- labour is deskilled, with the design of tasks being undertaken by managers; this strict division between mental and manual labour, and the fragmentation of tasks, was the basis of the principles of scientific management introduced by F W Taylor.

- wages are linked to the job rather than the worker (as had been the case with craft workers); there are clear demarcations of jobs; seniority is reflected in access to better paid jobs; and disputes settled in formalised procedures away from the shop floor.

- given the high fixed costs and low marginal costs, there is an inbuilt incentive to:
 - produce for stock

 - develop advertising and other forms of marketing

- extend credit

- maintain aggregate demand in the economy, the state coming to play a role of maintaining income levels at times of recession through unemployment pay.

- the company organisation associated with mass production is the multidivisional corporation, consisting of a head office and functionally separate departments. In the post war period these expanded internationally, more recently developing an international division of labour within the multinational firm.

The post war boom was based on the economies achieved by the application of this model of production to a wide range of industries - from cars, to consumer durables, and even to large capital goods like ships. In the 1960's however, the dynamic of this system began to slow down, and in the 1970's found itself in trouble. In part this was because of market saturation, in part because of labour difficulties. Over-capacity was temporarily hidden by an extension of credit, but the recessions of 1974/5 and of 1980/82 led to shake outs and restructuring. One response has been an even further extension of the model - exemplified by the world car, and the movement during the 1970's of production lines to Southern Europe and the third world. Another has been the introduction of flexible specialisation and flexible automation.

5.2 Flexible production

The main features of flexible production are the following:

- instead of standardised products from specialised machines, FP is based on a variety of products from general purpose machines. This has been made possible by the application of computers to

machinery. An early example was in the metal working sector. Some 50-75% of production in this sector involves batches of 50 or less. It was low volume, highly skilled craft production. It took time to re-tool, and re-set the machines. Mass production was not appropriate to it. The introduction of computer controlled machines, and computers to co-ordinate a set of machines revolutionised small batch production. This was a case of automating what was in any case a varied output. The same principle allowed assembly lines to be switched to allow more variety in place of standardised products. Toyota for example now change their product lines once a day, (compared to every 10 days for US motor manufacturers) and have brought down the set up time for a diesel engine bed planner from 4 hours to three minutes.

- a continuous two way interaction with the market has been developed; instead of producing for stock, manufacturers see what sells, and through electronic point of sale systems get instant feed back from the market, and adjust output accordingly. In many industries this has led automated retailing and distribution companies to dominate manufacturers, turning manufacturers into effective sub-contractors, producing to order, with close monitoring of quality and productive efficiency. This is the case for furniture, clothing, shoes and groceries in many parts of Europe.

- stocks and work in progress are further reduced by the adoption of 'just in time' systems, involving close relations with suppliers (who may deliver components right beside the assembly line) as well as planning production using closed loop manufacturing resource planning, and cutting production queues by optimising factory lay outs.

- innovation is continuous, with new products and designs being tried out to see which succeeds. With flexible systems, a manufacturer does not have to concentrate on getting the single

optimal model, like the mass producer. What has been found in many consumer markets during the 1970's and 80's is that the market had become much less easily forecastable; it is more volatile and differentiated. In the record industry for example, only one out of every 16 releases is profitable. In clothing, there are now up to 3 or 4 changes within every season, with manufacturers maintaining spare capacity to be able to respond to a 'revealed preference'. New styles are tried out, and then stopped if they are not successful. This unpredictability puts new emphasis on regular innovation and design.

- one result of the need for continuous innovation and the unpredictability of demand, is that there has been an extension and redefinition of sub-contracting. Japanese firms encourage sub-contractors to innovate, and provide them with finance, and managerial and other technical advice. The German engineering firm Bosch, has adopted what is called the 15-20 rule, according to which none of its sub-contractors is more than 20% dependent on Bosch. This is partly to diversify the sub-contractor's risk, and partly to ensure they remain part of other innovating networks.

- flexible production has also put a premium on skill, and on a closer integration of mental and manual labour among the core of skilled workers. Quality control and the zero defect policy (further reducing work in progress) are critically dependent on the skill and commitment of the work force, and are incompatible with the traditional industrial relations of mass production. Similarly Ford's fragmentation of tasks is inappropriate in factories which are regularly producing new designs and short runs: what is required are multi skilled people, with an interest in moving from job to job.

- similarly, demands of flexibility and creativity has led to flatter managerial hierarchies, with an emphasis on problem

oriented work teams and networking, rather than the inflexible structures of the multi-divisional corporation.

More generally, whereas mass production achieved its economies through optimising the use of fixed capital, flexible specialisation gains its advantages through optimising the use of working capital. Its targets are the cutting of stocks and inventories, the reduction of down time or the time taken for a part to pass from process to process. It aims to make fuller use of materials, and reduce energy inputs. Its target is to eliminate waste - of time, materials, labour and machinery. Its goals are similar to those of mass producers, but it pursues them in different ways.

The Japanese have not so much replaced mass production but re-interpreted it with flexible automation. Computer Numerically Controlled (CNC) machine tools have brought scale economies to small batch. Computer Aided Design linked to Computer Aided Manufacturing (CAD-CAM) has introduced variety into continuous production systems. The economies of working capital have been added on to those of fixed capital, to produce what has been called 'total competition'.

5.3 Flexible specialisation and the Third Italy

In a number of industries - most notably those with which Cyprus is directly concerned - the leading edge of competition has not been provided by a newly flexible mass production, but by a quite different type of industrial organisation, flexible specialisation. Italy - or more specifically, the Third Italy extending from the Appenines up to the Adriatic - exemplifies the new model. Its success is clear from the table overleaf. This table shows that in 1984 Italy accounted for one third of world exports of footwear, 30% of world exports in pullovers, more than 20% of world exports in furniture, and well over 10% of a variety of types of clothing. As our sector reports show, while Western European mass producers were losing market share in clothing, footwear, furniture, and even food, the Italians were gaining. Indeed the Third

Italian exports as a share of world exports
in selected commodities, 1978-8

	%ages	
	1978	1984
Glazed ceramic materials	58.6	56.4
Cement and artificial stone products	16.4	28.5
Handbags	39.9	35.1
Leather footwear	39.6	33.7
Rubber and plastic footwear	39.8	34.8
Men suits	18.1	21.9
Mens trousers	9.0	13.7
Men's cotton trousers	8.3	15.2
Jersey's and pullovers	40.0	30.1
Woollens jerseys	28.2	31.6
Synthetic jerseys and pullovers	40.0	30.1
Clothing accessories	18.3	21.5
Furniture	19.5	21.7
Wooden furniture	21.0	23.5
Chairs	26.3	28.0
Leather clothes	14.7	11.6
Wine of fresh grapes	21.7	22.0
Metal storage tanks	9.7	41.0
Steel storage tanks	9.9	42.0
Iron and steel, nuts and bolts	9.7	11.1
Locksmith wares	11.7	12.3
Cultivating machinery	7.8	13.0
Weaving and felting machinery	6.9	10.2
Looms	4.0	7.0
Paper product machinery	6.9	9.6
Non domestic refrigeration equipment	15.7	14.2
Domestic refrigerators and freezers	32.8	27.9

United Nations, International Trade Statistics Yearbook 1984, New York 1986.

Italy became the fastest growing region in Western Europe as a result, based on many of those industries which are present in Cyprus.

The principle features of the Third Italy model are as follows:

- it is a predominantly small firm economy. In footwear, the average size of firms is 17 employees; (as against 110 in the UK); in furniture it is 5.8, in clothing 5.5.

- these firms are not isolated competitors, however, but are linked together by industry associations, co-operative consortia, joint facilities, and geographical proximity. The geographical link is all important. Towns have come to specialise, Carpi in knitwear, Ancona, Florence and Montebelluno in shoes, Prato and Como in woollen and silk textiles, Brianza, Pesaro, Poggibonzi in furniture, and so on. Within each town enterprises have formed 'consorzia', whose operations are described in the relevant sector reports. Taking the Poggibonzi furniture consorzia as an example, it has a staff of 6 and 85 member firms who pay \$6,000 a year, covering 25% of the cost, the rest being paid by the regional and national governments. Services provided by the consorzia to the firms include the following: export promotion, fair and exhibition organisation; sales missions to foreign markets; market research; links to government bodies; an export office in Florence with translation facilities; bulk buying of raw materials; computer and telex facilities; advice on budget and tax returns; training facilities as well as files on the financial soundness of existing and potential clients. In 1979 there were 79,000 co-operative marketing ventures of this kind in Italy. There are also many financial consorzia. All play the role that the administration of a large firm would play for its component parts.

- the firms themselves specialise, some producing particular parts, others assembling, each able to share out production to others if demand exceeds capacity.
- they also tend to be well equipped, a small workshop housing state of the art machinery, or the artisans having access to CAD equipment through the consorzia.

The main point about the resulting structure is that it has been remarkably innovative. In clothing, footwear and furniture, the innovation has taken the form of design. It is design and quality which has given them their edge in the international markets. In other areas, the innovation has come about through modification and improvement (in the machinery sector for example) a gradual process rather than a discontinuous change. Thus what the industrial districts have lacked in productive efficiency, they have made up through design innovation, and quality. Their organisational flexibility has been matched to a multi skilled (and usually unionised) work force, which has enabled them to face the recession of the 1980's with more success than larger mass production and even flexibly automated firms.

In addition to specialisation in production, there is also a specialisation by market segment. Flexible production allows the development of products aimed at niche markets, where quality, design and customer tailored products can command a premium over standardised items. The Italian and Germany car industry provide one example, with the mass producers, Volkswagen and Fiat, standing in contrast to the high quality niche producers, BMW, Daimler-Benz, and Audi. The food industry is another, in which the growing predominance of retailers has provided the means of small specialist food producers to find a market against the mass food producers like Heinz, Unilever or Nabisco.

In each sector the pattern of competition between traditional mass production and new forms of flexibility may be different. In food the mass producers have been entering hotels and catering in order to escape

the power of the retailers. Some have been diversifying into new specialist products, such as health foods. Others have been trying to increase flexibility in their own production processes. In furniture, the new retailers like IKEA in Sweden, and MFI and Harris Queensway in the UK have developed a stranglehold on mass producing sub-contractors, and provided little opportunity for the design intensive, niche quality products. In clothing, the new wave retailers - Next, Burtons and Richards in the UK are now following the Benneton model - providing their own designs to a large network of sub-contractors, pioneering flexible specialisation from the sales rather than the production end. What is common to all, however, is that there is currently great scope for flexible specialisation as traditional mass producers struggle to adjust.

5.4 Summary and conclusion

Over the past twenty years there has been increasing competition in the world economy between two different systems of production. The first, mass production, has been the dominant system during this century, and is associated with the United States and to a lesser extent with Britain. It involved the production of standardised goods, in long runs, from purpose built, and inflexible production lines. Its economies came from the productivity of fixed capital.

The development of the computer led to the introduction of a new system of flexible specialisation. It allowed mass production to become flexible, with rapid change overs of machines, a new capacity to produce a variety of products and respond rapidly to market demand rather than producing for stock. Added to a just-in-time system of intermediate delivery, it led to economies through improved productivity of working capital. For small batch producers, who had previously been flexible but with few scale economies, it allowed continuous production as computerized design and manufacture permitted rapid switch overs and redesign of products, and computerised routing quickened the passage of parts through their many varied processes.

Flexible specialisation has been the basis of the high growth rate of manufacturing in Japan, Germany and Italy. It has been only slowly adopted in the USA and the Britain, where the manufacturing outlook, the systems of industrial relations, the organisation of retailing, and the structure of consumption itself have all been shaped by mass production. For Cyprus, the Italian experience is of particular interest since Italy has achieved considerable shares in world markets on the basis of flexible specialisation in those products which are the core of Cypriot production and which are the subject of the present missions study.

In determining an industrial strategy for Cyprus it is necessary to consider which model to follow since corporate and government policy will be different for each.

VI

THE STRATEGIC CHOICE

The central strategic choice for Cyprus industry is whether to follow the path of mass production, or that of flexible specialisation. At the moment it is caught between the two. Some firms we have called 'proto mass producers' in that they follow a mass production model, but are restricted by the small internal markets and the competition abroad from realising the necessary volume economies. Others are small flexible firms, but with neither the specialism, nor the quality to match the leading competitors overseas. The rapid growth of the domestic and Middle East markets for light consumer goods have allowed this choice to be suspended. Changes in both markets mean that the choice must now be made.

It is the unanimous view of our mission that Cyprus should follow the flexible specialisation route. In part this is because we think that there is no longer-term future for mass production in Cyprus. More important, we think that Cyprus has the conditions which could allow flexible specialisation to succeed. The former without the latter would have suggested that the Cypriot Government should assign a smaller role for industry in future development plans. The existence of the latter scheme allows that industry in a restructured form could continue to play a dynamic role within the Cyprus economy. The remainder of this chapter outlines in more detail the basis for this judgement.

6.1 The mass production route

Cyprus has five major disadvantages as a long term site for mass production, all of which have been indicated in Chapter 3.

- (i) it has a small internal market; this limits the secure local demand, paying average cost plus prices, and consequently hinders competitive price cutting in export markets.
- (ii) its traditional advantage - the low cost of labour - is gradually being eroded by wages rises and increased competition from lower wage countries both in the Mediterranean and in Asia.
- (iii) the small size of the market restricts the development of supply industries for mass produced consumer goods. Those volume suppliers who have set up - in cement, petroleum refining, and chemicals have been operating at low capacity and high cost.
- (iv) its external markets have fluctuated, whether due to movements in the oil price (the Middle East oil exporters), centralised political decisions (Eastern Europe and Libya), or the politico-military situation (Lebanon). Such fluctuations have been particularly serious for those exporters with inflexible machinery geared to volume production.
- (v) Cyprus's geographical position although advantageous for the Middle East market, imposes substantial transport costs on supplies from and exports to Western Europe.

These disadvantages make the mass production route more difficult; they do not rule it out. What has eroded Cypriot manufacturing growth has been the decline in the low cost standardised market in the Middle East. The greater part of this has been the result of falling Middle East demand rather than falling market share, but the industrialists to whom we talked all indicated that competition had become much tighter, and that with increasing attention being paid to quality in the more developed Middle East markets (such as Saudi Arabia and Kuwait) Cypriot exporters were being forced into the region's marginal markets.

Faced with this decline, Cypriot volume producers have reacted in the following ways:

- (i) a number of footwear and clothing firms have established technology agreements with European firms, giving them access to design and brand names in the Cypriot and regional markets. The accompanying table summarises contracts with 12 such firms, 8 of them signing contracts from 1984 onwards. 5 of the contracts limit sales to Cyprus, while the remainder also serve regional markets, with only three serving wider international markets including those in advanced industrial countries.
- (ii) these agreements have been part of a more general return to the domestic market, with increased competition reflected in price cutting, (as in metal working), a move into retailing (in footwear), more sales offers, and in one case increased specialisation (in fashion shoes).
- (iii) some firms have attempted to turn towards Europe. They have entered into sub contract relations with European retailers, designers and manufacturers, offering them an established low cost source of supply. The designs, marketing, and in some cases materials specification, are

Foreign Technology Agreements in the Leather, Footwear and Clothing Industries in Cyprus

Cypriot Company	Date of Contract	Nationality of Supplier	Type of Agreement	Length of contract (years)	Fee as % of sales	Technology supplied	Area of sale
A	1965	Canada	Know how + equity	10	1% or C\$10k	overall management and technical support	various
B	1979	UK	Management, know-how, marketing + equity	5	2½% of gross income	.. ..	various
C	1982	France	licence trade mark	3	10%	supply of design sketches	Cyprus
D	1982	USA	trade mark	6	6%		Cyprus
E	1984	France	license trade mark	3	10%	supply of design sketches	Cyprus
F	1984	France	..	3	10%	.. .. .	Cyprus
G	1984	Italy	..		6%	contract cancelled because of delays	-
H	1984	Denmark	license and purchase	5	5%	technical and marketing knowhow /patterns	Cyprus, Gulf, Saudi Arabia, Libya, socialist countries, other Middle East
I	1985	UK	license trade mark	4	5%	designs, samples, technical personnel	Cyprus and Greece
J	1985	USA	.. ..	5½	net sales - prod. costs + 2	supply of materials, 12 trade-prod. marks /1 month technical costs advice/patterns and samples - 2	Cyprus, Iran, Libya Syria
K	1985	Greece	.. ..		5%		Cyprus
L	1986	Denmark	.. ..	4	4%	40 styles per season/brand name	Cyprus, Greece, Libya Middle East

supplied by the client. In clothing, Cyprus has for sometime undertaken Cut, Make and Trim (CMT) sub contract work for London wholesalers. The 1983/4 ITA survey found just over a third of 70 Cypriot clothing companies engaged in CMT work. In 1987 we found 45% of our sample engaged in CMT, though one leading industry source estimated the current figure at 70% for the clothing industry as a whole. From our sample, only 10% had more than half their turnover accounted for by CMT, with most firms seeing it as a contributor to cash flow rather than as a central part of their strategy. Other volume clothing firms had established longer term contracts; one providing shirts to three large European jeans manufacturers, another underwear to Germany.

In the other sectors this model of low cost sub contracting for advanced country markets is less advanced. In footwear it was confined to Bata, who were sourcing the US from their plant in Cyprus (having moved production from France), to Atlas (the Far East), and to Alpha (Canada). All three of these companies had foreign equity and or licensing agreements. For footwear, more generally it is sub contract work for the East European economies which is more important. In furniture, cheap sourcing for Europe was confined to the three exporters of pine chairs to the UK, while in metal working the practice did not exist.

(iv) a small number of firms have attempted to diversify within the Cyprus market. This was the case of the switchgear producer seeking to start printed circuit board production in Cyprus. A number of firms see their future as much in the import trade as in production.

Each of the above represent a strategic response to the decline of the Middle East market, but all face limitations in the long term. Those oriented towards the home market, face the growth limits we discussed earlier. Those acting as a staging post for European

branded goods and designs in the regional market have greater scope, but the fees, ranging from 4% to 10% of sales for arms-length suppliers, are likely to take a significant cut of Cypriot profits which averaged 6.7% of sales in our sample of 19 clothing firms. Cut, Make and Trim, like sub-contract work for the advanced country markets, generally, also offers restricted margins.

This is not to say that Cyprus could not expand its role as a low-cost sub-contractor for the European market. There has been a tendency in the European clothing sector to move some processes to the southern periphery of Europe, and the evidence suggests that Cyprus still has a wage-cost advantage over other EEC countries with the exception of Portugal, though a disadvantage relative to North Africa.

Though Cyprus may lose out to Asian low-wage competitors in the Middle East, EEC protection should shelter them from that competition, at least in the clothing sector, within the Customs Union.

The central question is how long can Cyprus maintain its position as a low-wage supplier to Europe. Over the last decade wages have risen faster than GDP, with wages and salaries increasing from 38.3% of GDP in 1976 to 48.4% in 1985. Between 1980 and 1985 while the index of labour costs in European countries increased by 17%, in Cyprus it rose by 58%. In short, the gap between Cypriot wages and the rest of Europe is narrowing, and on present evidence, will continue to do so.

Much of the commentary on pay increases has emphasized institutional factors: strong unions; wage indexation; the impact of wage settlements for the 13% of employees in the public sector. This has led the employers organisations to press for the de-indexation of wages, and employers themselves to more vigorously contest sector wage settlements. 1987 has seen a sharp increase in industrial

action, notably in clothing, and most recently in the financial sector.

Undoubtedly these institutional factors are significant. The strong collective organisation of both employers and employees, and the central bargaining between them is one of the features of the Cypriot economy, and is itself part of the broader consensus established since 1974. But these institutions operate within the context of a labour market which is itself distinct. Given that growth in Cyprus has been 'extensive' rather than 'intensive' increased growth has required substantial increases in employment. Between 1977 and 1985 while unemployment remained constant, the employed labour force grew by a third. This expansion has had to be sourced out from a number of labour reservoirs: Cypriots working abroad, a reduction in emigration; people leaving the land as their prime employment; women; older people; and even some public employees taking a second job in spite of this being against the law.

We have seen no detailed study of the extent to which the rise in real wages has been the result of excess demand for labour. Within the manufacturing sector we came across evidence of competitive bidding up of wages for scarce skilled labour. More generally, the rates of pay in tourism and business services have moved ahead faster than those of other often more strongly unionised sectors, notably manufacturing and Government services (see Table 1). In the absence of more detailed work, all we register here is the fact that the demand for labour has been consistently running up against the barrier of supply. That supply has some flexibility. But we should note that a number of these sources of extra labour are drying up: migration has fallen from 5,647 in 1976 to 98 in 1984; the number of Cypriots temporarily working abroad has similarly declined; the rural population is now down to 36% of the total population; women's participation rates in the labour force are already high by international standards. While labour force projections forecast a natural increase, this has to be set against the labour intensive character of the tourist industry, which is expected to need a further 25,000 workers over the next thirteen years (a 14% increase

in the number of jobs outside agriculture as of 1986), together with a continuing expansion in business services, and trade.

Circumstantial evidence suggests that demand pull has been an equal force in the rise in wage rates as institutional push. Furthermore, we may expect the labour shortage to get more rather than less pronounced, with manufacturing being at a disadvantage relative to the less wage sensitive tourism and business services sectors. In such circumstances a strategy of lowering wages would be a diversion from the major issues. A low wage sub contracting strategy requires a substantial labour reservoir, or as development economists would put it, 'unlimited supplies of labour'. Cyprus is no longer in this position. Other economies when faced with a tightening labour supply have drawn in labour from abroad. Some industrialists have suggested that Cyprus should do this. But to date the government has had a clear policy of restricting the inflow of expatriate workers.

Other economies which have followed a path of labour intensive volume production - Ireland, Hong Kong, South Korea, Singapore - have all found a tendency for wages to rise and foreign owned or contracted production to move to a new set of lower wage countries. In each a labour intensive stage has been followed by an attempt to upgrade production. Cyprus has been through its labour intensive stage.

There is still some scope for European sub contracting, or regional market servicing in the short to medium term. But as a long-run strategy for coping with the second phase impact of the Customs Union, it is important that Cyprus look towards upgrading its industry, rather than confirming its reliance on a low-wage, semi-skilled labour force in circumstances of an ever-tightening labour market.

In summary, we do not believe that volume production has a long term future for Cypriot producers. The small size and slower prospective growth of the domestic market offers only a limited platform for exporters. In the Middle East we can expect low wage competition

against Cypriot goods to intensify. Quality products made in Cyprus either under licensing agreements or directly by foreign firms and destined for the Middle East market have better opportunities, but their impact on growth in Cyprus will be less than has been the case with Cypriot owned and 'designed' exports. Finally, Cyprus's role as a low cost labour platform for sourcing advanced industrial country markets will be limited not only by its geographical characteristics, but more importantly, by the structure of its labour market. Cyprus will not become the Hong Kong of the Eastern Mediterranean on the basis of low-wage volume production.

6.2 Flexible specialisation

A number of features of the Cypriot economy which have worked against efficient volume production paradoxically provide the basis for a strategy of flexible specialisation:

- (i) small firms have been one of the key features of many of the successful Italian industries. As we have seen the size of Cypriot firms in furniture, clothing and footwear is not out of line with Italy. What we know less about is the networking between these firms, and their ability to share work amongst themselves. Although there are strong sector and sub-sector organisations, there appears to be a stronger rivalry and non co-operation between Cypriot firms than is the case in the Third Italy.

- (ii) the fragmentation of ownership exists within the context of a small, closely knit community, in which family ties are strong. Family links have been important in exporting, as well as in organising business networks within Cyprus. Another similar feature between the Third Italy and Cyprus is the strength of the trade unions in organising an otherwise fragmented labour force.

(iii) Emphasis has been put upon educating a high-quality labour force in both universities and polytechnics abroad. One aspect of this is the large number of unemployed graduates. But conversely, this pool of highly-trained labour is an important resource for a strategy of flexible specialisation.

(iv) The Cypriot domestic and tourist markets, though small, are quality conscious and demanding. They thus act as a stimulus for design-led strategies in the consumer goods sectors.

(v) the fluctuations in overseas markets put a premium on flexibility. The fact that a market fluctuates is not a reason to abandon it, but rather to develop flexible production systems that can respond rapidly to those fluctuations.

What from one angle appears as a handicap - such as the small size of firms and of the domestic economy as a whole - from another offers an advantage - of flexibility, and of a tight-knit culture which serves as a means of synthesising an economy in which ownership is fragmented. It is an informal type of synthesis, and contrasts strongly with the formal synthesis of a large corporate organisation.

In the course of our visits, we found a number of firms who were following a strategy of flexible upgrading, particularly in the clothing industry. One medium-sized childrens' wear firm, for example, designers made up 9% of the workforce. As a result, the firm had been able to establish and promote its own brand name in the Cypriot market. Its owner, who had at one time worked as an engineer for an upmarket European car firm, had brought many of the quality lessons with him from the engineering industry, as well as an emphasis on management informations systems, and skilled labour. This firm has already been exporting to Sweden, and has recently

broken into the Dutch market, using its own brand name, after two years of marketing effort.

There are a group of firms like this: one exporting 100% of its fashionwear output through relatives in the United States, another producing up-market leather clothing for export, a third producing knitwear, buying its collection each year from a freelance designer based in Milan. So far these firms have not been able to afford CAD systems, but they have installed computerised accounting and management information systems to varying degrees.

The success of these firms in advanced country export markets shows the potential which exists in Cypriot industry, even though it has yet to develop along such lines in the footwear, furniture and metal products sector. In food processing, the situation is different. Here there are a number of products which are suited for niche markets in advanced countries. The diary producers are parallel to the new-wave clothing firms, actively marketing such niche products in Western Europe. In some cases they have been so successful that there are shortages of supply. In others, the full potential of particular Cypriot producers remains to be realised.

A number of lessons can be drawn from the experience of these firms. First, a number of them have used their albeit small home market as a testing ground for their products. In contrast to mass producers, the home market is important as a site for product development rather than a protected market allowing high mark-ups to finance their competition abroad. The presence of large numbers of tourists from Western Europe offers particular potential here. Tourists on holiday are open to new products, and those which are successful thereby have a potential core demand overseas when the tourists return home. One rusk manufacturer now exports to Scandinavia as the result of demand generated by Scandinavian tourists in Cyprus.

Secondly, these firms are competing on design and quality rather than price. The fashionwear clothing firms spend considerable sums on keeping abreast of design intelligence from abroad, one firm spending C£800,000 a year on fashion forecasting reports, foreign travel and salaries for its 10 person design staff, or 4% of its total turnover. Others in addition to investing in design, have sent their daughters to London and Paris for specialised training in garment design. In the shoe industry, a number of firms have sub contracted design to Italy as a step towards making themselves competitive in Europe. In furniture, they were cases of outstanding design, but in these the problem was one of how to shift from being one-off, luxury producers to being more automated, low-priced, yet still high-quality firms.

Thirdly, these firms placed an emphasis on the quality of their labour force, and the importance, of good industrial relations. In the clothing industry, for example, it was the quality-conscious firms which undertook training, and who were unanimous in the view that moderate increases in wages would not pose major difficulties for their businesses. In the footwear industry, there was a clear correlation (0.75) between average wages and value added per worker. In the furniture industry, one of the design-led firms had also introduced the most productive working system within the industry as a whole.

Fourth, with one exception, these firms remained independent of foreign firms who wished to use them as sub-contract producers. One design-oriented furniture firm had refused an offer for a joint venture with Habitat, a large UK retailer, on the grounds that the contract stipulated 100% Habitat designs. As we have seen the design oriented clothing firms have preferred to sub-contract design abroad, rather than tie themselves to a licensing and trade mark contract which restricted them to Cyprus and the local regional market. Only one of these 'designer' clothing firms had entered into a sub-contract with a European firm, in this case French and British designer companies. The French company sent its design team to Cyprus several times a year to work out final samples with the local Cypriot management. The Cypriot factory produced for the French

market, and was allowed to sell the output anywhere outside France. The Cypriot firm had a design team of its own working with the French designers, and developing original designs of their own for the regional market. In this case the owner/manager saw the link up with the overseas designers as a means for learning about the requirements of design in the European market, rather than as a long term substitute for developing his own designs.

Finally, these new-wave firms are primarily oriented to the European and North American rather than Middle Eastern markets. This is a different version of the 'turn towards Europe' to that of the low-cost sub-contractors. For the new wave firms are taking upon themselves the responsibility for both overseas marketing and for design, the key to competitive success in the modern European industry. The less developed design capacity in the footwear industry is one reason why it has not made the independent breakthrough into the European market as have a number of the clothing firms.

The evidence and performance of these firms indicates the potential which exists. They are as yet few in number, more common in the clothing industry than in the other sectors studied, yet showing by their strategy in practice a way which other firms could follow. What is important about these examples is not only that they make a virtue out of a number of features of Cypriot industry which to mass producers appear as a weakness. They also address the changing patterns of demand in Europe and in Cyprus itself towards more differentiated designer products.

Each sector case study carried with it a similar message:

- in food processing, the most intense competition was in processed commodities - fruit juices, grapefruit segments, seedless grapes, bulk wines and grape must; higher value added opportunities existed for specialised Cypriot

products - high quality wine, halva, tahini, preserved vine leaves, preserved capers, mosphito berries, herbal teas, sesame rusks, goat and sheep's milk yoghurt and cheese, halloumi cheese, anari, trahanas and kefalotyri. In these cases not only was greater niche marketing normally required, but in some of these production, too, needed to be systematised.

- in clothing, demand has become increasingly differentiated between basic clothes like t-shirts and jeans which are produced in large volumes in low wage countries, and more fashionable clothes, produced in shorter runs closer to the domestic market, using flexible production techniques and integrated production and marketing systems. The sector report notes that Cypriot producers were losing out in the former market in the Middle East, and that what they needed to do was develop a distinctive Cypriot style which would give them a long term position in the fashion market, both at home and abroad.

- in footwear there has been a similar movement in internal demand; Cypriot producers have largely copied foreign designs, but this left them behind in fashion markets, and explained the increase in import penetration in the Cypriot market itself. The opportunities for Cypriot footwear firms lies less in competing in the mass market products - sport shoes and simple sandals for example - than in upgrading their products for the quality home and export markets.

- in furniture, the sector report points to the difficulties of a strategy centred on sub-contract production for mass European retailers like IKEA and MFI. Part of the problem is shortage of solid wood resources; part, the continuous switching of mass retailers to ever lower cost sources of supply. Such a strategy even if it could be realised - and

most Cypriot producers are at present not geared up for it - would at most be temporary. On the other hand, the report suggests that there is scope for a policy of flexible specialisation, initially improving design, production efficiency and product quality for the home market, and then developing exports from that base.

- in metal working, the sector report sees the main export opportunities coming from specialising in niche products, emphasizing quality, design, reliability and service (e.g. in commercial refrigerators, and centrifugal pumps). This would need to be matched by improvements in production efficiency, based on computer controlled design and machine systems, as well as an adaptive R&D capacity. It sees little opportunity for basic volume production exports either in Europe or the Middle East.

In none of these sectors is the path to flexible specialisation easy. The point made by the reports is that it is a more promising strategy - in the context of the development of European industry - than the alternative of volume production.

6.3 Europe versus the Middle East

We have noted that the new-wave manufacturers have concentrated on the European market at the expense of the Middle East, and that a number of producers have also oriented themselves to the European and North American markets as low-cost volume producers. Since 1984 there has been increasing emphasis both within Government and industry circles that Cyprus industry must turn towards Europe, away from the uncertain markets of the Middle East. The Customs Union has been discussed in these terms as furthering such a re-orientation.

The view of the mission is that primary emphasis should be put on the type of productive strategy pursued rather than simply on a geographical area. A strategy of flexible specialisation is applicable for Europe and Middle East markets, just as volume production is possible for both. The market area by itself does not determine the strategy.

That said, there is a need for a geographical strategy to set alongside a productive one. We suggest considering three phases:

- a) product development within Cyprus for domestic consumers and tourism.
- b) expansion in targeted European markets, to gain direct experience of competition at source.
- c) expansion to Middle East markets.

Existing new-wave firms have principally followed the first two of these phases. They have not, by-and-large entered the third. Yet it is important in pursuing the new strategy, not to forget Cyprus's key position in the regional market. It stands between Europe and the Middle East, and can act as a gateway between the two. In the case of metal working and some food products, the Middle East should be the primary focus of any new orientation. The capacity of producers of turbine pumps, solar heater or commercial refrigerators to tailor their products to the specific requirements of the Middle East market, and to provide a supporting service organisation, would give Cypriot firms a strong competitive position. There are equally possibilities for expanding Cypriot food exports to the Middle East, and for having Cyprus as a food broker between Europe and the Middle East (this is discussed in more detail in the Food Processing Report.) Even in clothing, footwear and furniture, the increasing concern with quality would provide a suitable target for expansion

for a firm which has established an independent design and flexible production capacity.

It is important, therefore, that a policy of upgrading Cypriot industry should not go along with a growing neglect of traditional regional markets. The Export Promotion Organisation will need to ensure that Cypriot producers maintain as close a two-way relation with Middle East markets and direct customers as they aim to achieve in Europe, and that they see their role as adapting their own and other European designs to the tastes and requirements of the Middle East markets. In the long-run, we expect that the Middle East markets will remain the primary markets for Cypriot manufacturing goods.

The European market will be as important as a means for learning about marketing, design and technology as it will be as an expanding outlet in itself. The aim for Cypriot producers should be to upgrade their products in both the Middle East and Europe, rather than shift entirely from one to the other.

6.4 Sector priorities and new products.

Just as Cyprus industry should not abandon the Middle East, nor should it abandon its traditional sectors. As we indicated in an earlier chapter, there are no old sectors, only old products and processes. The task is how to redesign the products and upgrade the processes. This can best be done when there is a foundation of experience within the industry, a pool of skill, and an existing network of suppliers and outlets at home and abroad. Such a foundation takes time and substantial resources to establish from scratch in a new industry. For the time being at least, Cyprus is not in the position of Japan, or South Korea, of choosing to abandon some traditional sectors, and switching to leading edge industrial products. Its economy is too small, its industrial culture too recent, to be able to successfully initiate new internationally

competitive enclaves from scratch.

More appropriate is the Italian model, where international competitiveness has been built on a mixture of tradition and innovation. Prato for example - now one of the world centres of the international garment industry - was an area where agricultural communities were known for their skill in making straw hats. It then built up a clothing industry in the post-War period on the basis of cloth made out of second-hand clothes, whose poor quality was compensated for by highly-coloured designs developed for export to the Middle East. This was the historical root of Prato's modern industry. We refer to it as 'creative continuity'. It applies not only to the consumer goods industries, but to the ways in which capital goods were developed in this area of Italy, through continuous modifications of machinery imported for the consumer goods industries.

Creative continuity is a relevant model for industry in Cyprus as it now exists. Cyprus should therefore be looking for organic growth and diversification from existing points of strength, rather than opening up 'pioneer' sectors.

In practice this means two things. First, each sector needs to have its own diversification strategy. For example the metal working sector report proposes, as a long-term aim that the sector should aim at reverse engineering, with a view to firms carrying out complete product manufacture. Core products for development would include valves, ball valves, lobe valves, plugs, gears and worm screws, motors and couplings, and would require increased expertise in casting, forging, pressing and forming, metallurgy machining, welding and joining, finishing and embellishing. This reverse engineering would be in support of groups of upgraded products currently produced in Cyprus, notably pumps, solar heaters and refrigeration equipment. This, and similar policies for the other sectors covered by the mission, are discussed more fully in the sector reports.

Secondly, there are some non-manufacturing areas of expertise in Cyprus which could be used as a basis for new manufacturing development. The first is water management. Cyprus has internationally-recognised expertise in water management, in water management construction, and in associated agricultural development. The accompanying report on the Knowledge-Based Industries recommends that a Water Management Agency be set up to co-ordinate these inputs as part of a water management package for export. One part of this package would be manufactured products, not only hydraulic pumps, but other components of water management systems which could be developed in Cyprus. The report has a similar view of the potential for export of energy conservation systems, again including existing and yet-to-be-developed outputs from the Cypriot metal working sector. Other proposals for the development of fertigation have implications for the computer software sector, and would also require higher quality plastic irrigation pipes. In each of these instances the manufacturing opportunity arises from a strategy centred on an existing non-manufacturing area of specialisation. It represents the principle of organic diversification nonetheless.

The identification of new industries thus needs to be derived from the analysis of existing sectors, whether or not they currently involve manufacturing. It follows from what we said earlier about the 'filière' or thread of economic activity, that new manufacturing may result from a service industry, or that development in services may help to strengthen and transform existing manufacturing. Thus the growth of the computer software sector in Cyprus - which is discussed in the Knowledge Based Industries report - has already led to initiatives in the manufacture of electronic displays. The development of bio-technology in fish farming and animal husbandry opens up new opportunities in the area of food processing. One task for an overall Industrial Strategy for Cyprus is therefore to draw out the implications for manufacturing of developments in primary and service sectors of the economy. This is a more promising approach to industrial diversification than the compiling of lists of potential products which have no organic link to existing areas of productive experience in Cyprus.

During the present mission, we have not had the time to undertake detailed studies outside our five main sectors. The Knowledge-Based Industries report indicates a number of non-manufacturing sectors of importance in the new industry context, particularly those in which Cyprus has a potential competitive advantage in the Eastern Mediterranean and Africa. The report recommends a number of further steps to be taken with respect to these industries.

In this general report we are concerned with the approach to rather than the details of the Knowledge-Intensive Industries and their diversification. We recommend that in any further studies undertaken of non-manufacturing industries, the potential for manufacturing be brought out within the context of overall Industrial Strategy framework.

More particularly we recommend that urgent studies be undertaken on three sectors of particular significance to manufacturing:

- (i) retailing and distribution
- (ii) catering
- (iii) the leisure and cultural industries

Each of these has been traditionally classified as a service industry. Each is relatively underdeveloped in Cyprus, and each has substantial implications for Cypriot manufacturing. In the case of retailing and distribution the link is with quality control, stock reduction, and marketing information. In the case of catering, recent developments in Western Europe have transformed significant parts of the catering industry into branches of factory-based food processing. In the case of the leisure and cultural industries, museums link up with local design; the growth of live music has fed back into an expansion of the record industry; live theatre and sport has been the basis for the growth of indigenous television and film production; while education has strengthened the local production of books and other written publications.

What is important in these sectors is that major developments have been taking place in all of them internationally, and that in Cyprus all are a part of the tourist industry. The already strong links between tourism and manufacturing, and the potential for closer integration between the two sectors with respect to product development, would be further strengthened by developments in the above three fields.

Equally important, manufacturing industry can contribute to the development of these other sectors of the economy. For example, a catering industry based on the principles of flexible specialisation rather than mass production, would maintain the individual distinctiveness sought by many Cypriot hotels at the same time as substantially reducing costs. It could indeed be one part in a broader strategy of flexible specialisation in the tourist industry itself, where the same tension between flexible specialisation and mass production exists as is found in manufacturing sectors. Similarly a local supply of high-quality products is an important aspect of any successful just-in-time system of retailing.

6.5 Summary and conclusion

There are three main conclusions we have drawn with respect to the strategic orientation of Cyprus industry:

- (i) it should follow a strategy of flexible specialisation rather than mass production, as more appropriate to the size and strengths of the Cypriot economy, and offering much firmer prospects for maintaining market shares at home and expanding abroad.

- (ii) while seeking to gain experience and some market position in Europe on the basis of own-design products, Cypriot industry should maintain its orientation towards the

Middle East and African markets, particularly where it can act as an adaptor of European-type products for the particular requirements of the regional market.

- (iii) Cypriot industrial strategy should start with existing sectors, looking for expansion and diversification on the basis of already-established skills, either in manufacturing or in the agricultural and services sectors. The aim should be to foster an organic growth - mixing innovation with continuity - rather than attempting to start from scratch enclave innovations which have no current link with the economy.

Of these, the first is the most important. The future for Cyprus industry will depend on the extent to which existing industry can be restructured. The stronger is existing industry, the more will diversification be possible. The search for new industries should be a complement to, not a substitute for, a programme of restructuring the old. That such a restructuring is possible is shown by the growth of a new wave of firms, notably in the clothing sector, which have followed many of the principles of flexible specialisation. At the moment, however, this growth is at an early stage. If it is to be expanded and generalised, then major changes will have to take place in the approach of the firms themselves and in the general framework of industrial policy. The changes required, in strategic direction and institutions, are the subject matter of the next chapter.

Table 1

Index of average rates of pay in real terms 1985

1980 = 100

Finance, insurance, real estate and business services	140.2
Municipalities and improvement boards	137.2
Wholesale and retail trade, restaurants and hotels	135.4
Other services	134.1
Average for whole economy	132.9
Transport, storage and communication	132.2
Manufacturing	131.9
Mining and quarrying	130.9
Government (all activities)	130.3
Agriculture	128.3
Electricity, gas and water	127.1
Construction	122.3

Source: Economic Report

Table 2

Cyprus employment 1976-85(thousand persons)

	1976	1985	% Change	% increase in real GDP
Agriculture	36.9	36.3	- 2	14
Mining and quarrying	2.3	1.0	-57	-37
Manufacturing	28.4	44.8	58	85
Electricity, gas and water	1.3	1.5	15	90
Construction	10.7	21.4	100	62
Wholesale and retail trade and hotels	24.5	47.3	93	182
Transport, storage and communication	8.3	12.6	52	103
Finance, insurance, real estate and business service	6.1	11.2	84	140
Community, social and personal services	27.8	41.7	50	111
Total	146.3	217.8	49	95

Source: Economic Report.

VII

PUTTING THE STRATEGY INTO PRACTICE

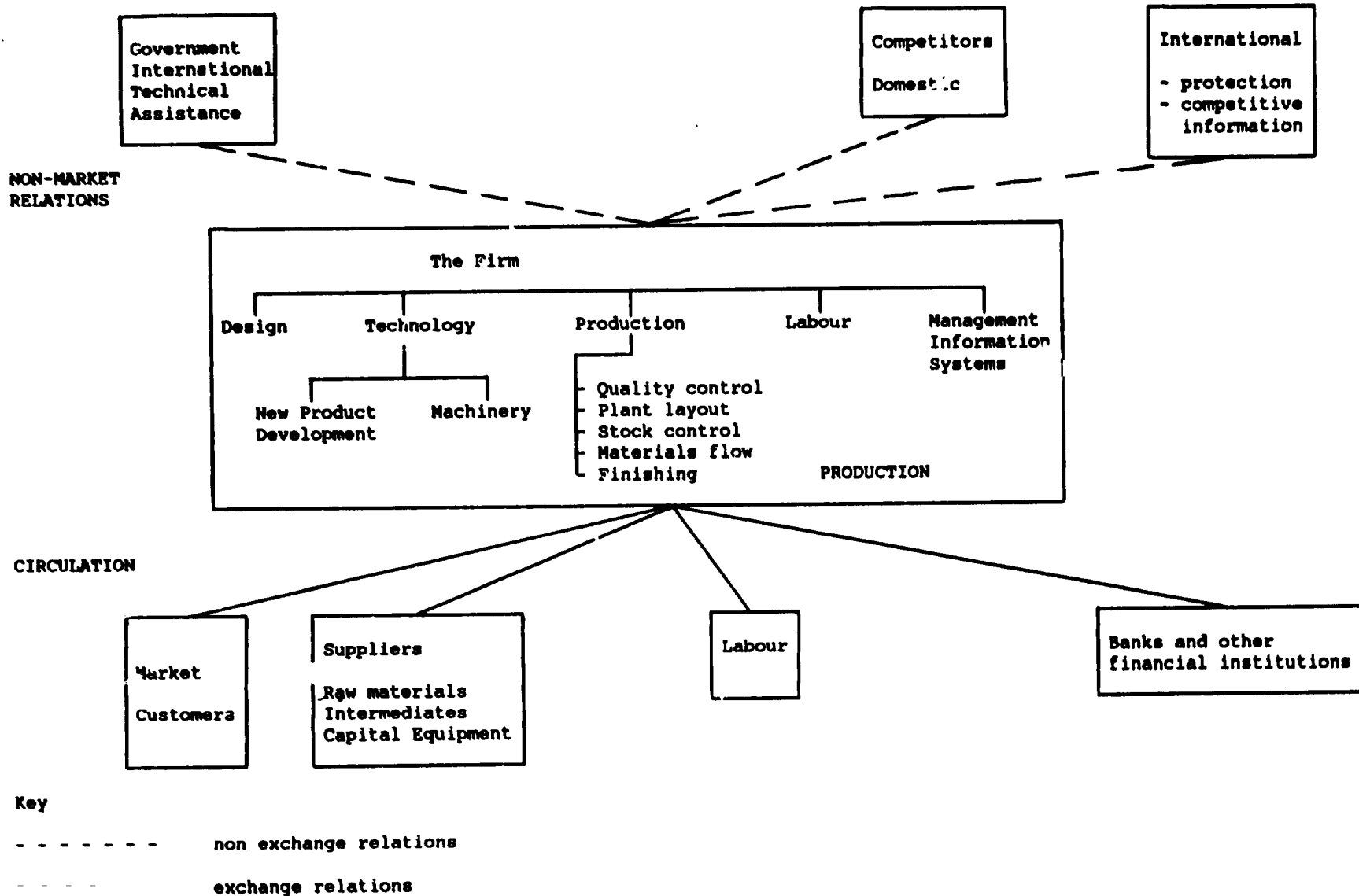
7.1 Systemic Flexibility

In putting the strategy into practice there are two issues. First how should existing policy be redirected and strengthened, and second, what is the best institutional means of carrying any new policy through. On the first we have already indicated the direction which we think Cyprus should take. This will involve the recognition of the importance of design, of stock control, of effective management information systems, of flexible machine systems and the capacity to adapt them. It will require a new approach to labour and skill, to finance and to the relations between firms and their customers and between firms and their suppliers. In the three main spheres of economic life - production, circulation and non-exchange relationships (shown in Figure 1) - the landscape of the corporate economy has been changing, and Government policy needs to change with it.

A policy which restricts its horizons to making sure the markets are working is not enough. What the Government is concerned with is how the just-in-time principle can be applied at the level of the sector, and this requires that each link of the sectoral chain is in place, that each knows what the other is doing, and that short-term interests do not prejudice long-term growth. Just-in-time requires planning and coordination. It moves too fast for the market.

Figure 1

The Strategic Planning Framework



Policy needs also to assist innovation within the sectoral chain. Here the task is one of supporting the creation of a culture - in design for example or in a new approach to management. For this the approach required of the policy maker is that of the garden rather than the mechanic. new cultures are not made by incentives alone.

7.2 The flexible state

New directions demand new approaches from the policy maker. They also require new institutions. In countries where flexible specialisation has been successful, we can observe that there has been a redefinition of the role and the institutions of the state with respect to industry. Flexible specialisation in industry has been matched by the growth of a flexible state.

In many ways the changes in the state have paralleled the changes in the structure of large business organisations. During the period of mass production, a new form of business structure was developed known as the multidivisional corporation. It had an extended hierarchical structure, strong centralisation, a clear division of labour between departments and functions, and between innovators and operators. It also showed a tendency towards vertical integration, so that the whole chain of production could be under a single command.

The flexible corporation of the 1970's and 80's has changed this. The growth of information technology and the capacity of control system means that, as we noted earlier, a firm like Benneton can decentralise retailing and production, keeping control of a design, marketing, dyeing, automated distribution system, and a centralised business information flow. Greater centralisation has allowed a simultaneous decentralisation, with increased autonomy (even separate ownership) for component suppliers and retail outlets within tightly defined limits. Managerial hierarchies have become flatter (the Japanese have been the pioneers in this), with a more fluid division of labour, work teams being brought together for a particular task.

and then dissolved when the task is done. Head offices have been slimmed down, with services sub-contracted, central routine functions computerised and then decentralised geographically, leaving the head office to concentrate on strategy, animation, monitoring, and high level diplomacy. In designing corporate structures an emphasis has come to be put on institutions which encourage creativity and learning rather than mechanical delivery. What is striking is that private business found itself facing similar problems of inflexible bureaucracy to those faced by public organisations. Indeed the public bodies had often been set up on models drawn from the private corporations of the mass production age. But with the discipline of international competition pressing more upon the private corporations than on the state, it was the former who had to respond and restructure first.

The lessons of the new flexibility in private corporations have only recently begun to work their way into the public sector. But already there is a pattern clearly emerging in a number of European countries. Its key features are as follows:

- a decentralisation of services towards the user (UK, Sweden)
- an increase in sub-contracting, with the state maintaining control over system design, and the terms of licensing, as well as providing any necessary subsidies, (TV franchises, bus transport, postal services)
- increased user control, through user councils, fines for failures in service delivery, choice and competition within the public sector, consumer research, ombudspersons, increased information on service delivery
- the finance of voluntary groups, both to deliver services, and to act as seed beds of innovation

- a new emphasis on strategy within public services, with the involvement of management, unions and consumers in the development of such strategies

- within public administrations, flatter hierarchies, problem solving teams, mechanisms for cross-departmental co-ordination, target performance and monitoring, internal auditing, the computerisation of routine functions, the creation of new units and the more continuous restructuring of internal organisation.

- an increased role for local and regional Government in service innovation and delivery.

There is as yet no fixed model of the flexible state - the above have been largely innovatory responses to particular problems rather than the imposition of a pre-conceived model drawn from industry. But the fact that they can be seen emerging in a range of services in different places suggests that the new model may be emerging in practice before it is generalised in administrative theory.

In the field of industrial policy there are many examples of the new model. In Germany, Italy, the UK and the USA it is local and regional Governments which have taken the initiative in strategic thinking and industrial service provision rather than the Departments of Industry in central Government. Massachusetts State has set up a range of institutions dealing with industrial turnarounds, industrial expansion, new product development, high-level technical training, and venture capital operations. The Italian municipalities have worked closely with groups of industrialists, subsidising their initiatives, and organising a variety of basic services like industrial property and training. In the UK the municipalities have been the most innovative public institutions in the development of sector strategy, and in the public venture capital, and public turnaround fields. They have set up enterprise boards which are

usually controlled by the municipal authorities, within clearly defined guidelines and with a municipally appointed board. The municipalities themselves have concentrated on strategic research, training, and the operations of local and national public services.

In Cyprus, there are some parallels with these experiences abroad. The main industrial institutions now operating in Cyprus are a mixture of governmental, quasi public and private bodies. In the field of training, there is a specialist strategic unit, the ITA, responsible for training strategy, the stimulation of new training courses, and the funding of other organisations to carry this out, including two other quasi public bodies, the HTI and the CPC. As a structure, this has the flexibility which is required. In the field of exports, there is shortly to be set up another quasi public institution, the Export Promotion Organisation, which is also responsible for strategy, some implementation, and the funding of other bodies to carry through the required tasks. New forms of production organisation and industrial relation have been the responsibility of the Cyprus Productivity Centre. The Cyprus Development Bank is a fourth institution which exemplifies the new mode. It has been subject to a number of pressures which raise the question of its strategic direction though not its institutional form.

There are other policy areas where the specialised institutions do not exist, for example design, machinery supply, research and development, and management consultancy. Either these are undertaken by a number of different agencies and institutions, or, as in the case of design, they are not undertaken at all. We will discuss these in the appropriate place later in the chapter.

Looking at this structure as a whole, there are a number of institutional gaps which need to be filled:

- associations of industrialists to carry out collective services for themselves
- an adequately funded financial institution to undertake sectoral restructuring, a long-term strategic investment.
- a re-oriented incentive scheme, with a number of targeted support funds
- a centre to encourage the development of industrial design
- a network of sectoral technology centres

In addition there are a number of other policies which can be carried out by existing institutions, and which we will discuss under the relevant functional headings.

7.3 Sectoral consortia for collective services

The starting point for any change must be the firms themselves. Theirs is the prime responsibility for re-orientation. It is the producers who need first consider the relevance (if any) of flexible specialisation as applied to their current and potential business and what would be required to re-orient their firms accordingly. The Government, external consultants, even a fully resourced industrial bank cannot do this for them. There is no magic solution which can be delivered from outside. Rather the question is one of strategic change starting from within.

In large firms, the task of thinking about strategic changes is a specialised function within the firm. There are corporate planning departments, whose members are not only trained in strategic skills, but provide themselves with constantly updated information about their industry and where it is going. Journals, conferences, professional organisations, business information reports, international travel and discussion - these are the means by which corporate planners keep abreast of the times. This is impossible in firms the size of those in Cyprus. So is specialisation in the skills of managerial implementation. Figure 2 sets out some of the areas which need to be managed within a firm. In Cypriot firms, the owner-managers are having to deal with all these issues, and in the smaller firms are involved as direct producers as well. In a small number, the owner-managers or their relations have specialised managerial knowledge from their previous work - design, accounting, in one case marketing. But they cannot for the most part continue to specialise. Nor, quite simply, do they have the time to undertake many of these functions. Finally, where information is involved, whose gathering and processing is subject to substantial economies of scale, small firms lack the resources to finance what is required.

The lack of managerial time to spend on strategic planning and its implementation, with the accompanying problems of lack of specialised skill and information, is one disadvantage faced by small firms. A second is the problem of technological indivisibilities. For example, a number of clothing firms would have liked to buy CAD systems, but their turnover did not justify it. The same was true of some machines in the furniture industry. As currently constituted, firms either have to do without this equipment or use it at under-capacity.

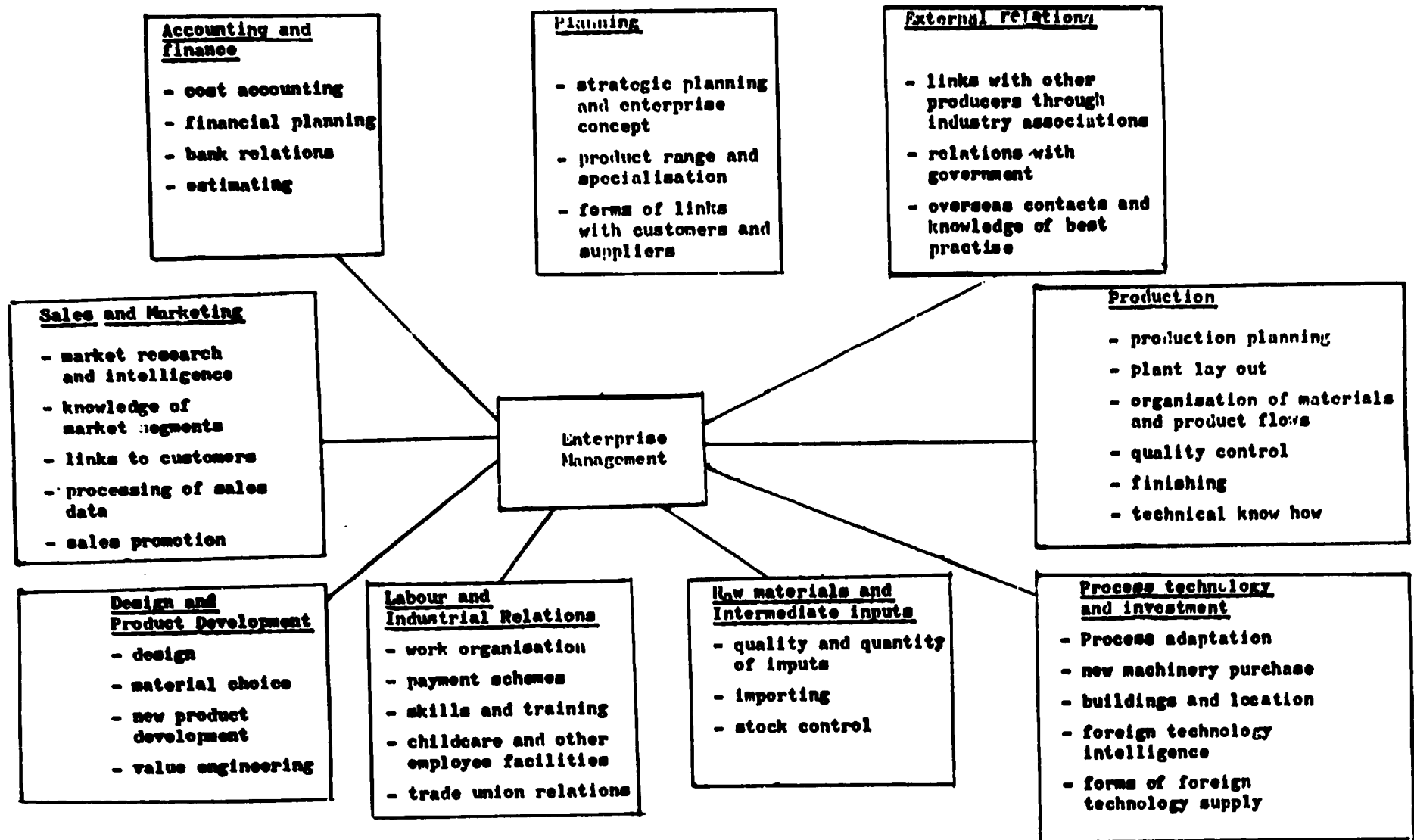


Figure 2 Enterprise Management Functions

Given that the size of Cypriot firms has remained remarkably stable and has not responded to the incentives to merge and expand, the central focus of policy needs to turn to the provision of many of these services on a joint basis. On the need for such joint services we found common agreement between industrialists, within the employers' organisations, in Government, and in a range of consultancy reports. Where there is more uncertainty is the best institutional form for the provision of these common services.

It is the view of this mission that sector industry associations should become a prime focus for the provision of common services. It is such sectoral associations which have been so important to the success of Italian small-firm industry, and to the export strength of small firms in Germany and Sweden. Financed and controlled primarily by the firms themselves, they have shown themselves to be flexible, capable of responding rapidly to the particular needs of their members, and highly productive. As well as specialising by sector, they have also commonly some specialisation by function.

If we take the Italian case as an example, the industrial consortia have been encouraged by national law to provide common services to firms with less than 20 workers. They cannot themselves be profitable and must be accountable to their members. Some co-operation between firms takes place informally - determining firm specialisation in a particular area for instance. The formal framework of the consortia have been used largely for joint finance, marketing and raw material purchasing. By 1979 there were 79,000 co-operative marketing ventures in Italy. One example, the consortia of furniture and allied producers in Poggibonsi, south of Florence is discussed in the accompanying furniture report. It has 85 members, employing 2,000 people, who each pay approximately \$6,000 a year as a membership fee. This allows the consortia to employ a staff of six, who provide a range of marketing and joint purchasing services.

Another example is the Centro Informazione Tessile Emilia-Romagna (CITER), a joint public-private organisation located in Carpi, the

centre of the Italian knitwear industry. The CITER grew out of a management training course sponsored by the European Social Fund. It has a budget of \$250,000 75% of it drawn from its 500 member firms (most of them with less than 50 employees) who each subscribe \$400 a year. It provides a comprehensive range of information services in the areas of design intelligence, market research and fabric sourcing, as well as technology and management consultancy.

The advantages of the consortia model are as follows:

- (i) the responsibility of initiating, organising, and funding the association lies primarily with those who are to be helped by it.
- (ii) it is flexible, with an association being formed to meet the particular needs of a given set of firms. The flexibility is one of function, membership, and extent of public participation. Within the overall terms set by the legal framework, there is no one standardised model.
- (iii) it is pluralistic. Firms may be in more than one association - one for credit for example, another for marketing;
- (iv) the contributions are modest given the services provided.
- (v) they exemplify the advantages of sectoral specialisation; for instance, an overseas market intelligence system can also provide information on new products, and new technology; it can report on changing strategic developments within the sector, and potential overseas partners; it can identify sources of intermediate materials or of specialist industry consultancy. Just as

to find large firms specialising by sector, so these collective services have found economies in sectoral specialisation.

We see many advantages in Cyprus of developing structures of this kind. The initiative would have to come from the industrialists themselves, but the framework, together with incentives, would be the responsibility of the Government. In order to get this off the ground we recommend the following:

- (i) groups of industrialists should take the opportunity of visiting Italian consortia in their respective sectors of industry
- (ii) a representative of the National Confederation of Artisans of Italy be invited to Cyprus to advise on the establishment of consortia and of an appropriate national framework for industrial consortia.
- (iii) that a study be undertaken of the German export cartels and the Swedish joint marketing co-operatives to identify features which it would be of advantage for Cypriot associations to adopt.
- (iv) that the Government undertake to set up a national framework for industrial consortia, and provides funds through specific incentives schemes to encourage the development of both formal and informal co-operation between firms.
- (v) that the industry associations and the trade unions agree to support this programme for the provision of common services.

In terms of the range of services to be provided in this way we would give priority to the following:

a) design intelligence

At the moment for the clothing industry the Ministry of Commerce and Industry organises well-attended twice-yearly seminars by a French design intelligence company called Promostil on fashion trends for the coming season; they also hire international consultancy firms to undertake one-off surveys of overseas markets (Austria-Switzerland, and Canada). A number of clothing exporters also invest considerable sums on purchasing commercial design forecasts at C£500 and on overseas research visits. There are scale economies in these areas - an individual subscription to a clothing association could well be less than the cost of a single design forecast, yet provide access to much more.

b) export marketing

There is a clear need for a joint sales organisation, particularly for smaller firms. Many firms use commission agents and pay a premium for their services; a joint sales organisation would enable them to avoid the middlemen and at the same time would provide logistic and technical support for exports, as well as contributing to the foreign market intelligence. Such an organisation could also help impose quality standards, which are so important in the middle and upper segments of the market.

c) **computer aided design and materials lay out facilities;**

In clothing, footwear and metal working there were evident opportunities for the sharing of advanced design and layout equipment.

d) **management consultancy and technical assistance**

While the larger firms are relatively knowledgeable about current developments in machinery and other types of technology, the same is not true of smaller firms; similarly there are serious shortages of technically trained people in local industry, and of specialist management skills. An industry association could build up an approved list of consultants as well as providing a channel for technological information.

(e) **operative training**

A joint association could provide a fruitful link between the work of the ITA and individual firms, organising joint training schemes for industry, and advising member firms on training and good labour practices.

These are the priorities which emerged from the sector studies. Other functions could be included, including raw material sourcing, joint financing, the establishment of child care facilities, and the supply of labour market information. Certainly any centre should offer access to common business services like telex and computer facilities, printing, design and layout, and access to translation services.

The question of representation and funding go closely together. In the Cypriot case there is an argument for tripartite institutions, with representation from trade unions and Government on the board of the industry associations along with the industrialists. For example it would make sense to have representatives from the MCI and the ITA as well as the Export Promotion Organisation involved. But it is important that the Government retain a back seat, even if it provides significant initial funding to get the consortia off the ground. In the long run, the bulk of the core finance of the consortia should be funded by member subscriptions though additional functions could be taken on, at least part-funded by the Government.

The above proposals in part reflect the principle that institutions should be as close and as responsive to the users as possible, and in part derive from the success of these institutions abroad. They would form a new critical layer in Cypriot industrial organisation between the individual firms and the state. To date this intermediate layer has largely been missing.

In discussions of these issues during our mission two points were raised with us. First a number of industrialists told us that Cypriots would not co-operate, that their competitive individualism was too strong. For the second, cases were cited where attempted co-operation had broken down because one of the parties to the agreement had gone behind the backs of the others. There were clearly long-standing rivalries between some firms which would make co-operation difficult.

Our response to this is that without co-operation much Cypriot industry is unlikely to have a long-term future. It is as simple as that. The kind of common services we have discussed cannot by and large be supplied so effectively by the Government. If firms cannot subsume their internal rivalry in the face of a much greater external competitive threat, then there is nothing outside organisations can do to secure their future. Some firms are already co-operating, of which the Limmasol furniture makers are a recent example. Whatever

the outcome of this particular project, the initiative they have already shown is a guide to what is more generally required.

What is exemplified in the Limmasol case is that co-operation does not have to take place at the level of the whole sector. It need only involve the firms who feel they can work together on the specific task in hand. The important thing is not that all firms co-operate but that some do, and that Government incentives should be geared to that end.

The creation of this new middle institutional layer will have to be approached pragmatically. Different forms may suit different industries. The Government will play more of a role in some than in others. Whatever the mix, industrial consortia in some form are, we believe, indispensable to the project of flexible specialisation. They promise the kind of flexible, creative, and closely-targeted service to small firms which more centralised institutions, public or private, will find it difficult to match.

7.4 Strategic Planning

One of the preconditions for effective decentralisation is the existence of an agreed overall strategic framework. In a firm this is prepared by the head office. In an economy it should be provided by the state. For Cypriot industry the present report is intended as the basis for such a framework. What is currently lacking is an appropriate structure to continue this work of strategic planning, and co-ordinate its implementation.

7.4.1 The existing structure

(i) strategic planning capacity

Within the Cyprus Government there is at present little if any capacity for strategic industrial planning. In the Ministry of Commerce and Industry, there is a research and development unit of seven people which is largely taken up with day-to-day issues such as the industry guarantee scheme, permits for machinery imports and for foreign shareholding. In the Planning Bureau, there is one industry specialist, who also has many immediate demands on his time. The Planning Bureau sees its prime functions as co-ordinating industry with the rest of the economy, rather than developing industrial strategy directly. Thus the Industry section of the 5th National plan was grafted by the MCI, for consolidation by the Planning Bureau with the Plan as a whole. Most of the strategic documents which exist have been produced by overseas consultants on short-term contracts.

This is not enough. There has to be an internal strategic capacity - not least to make full use of external reports. There has to be a regular domestic source of strategic ideas, one which has close links to the rapidly changing circumstances of particular industries and international markets.

The management of the strategic planning programme will require not only much more time than is currently allocated in the relevant ministries, but new skills (strategic research and consultative planning) and new methods (of international data gathering, for example).

(ii) intra-Government co-ordination

At the moment there are a variety of mechanisms for co-ordination on industrial matters within the Government:

- there is a planning structure which consists of:

Central Planning Commission	comprising ministers and chaired by the President
Working Planning Committee	composed of ministers and chaired by the Minister of Finance.
The Planning Bureau:	which acts as the servicing body to these Committees.

- since 1980 there has been a mechanism for co-ordination on Custom Union issues

A Ministerial Committee on EEC matters	chaired by the Minister of Foreign Affairs, and including the Ministers of Finance, Commerce and Industry and Agriculture
A technical co-ordinating committee on EEC matters	chaired by the head of the Planning Bureau, and including the Director Generals of the Ministries represented on the Ministerial Committee
An advisory committee on EEC matters	run by the Ministry of Commerce and Industry and including representatives from the Employers organisations.
An economic council	chaired by the Minister of Finance, and including representatives of the banks and industry

None of these is suited in their present form for the specific task in hand. Overall economic planning, the impact of the Customs Union, and the issues of immediate economic policy, all have a bearing on strategic industrial planning but they are not coincident with it.

To convert any of them into the necessary strategic industrial planning body would require them to abandon some of their current functions which need to be undertaken. To ask them to add the strategic planning functions to their existing responsibilities would be to overburden them as they are currently constituted.

7.4.2 A new body

To take account of both of these gaps, we recommend the establishment by December 1987 of a STRATEGIC PLANNING COUNCIL for industry. It would have the following features:

- it would be temporary, running in the first instance for the four years to 1991
- it would be multipartite, including in its membership representatives from Governme.t, industry, the trade unions, banking and the quasi public bodies
- it would have an Executive Committee comprising the Ministers of Commerce and Industry, Finance, Labour, Education and Agriculture.

The Strategic Planning Council should be serviced by a small STRATEGIC PLANNING SECRETARIAT for Industry of high quality officers, comprising:

- one senior economist as the head of the Unit
- a deputy

- two secondees with sectoral expertise drawn from other Ministries, with at least one from the MCI
- three support staff drawn from the participating Ministries

In addition at any one time it would put together specialist teams to work on a particular sector. In addition to the core staff, these would include:

- short-term secondees from the sector in question
- short-term secondees with relevant expertise drawn from other parts of Government (for example the sector desk officer from the extension service)
- other short-term secondees and consultants as required.

The Secretariat would have a budget of C£200,000 p.a., of which 60% would cover salaries, 10% consultants fees, 10% foreign and internal travel, and 20% running expenses, including printing and publishing.

The tasks of the secretariat would be as follows:

- the preparation of detailed strategic plans on each major industrial sector in Cyprus, using the sector reports of the present mission as a starting point
- ensuring the widespread discussion of the reports

- submission of the revised reports, including proposals for action and funding to the SPC
- producing an updated Cyprus Industrial Strategy based on at least eight sector studies by mid 1990 in time for incorporation into the Sixth Emergency Plan.
- co-ordinating the production of a Cyprus Technology Strategy by mid 1990
- producing or causing to be produced other papers as required, including:

an assessment of statistical requirements for the Industrial, Labour, and Technology Strategies and for industry on a regular basis.

proposals on the revision of the industry incentive schemes.

- submitting to the SPC a bi-monthly report on progress by Government, quasi public and private bodies in carrying out agreed recommendations with explanations for non-performance. These reports should not dominate the Council agenda but should be primarily for note with necessary action taken outside the meeting.

The Secretariat would be acting as initiator, animator, synthesiser, progress chaser, and reporter for a wide range of activities only some of which would be undertaken within the secretariat itself.

The aim of limiting it in time and staff numbers, as well as staffing it with secondees and temporary postings, is to ensure that it strengthens static work and implementation in existing Ministries rather than supplants them. Government secondees having worked in the Secretariat would return to their Ministries with a better sense of overall strategic direction, and would hopefully form the core of a new strategic work force within the respective Ministries.

The Strategic Planning Council and its Secretariat would be the focus of responsibility. It would be charged with identifying problems and reporting to the Council of Ministers on performance and achievement.

The work of both Council and Secretariat should be the subject of independent assessment annually, the assessors' report being submitted directly to the Council of Ministers. A final independent assessment covering the years of the fifth emergency plan period should be submitted by the end of 1991.

7.5 The Ministry of Commerce and Industry

A temporary Strategic Planning Council of the kind proposed requires a lead Ministry to carry through many of the recommendations on a permanent basis. This should be the Ministry of Commerce and Industry. The specific functions we have in mind include:

acting as the main focus within the Government for industrial technology imports and administration of advisory services

co-ordination of Government administrative controls over machinery imports and foreign investment

operation of an emergency management unit to raise the level of management in Cypriot industry

acting as reference point between Government and sectoral industry associations

acting as sector strategy promoter within the Government on behalf of the Strategic Planning council.

While the Strategic Planning Council will have the overall responsibility for implementing and monitoring the industrial strategy, the bulk of the work of implementation will fall to the MCI. Their task will require a mixture of administrative, diplomatic, animating, and progress-chasing skills. At the same time it will be necessary for the Ministry to build up its own strategic capacity, both because the process of strategy development and implementation can never be entirely separated, and because the Ministry will be a major source of strategic inputs into the work of the Strategic Council itself. The Ministry will have to have the capacity to submit papers to the Strategic Planning Secretariat on a range of issues over which the Ministry currently has responsibilities.

If it is successfully to undertake these tasks, it will be necessary for some internal restructuring to take place within the Ministry. The existing organisational structure is presented in Figures 3-6. The main points to make about the present structure are as follows:

Figure 3

Ministry of Commerce and Industry

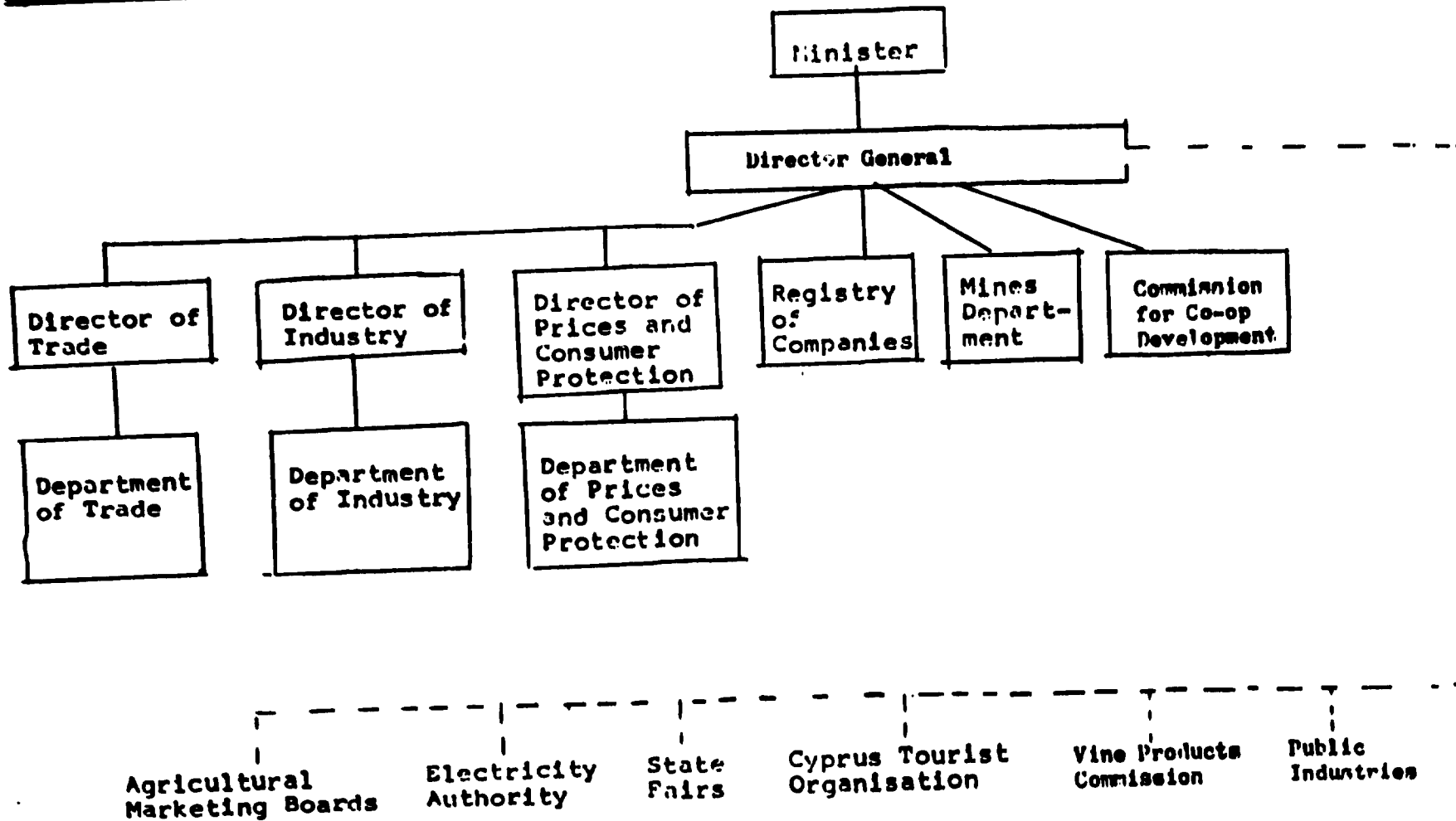


Figure 4

Ministry of Commerce and Industry: Industry Division

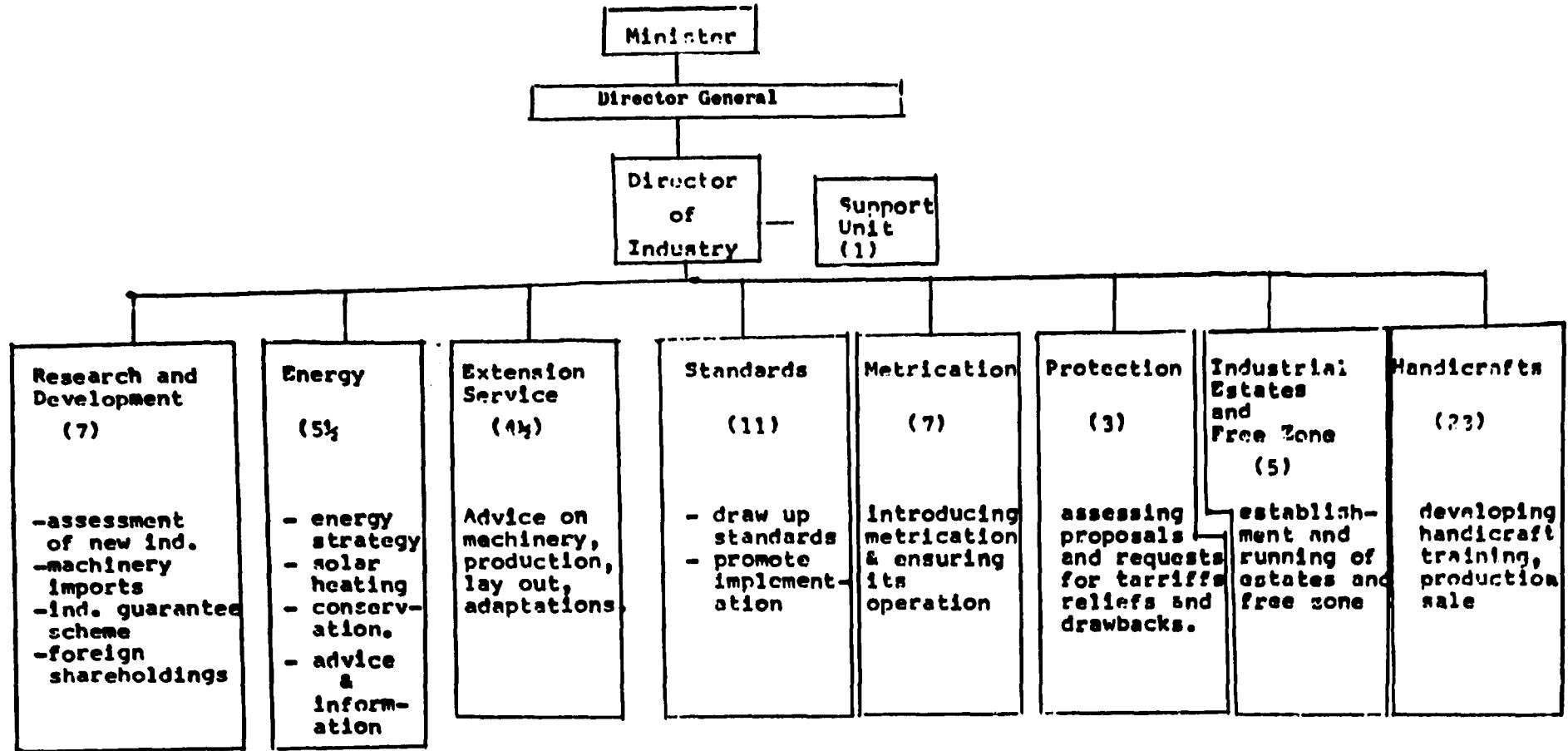


Figure 5

Ministry of Commerce and Industry: Trade Service

Organisational Structure

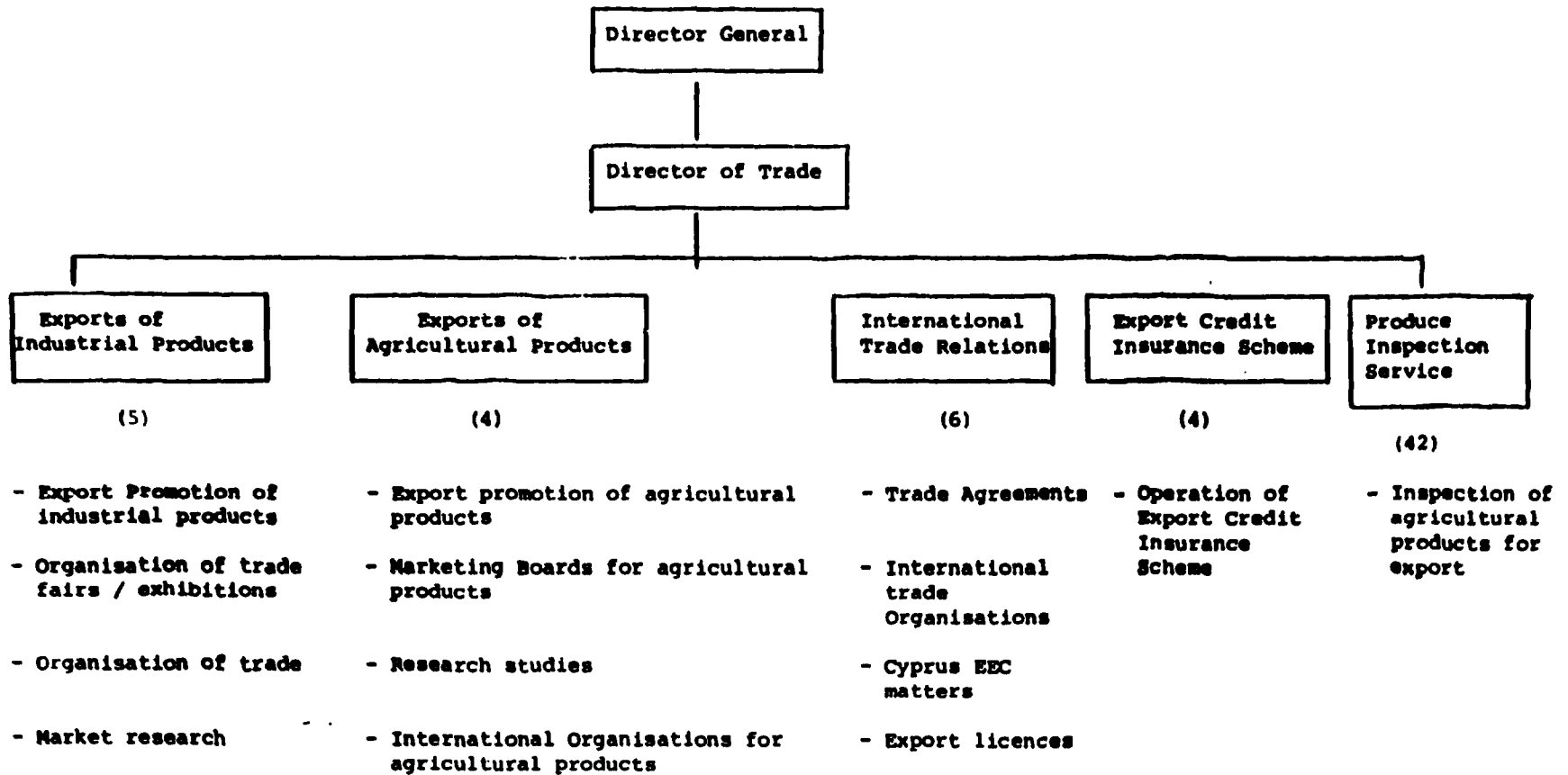
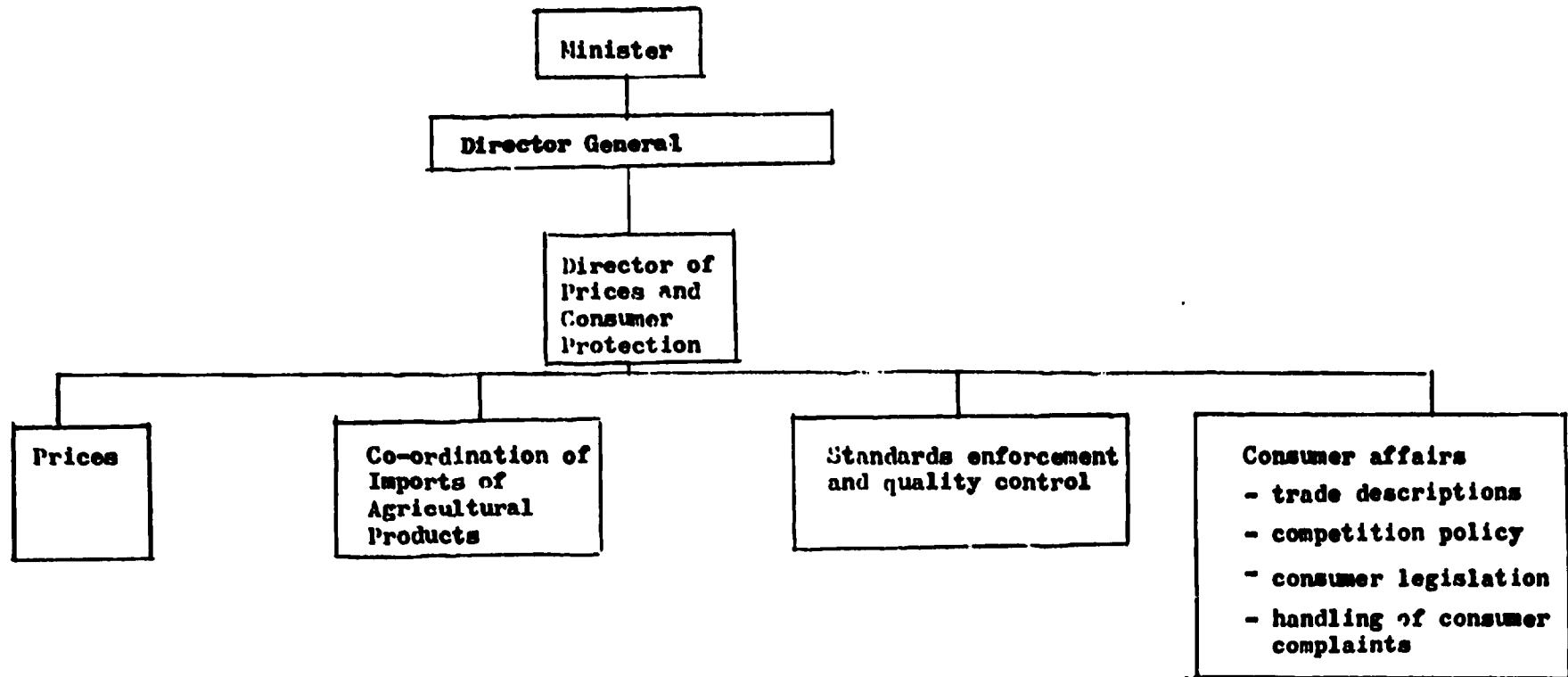


Figure 6

Ministry of Commerce and Industry: Department of Prices and Consumer Protection.



- (i) the Industry Division is predominantly concerned with administration and implementation. Of the 68 staff in the division, 95% are concerned with advisory work, the introduction of new systems (like the metrication group and the Cyprus Standards Organisation), routine processing of applications and requests, or the operation of projects (such as the Industrial Estates and the Free Trade Zone).

- (ii) There is little capacity for strategic planning and long-term research. The Research and Development unit are largely taken up with routine work.

- (iii) The day-to-day pressure on the Division is such that those with analytic skills are too often (and understandably) pressed into immediate tasks - preparing tariff data for the Customs Unions negotiations, looking after visiting consultants, and so on.

- (iv) there is a low level of automation, with the administration of the industrial estates, the issuing of import licenses, the granting of conditional reliefs and drawbacks, the calculation of the costs of allowing reliefs and drawbacks, the drafting and redrafting of standards, and the issue of standards, and the issue of standards for conversion in connection with metrication all having to be done manually without the aid of a computer system. Not only have funds not been allocated to the Ministry for word processors, but the Ministry have not been able to invest in a range of modern office equipment, including an up-to-date telephone system. The lack of telephone lines has been a constant frustration to the management of the Ministry, the staff, and those whom the Ministry is intended to service.

- (v) as in many countries, the existence of administrative controls - such as import licenses - leads to frequent challenges by applicants of the decisions on desk officers, and appeals working their way up the hierarchy until on occasion they reach the Director General and/or the Minister.

- (vi) there is little direct professional support to either the Director General or the Director of Industry in spite of their wide range of immediate responsibilities.

- (vii) as in other sections of the Government, there is a relatively sharply defined division of function with the Industry Division.

If the Division is to play the role that is necessary for the implementation of the Industrial Strategy, then some changes will be required. Although additional staff would undoubtedly help, they may not be immediately forthcoming, and were they to be agreed it would be some time before they were in post and operational. We have assumed therefore that changes will have to be made within existing staff numbers. For this to be possible, either the tasks currently performed will have to decrease, or ways will need to be found to improve current staff productivity.

The first should be considered as part of an internal review and a report made to the Strategic Planning Council. As to the second, there are considerable productivity gains that could be realised through improvements in office automation. It is of the upmost urgency that the potential automation identified for the Ministry in the 'Master Plan for the Introduction of Computers and Information Technology in the Public Sector in Cyprus' be implemented as soon as possible. We understand that the responsibility lies with the Department of Data Processing Services (DDPS) of the Ministry of Finance. We also recommend that the Telecommunications Authority

takes urgent action on the telephone system and other aspects of office equipment within the Ministry.

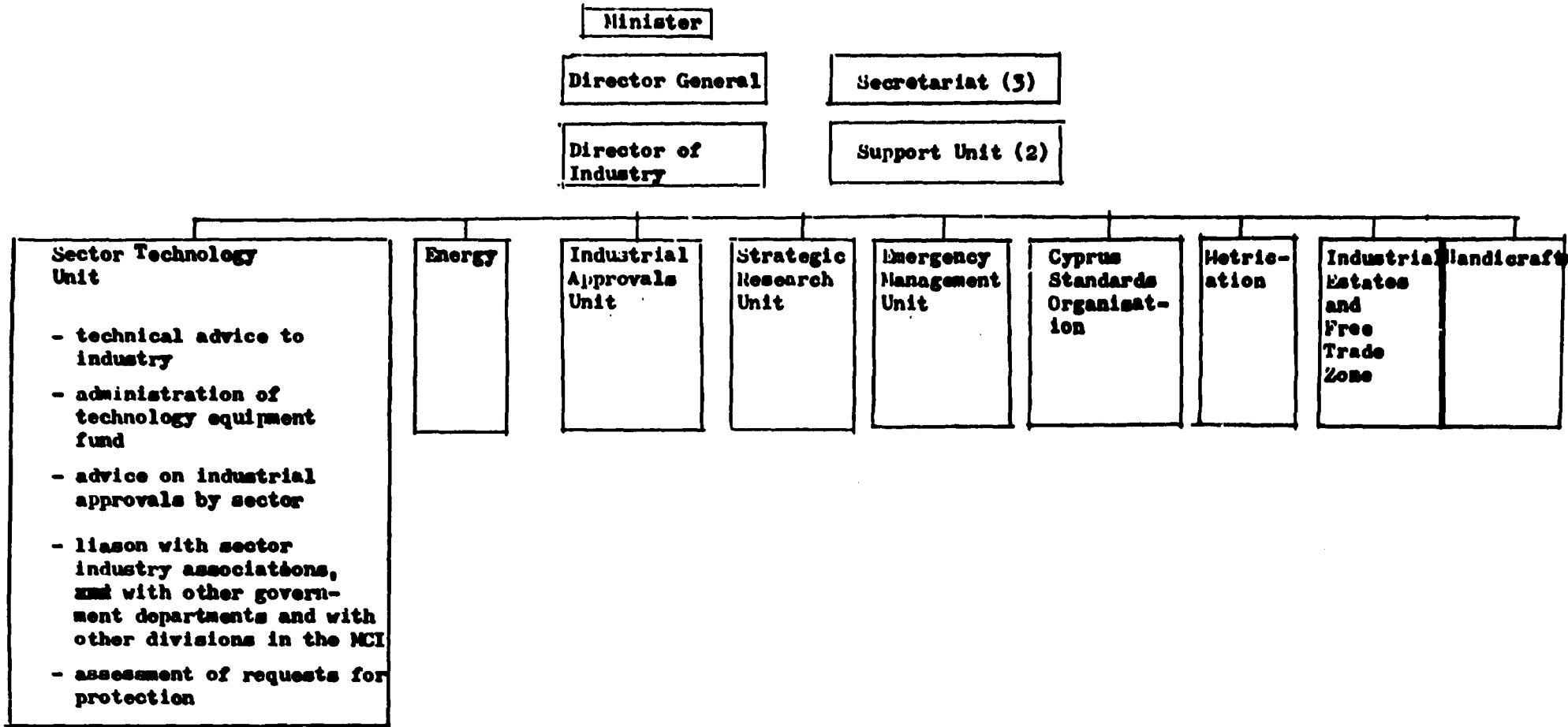
If the Ministry is to become the principle point in Government for the stimulation of technology and productivity in industry, then it must itself be a model in the use of technology, and the productivity of its labour. The Ministry should aim to become a pace setter in modern administrative methods. With this in mind, we also recommend that the team that undertook the Organisation and Methods study of the ministry of Agriculture be invited to undertake a similar study in the MCI.

One way in which the expansion and restructuring of the Industry Division's work could be organised is given in Figure 7. The main suggestions we make are as follows:

- (i) that a new Sectoral Technology unit be established, incorporating the existing extension service, and organised like the extension service on the basis of sector specialisations. It would take on the Ministry's responsibilities for advising the Central Bank on machine imports and foreign shareholdings (since the sector specialists would in any case be well acquainted with machine importers in their sector, and the potential effects of foreign shareholdings) as well as the work on protection. They would continue their extension service work, and take on further the administration of the technology equipment fund, and the management equipment fund, as well as the liaison with sectoral associations, and other Government departments (including their own trade and consumer affairs divisions) in order to push forward the Industrial Strategy. The existing extension service staff would require some further training for these extended responsibilities, as would the non-extension service staff drafted into the new unit. This unit would be the

Figure 7

Proposed structure for the Industry Division



main link to the Strategic Planning Council Secretariat, and would second staff to the Secretariat as and when required.

- (ii) a new small Industrial Approvals Unit should be formed which - working closely with the Sectoral Technology Unit - would act as a single window agency for all applications seeking Government approval, for industrial projects, technology transfer, joint venture proposals, machinery imports and so on. The Approvals Unit would be responsible for co-ordinating the responses of other sections of Government, and ensuring a speedy decision. It would service an Industrial Approvals Board representing relevant Government departments and the Central Bank, with power to take the decisions on industrial applications. Appeals against decisions should be channelled to an independent ombudsperson rather than to more senior levels of Government.

- (iii) a Strategic Research Unit should be established with a small staff of people with proven experience in industry research and high quality output

- (iv) an Emergency Management Unit (see below) should be set up composed of external consultants and one permanent member of the Ministry staff with accounting skills

- (v) to increase the flexibility of the Division we suggest expanding the support unit of the Director of Industry to two

- (vi) we also propose the establishment of a small secretariat of three people, working directly to the Director-General, who would

- prepare policy papers on issues directly concerning the Ministry including a running brief on the organisations on which the Ministry has direct representation and/or responsibility

- act as a support staff to the Director- General on the wide range of problems which come to him.

Quite apart from the numerous day to day issues with which the Director General has to deal, he will play a crucial part, along with the Director of Industry, in ensuring the successful formulation and implementation of The Industrial Strategy, and it is imperative that both are given the support that they would have as a matter of course in a private industry of the size and scope of this Ministry.

Side by side with this structure, the Ministry should aim to move to a more flexible system of working groups to tackle non-routine tasks. Key to this will be the formation of a set of team leaders who can motivate a group, and have the trust of senior management to operate within considerable delegated authority. There should be an increase in the training budget of C£20,000 a year since an expansion and updating of skills is a necessary condition for the successful application of such a flexible system.

Finally, the Ministry should consider ways of increasing the contact of its staff with the day to day problems and experience of industry itself. One factor which lies beyond the Ministry's control, is the non-coincidence of working hours, which is particularly serious as far as direct contact with the European market is concerned - effectively time overlap being confined to less than three hours a day. The limited amount of overseas travel is another example. The extension workers for instance, who are able officers, nevertheless find it difficult to sustain contact with the most advanced developments in the field, even down to the level of the Trade

Journals. Urgent attention should be given to the extension of the present system of personnel management to ensure:

- that all Ministry staff have the opportunity for direct contact with functioning industry, including secondments, away from the Ministry buildings themselves.
- that those in an advisory position are able, through training and travel, to update their knowledge.

7.6 A new model of development banking

Another set of institutions which have a central role to play in any process of restructuring are the banks. In developing economies they have been of two kinds, commercial banks and development banks. Commercial banks are deposit-taking institutions, lending for the most part on the basis of collateral, with a short- to medium-term time horizon. Development banks were intended to complement the commercial banking system. They acted as channels for long-term finance (much of it from abroad) to private firms, offsetting the short term bias of the commercial banks. They often found themselves in the position of lenders of last resort, and turned to by Governments and development agencies to promote particular development initiatives such as small-firms schemes and regional investment programmes. They had a more active approach than many commercial banks, providing enterprise advice and help in the preparation of project proposals. They were by-and-large project-oriented. They grew rapidly in the period between 1950 and 1980. By late 1983 the World Bank had records of 137 of them. One of them was the Cyprus Development Bank, founded originally shortly after independence in the early 1960's, and restructured in 1976.

It is clear that an active financial institution, closely involved with the firms it finances, concerned with the long-term, and wider development objectives, and capable of offering hands-on project and

management advice, should play an important part in any process of industrial re-organisation. We are of the firm opinion that not only is development banking necessary for Cypriot industry in the coming period, but that it should be considerably expanded. The form it should take, and its links to the main commercial banking system is less clear. For what we observe throughout the developing world is that the original model of the development bank is in serious difficulties.

These difficulties are partly the result of increased competition - from local commercial banks moving into the long-term market as well as international banks expanding in developing countries. In part they arise from the world recession, particularly after the second oil price shock in 1979/80, when the rise in rural interest rates and the depression of local and overseas markets led many of their clients to have repayment problems. This particular 'debt crisis' highlighted other weaknesses in the development banking model: they lacked access to deposits; they operated with limited interest spreads as Governments and agencies tried to keep their interest rates low for development purposes, hence they had difficulty in building up their own funds; not only were they limited to a particular banking function (losing the economies of multi-function banking) but it was a function which often involved the more risky investments, and the 'last resort' investors. When on top of this they were asked to carry out other functions which the private banking system was not adequately performing (for example small-firm finance), there was a sense in which they were being squeezed between development objectives and the market without the resources to carry the job through. The 1980's crisis therefore served to highlight some of the inherent problems of the original model.

The response has been varied. One has been to move away from industrial investment. Another has been to increase access to funds; either their own funds through increasing spreads, or other funds through linking with deposit takers, or in some cases HP companies. Thirdly they have tried to diversify functions, moving into insurance, leasings, consultancy services, and computerisation.

Finding themselves the poor relations in the market - without the economic expansion of earlier periods to sustain them - they have tried to strengthen their competitiveness both in terms of access to funds and of services provided. If not a 'big bang', there has certainly been a smaller bang, with echoes of the development of the 'financial supermarket' which has characterised the present period in developed country banking.

One consequence of the above is that the development banks have been in danger of losing their long-term development identity. In order to survive, many have become more like their competitors the commercial banks. The commercial banks, for their part, have not welcomed increased competition in their customary markets from institutions originally designed for a long-term function. Yet the dilemma of development banking in the 1980's remains. If they are to operate in the market, then they must have the funds to do so. If specialised banking functions are increasingly coming together in single institutions for competitive reasons, then the development banks must be given the scope to hold their own in an era of financial supermarketing. Alternatively, they could be more insulated from the market: with greater access to state funds, and without the expectation of profitability. As it is they are caught between two worlds - expected to operate in and against the market, and to bear development functions without the means to carry them through.

These tensions are apparent in Cyprus. The Cyprus Development Bank shares many of the more general characteristics we have mentioned above. It was established to provide long-term finance to productive, private industry. It was not given access to internal savings, but rather drew its funds from the Central Bank at a subsidised rate. Latterly it has raised a tranche of overseas capital. With fixed interest rate of 9% its spreads are limited. It has not been able to build up its own internal funds. As far as its clients were concerned, it too has often found itself the lender of last resort. Both the Government and the commercial banks have brought it into firms facing difficulty. Of its portfolio of 30

firms in which it has investments approximately 50% are problem companies. On its loans (to 120 companies) it has a 20% delinquency rate. Given its limited functions, it finds it is commonly the last to be paid by lenders, since it lacks the everyday levers of the commercial banks. Its investments are made according to economic rather than narrow financial criteria, by the incorporation of shadow prices into the feasibility study. It is striking that in spite of all this, the CDB has registered a profit in every year since 1979, with an average yield on its portfolio of just under 5%.

The tensions, however, are there, and are likely to increase as Cypriot growth slows down, particularly as the effects of the Customs Union work their way through manufacturing. Until now the sustained growth of the last decade has allowed the more general tensions we have noted in development banking to have been kept to manageable proportions. We expect this to be un-sustainable in the near future. Clear choices need to be made if one of Cyprus's successful economic institutions is to be able to continue productively.

The issues that need to be addressed are those of function, finance and control. As far as functions are concerned, there was general agreement amongst all to whom we spoke that there was a need for a long-term financial institution. A number commented that the CDB was decreasingly playing this role, and that there was a need to re-establish the CDB as a development bank. We have examined a number of projects where the CDB decided not to provide finance, as well as a number where they did. For the most part, the issue was not one of long-term funding. The normal medium-term period of loan was appropriate, backed up with equity for a measure of longer-term funding, (currently the equity: loan ratio in the CDB's portfolio is at its limit of 1:10). There were cases which we felt did warrant support - including projects in fields we have advocated in this report - but the issue was one of the required rate of return rather than the length of time of the loan. Currently the CDB uses a 16% internal rate of return in their feasibility studies, made up of 7% cost of funds, 4% growth, and 5% inflation. Were this lower, it could back more projects. On the other hand, given the requirements

under which it is currently working, it is prudent to say the least to maintain the 16% rate, and in some cases the risk element would justify a higher one.

Risk is a second factor. The CDB discounts risk on the grounds that it is a public institution, and that it acts as if it was its own insurance company. The successes will balance out the failures. But this is only one version of risk. Venture Capital houses in the UK also expect to balance out success and failure, but they use a discount rate of between 50-80% nevertheless because of the inherent risk of the kind of businesses with which they are dealing. The successes have got to be that much bigger in that business to effect the balancing. Our view of the CDB is that its financial constraints do act as a disincentive to high risk investment.

If long-term and risk-finance were the two major issues they would be quite easily dealt with. A further subsidy could be provided explicitly for long-term funds, and a venture capital unit could be set up with public and private funds (inside or outside the CDB) to provide the risk capital. But in our view this is not the main issue. What is now needed is an institution which can take on the proactive task of sectoral restructuring.

This cannot be accomplished solely at the project level. It may be a question of encouraging firms to come together to initiate common services; or of establishing a common facility to produce previously imported inputs; or of encouraging specialisation between firms in the same industry. In each of these cases there will be external economies to each firm which are internal to the sector. Some of these may be organised by the industrialists themselves. Some will be encouraged by Government schemes and agencies. But in our view a development bank can play an important role as mid-wife to these forms of co-operation. It usually has hands-on experience of firms within the sector. It can develop the sector specialism of an industrial bank. It has the loan facilities and other support services to help bring the changes about.

Once a detailed plan for sectoral restructuring exists, then long-term development finance becomes necessary. By long-term we do not so much refer to the term period of a loan, rather the ability of a bank to stay with a project through failure. From the experience of restructuring elsewhere, one of the most damaging aspects of 'short termism' is its incapacity to do this. A firm attempting restructuring may well not get the strategy right on the first occasion. The Japanese are notable for treating such failure as an occasion to learn lessons for improvement rather than a cause for closing down a project. In the development of strategic investments they are more concerned to monitor performance against technological targets, market forecasts and competitors' development, only then considering the financial bottom line. In this way they build in the possibility of 'negative knowledge' - that is knowledge derived from failure - as a precursor to finally achieving 'positive knowledge'. What is needed for an approach of this kind is a source of finance capable of sticking with a project in such circumstances. When we speak of long-term development finance it is in this sense.

This is the core of the redefinition of development banking which we believe is required in the current period. The development banks should see their task as one of sectoral restructuring. Once the main task of a development bank is defined in this way, other requirements follow. It will need sector specialists with strategic skills. It will need to be able to call on company doctors, inside and outside its organisation; it may need special venture funds for innovation within the sector, as well as the long-term funds we referred to above.

It will need to be closely co-ordinated with relevant parts of the Government. First and foremost this applies to the development of the strategy itself. In a country such as Cyprus, it is important that the Government co-ordinates the process of strategic industrial planning. The bank should make a major input into this process, but it should not have the responsibility of overall co-ordination. Its task is primarily one of implementation within the perspectives laid down in an industrial plan. The Government, too, may also contribute

to the implementation of the restructuring programme, through funds or the activities of quasi-public institutions, like the ITA or the HTI.

The current period demands a revision of the relationship between Governments and development banks, in the same way as it requires the re-orientation of the development banks themselves.

A public sector restructuring institution is a different body from a project-defined development bank. They are not mutually exclusive:- sectoral restructuring extends rather than replaces the development banking tradition. The practice for which development banks have become known: careful long-term project appraisal, using economic rather than narrowly financial criteria, with hands-on assistance, and supported by public funds - all these are an important base from which to extend into sectoral restructuring.

During the 1980's there has been a growth of restructuring institutions in the industrial areas of advanced countries. Many have been involved in traditional industries such as those found in Cyprus - clothing, textiles, furniture, engineering. Over the next five years the challenges facing Cypriot firms call for a similar response.

What is needed is less a return to the earlier model of a development bank than the creation of a new one. It should be new in its prime focus on sectoral restructuring, and it should be new, too, in its financing and the criteria against which it is judged. If it is to be assessed by the market (in terms of rates of return), then it should be allowed to live by the market. If it is to be judged by other criteria, then those criteria should be made explicit, and funds provided accordingly. At the moment the traditional model asks a development bank to make a return, to restrict the areas in which it competes, as well as to take on a variety of non-market functions which are liable to lower the financial rate of return. This created

difficulties at the time of industrial expansion. At a time of recession the burden can become unsustainable.

Within the new model there is the following choice. On the one hand a development bank could be like an industrial bank. It would be market-oriented and assessed, but would act as agent for the Government in specified and funded ways. Thus its aims and objectives would be to undertake sectoral restructuring, but it would be allowed to diversify into other fields where these served to support its principle objectives. One type of diversification would be for purposes of raising finance. It could move into deposit-taking, hire-purchase, and mortgage banking, to give it a similar opportunity for fund raising to the commercial banks. It could diversify into business services where these contributed to the restructuring package which was the bank's *raison d'etre*. Such diversified activities could be limited to a certain percentage of the bank's activities in order to ensure that the central industrial function was not crowded out. But essentially these would be guidelines to a market-oriented institution.

Where non-market criteria or services were required, then these should be financed by public funds. For example, if projects are to be accepted because they meet a target economic rate of return when they do not meet a normal financial rate of return, then the difference between the two would be contributed out of a development fund. It would be normal for any project then to have two sources of funding within the bank: a commercial source and a public one. Where possible this public source would be invested in equity (rather than granted as an interest-bearing loan), with the development bank holding the stake on behalf of the public. If the Government decided to make it a priority to invest in the restructuring of a declining sector, then an identifiable fund should be made available to provide public funds to match the bank's commercial ones. Such a system would have the advantage of making the Government's non-market goals explicit, and ensuring that public funds were forthcoming to permit the bank to realise those goals.

Such a model has clear implications about control of the bank. Public policy would be determined by arm's length 'agency' negotiations rather than settled directly by the Board. The Government should clearly still have representation on the Board, but the Board should be seen as relatively independent, concerned with the bank's broad directions, and the soundness of its commercial and public agency activities.

The alternative model is that of a quasi-public instrument. Its market sources of funds would be confined as in a traditional development bank. It would operate with low spreads and no access to internal savings. While it could be encouraged to develop business service activities as part of its service package, it would be restricted from diversifying into unrelated areas of business like hire purchase and mortgages. It would not be judged primarily according to financial rates of return, but in terms of a set of qualitative performance criteria - such as the progress of its restructuring work, the extent to which it has encouraged technological development, exporting, design, computerisation and so on. Public funds would be made regularly available to these ends, and the bank would be answerable to the Government as trustees of these funds. None of this would mean that the bank would not continue to operate as if it was commercial: giving loans, taking equity, selling services. But this would be to reduce the costs of its public funding rather than to maximise profits.

In this model, the control would be direct and hands-on. The Government would predominate on the Board, taking an active part in setting the detailed direction of the bank, and assessing its performance against the qualitative criteria. This is the model followed by a number of the Enterprise Boards, and local Government funded initiatives, in Western Europe.

Which of these two models is adopted is a matter of policy. Each has its particular difficulties and advantages. What we can say is that a choice has to be made. If the first is adopted without the clear

public agency functions, then the bank becomes a predominantly commercial bank. If the second is adopted, without the funds, but with a profitability criteria, then the bank is caught in a lock between public ends and expectations on the one hand and market requirements on the other.

The Cyprus Development Bank currently suffers from many of these confusions. It has strong non-financial criteria, and hands-on control from a predominantly Government board. Yet it has been relatively starved of Government funds, while still being assessed largely by market criteria. Squeezed in this way, the bank has been forced to step back from high risk and low return projects, while seeking new sources of funds by diversification into a range of financial and business services. It is difficult to criticise the bank for its diversification policy, since, like other development banks, the constraints it faces have necessarily pushed it in a commercial direction.

On the other hand, the Bank still maintains many positive features of a development bank, features which are a necessary foundation for the sectoral restructuring we believe is necessary. First the bank still adopts economic and not strictly commercial criteria in assessing projects. Although its culture appears a vigorously commercial one (in its internal organisation of activities as much as in its external ones) we found many example of where it was taking a longer view. It has identified the importance of CAD-CAM, and has developed an internal expertise in this field which will take time before it pays off financially. It has subsidised its consultancy rates in priority cases. It is attempting to develop the accountancy package for small businesses out of a belief in its importance, as much as the promise of its returns. It has engaged in turnaround situations, in spite of the risks and difficulties involved. If one side of its style is commercial, there is another which is pro-active and developmental.

Most important it has developed a measure of sectoral expertise and sectoral perspective. It has specialists in the tourism sector for example, and has been developing a distinct strategy for that sector. In spite of its small staff, it has a strong hands-on knowledge of a number of the most important industrial sectors. Most significant of all, it has supported the initiative by the Limmasol furniture manufacturers, to invest in common retail facilities. The Bank has not only played a direct part in the discussions, it has extended loans to a majority of the firms to finance the costs associated with this scheme.

Because of the pivotal role currently occupied by the CDB in development banking, and because of its controversial character, we have looked in depth into its working and performance. We discussed both with borrowers, and would-be borrowers, as well as with the loan officers who handled the applications. We conducted sixteen substantial interviews with CDB personnel, as well as attending a number of collective discussions. Our conclusion is that it is a vigorous institution, which has achieved a remarkable amount with a small staff. Its structure and style exemplify the kind of flexible enterprise which we believe is required for the 'new competition'. It has a flat hierarchy; it operates task forces, yet with clear centres of responsibility. Its organisation chart shows a matrix organisation with a wide range of specialised functions for a professional staff of only twenty. Perhaps most important of all, it is an institution in which its members are clearly learning, always the sign of a productive institution, and a feature of the traditional development banks.

Yet at the same time we see it as seriously cornered by the conflicting pressures of commercial survival and development banking. As a vigorous institution, it is attempting to solve the contradiction by strong movements in both directions. But such are its current positions that there is real danger that its dynamic will not be directed sufficiently towards development goals. Put another way, with new directions, sources of funds, and clarified structures of assessment and control, we believe the CDB could become a model of

the new development banking, and contribute centrally to the major programme of restructuring that faces Cyprus. For that to happen the Government, the Board of the CDB, and the CDB staff would need to clarify which version of the new model should be adopted for the CDB, and what changes would be necessary in order to make it effective.

Our first major recommendation, therefore, is that the CDB should be re-oriented in this way, to become a development bank specialising in sectoral restructuring and network support. This will mean that it should be given access to new sources of funds - public and private - and that its structure of control should be adjusted to reflect the character of the institution. The choice between the independent /commercial/public agency model and the more directly-controlled quasi public instrument model should be made by the Government and the Board. But the choice needs to be made. For at the moment the conflicts bearing upon the Bank are likely to pose an increasing threat to its productive performance. By itself, however, even a reconstituted CDB will be insufficient for the task in hand. With more resources it could clearly expand. Its management believe it could take four more staff a year without weakening the organisation. This means that even at its maximum it could no more than double in size within five years. Its current level of investment in equity and loans to manufacturing is approximately C£10 million. In 1981 fixed assets at cost in manufacturing were valued at C£226 million, and are likely to be at least double that figure by the end of the decade. Even at twice its existing size the CDB would account for less than 5% of this figure (currently it accounts for only 3% of all loans in the economy). The task of restructuring is going to demand greater resources than that.

There are two possibilities. First, the CDB could expand at a faster rate than four further staff per annum. There are dangers with this course. The CDB's current flexibility in part stems from its small size. Although its existing staff could no doubt handle a larger volume of business, the critical issue is staff numbers since industrial restructuring is labour-intensive. Hence while we think that the CDB should expand both in the quantity of investment capital

available to it, and in staff numbers, we suggest that this expansion be taken in two stages, with an assessment after the first stage as to whether the gains from expansion outweigh its disadvantages. For the period until 1991 at least, we recommend that the expansion rate be kept within the bounds suggested by the management of four new staff per annum.

The second possibility for expansion is that there should be a second development bank. This would have the advantage of providing a stimulus and a measure of competition for the CDB, and the opportunity for different approaches and specialisations, which is more difficult in a single organisation. In general, in fields of innovation such as the new development banking involves, two organisations are better than one. In this case the two should follow the maxim of successful flexible specialisation of 'competition within co-operation'.

It would be possible for this second bank to be Government-initiated like the current CDB. This could well lead to conflicts of interest at the level of the two boards. Instead, serious consideration should be given to the commercial bank's jointly setting up an Industrial Bank. In the UK the clearing banks were encouraging to do so by the Government, and the result - the 3 I's - had become an active force in industrial restructuring. The bank itself takes a longer view and a more active stance towards its investment than the clearing banks have traditionally done. Such a model has the additional advantage in the context of Cyprus that it can call on existing bank staff. The shortage of staff for recruitment has been one of the problems faced by the CDB, in part because of salary levels which are lower than those of the commercial banks. While the commercial bank staff would have to be trained in some aspects of industrial banking, it would be faster and more effective to establish a new bank around a core of existing bank specialists than to start it from scratch.

The finance for a second bank could come in part from the transfer of the priority funds held by the commercial banks. These have not been fully used in spite of the incentive to do so. These funds should be directed at the priority industries as currently classified, and the new bank should be encouraged to develop sectoral specialisms in accord with the demands of the programme of restructuring. In addition, the Government should engage the bank, just as it would the CDB, as an agency for non-commercial purposes, for example the funding of design development or technical innovation. We suggest that this consortium be known as the Cyprus Industrial Bank.

Our proposal is made in the light of discussions held with the two principal commercial banks. Both had clear strategic perspectives, both were keenly aware of the problems facing Cyprus industry, and both perceived the need for a revived development banking function. In as much as they also have substantial investments in manufacturing industry, some of which may well be at risk in the event of widespread cut backs in manufacturing activity, then both, too, along with the other commercial banks, have a material interest in the success of a programme of industrial restructuring.

Two objections might be raised to this proposal. First that Cyprus is too small to afford two development banks. We wholly disagree with this point of view. The size of the task merits at least the scale of the response we propose, and as we have indicated, to have two smaller institutions is preferable to having one large one. A second objection might be that there would be negative competition, with each trying to drive out the other. The Government would have no interest in doing so via the CDB; and while the commercial banks might in principle consider such a competitive strategy against the CDB, the strength of the Government's backing of the CDB would be sufficient to deter them.

Our second major recommendation therefore is that the Government should encourage the Commercial Banks to set up a joint development bank to be known as the Cyprus Industrial Bank, whose purpose would

be to become actively involved in the process of industrial restructuring. The finance would be provided from the deposits currently held in the priority fund, and the Bank would also be encouraged to undertake non-commercial support services for the Government on a subsidised basis.

This proposal reflects our view that it is important for the commercial banks to be more fully involved in the promotion of flexible specialisation than they have been able to be until now. If the consortium cannot be agreed, then at the very least the commercial banks should be more closely involved in an expanded CDB.

The various financial problems affecting manufacturing industry will best be met within the context of an expanded development banking as we propose. Working capital shortages can in part be met by improved stock control, and in part by a development bank with an active strategic position within the industry. Public-financed venture capital would best be located within the development banks, as would turnaround support and a measure of hands-on consultancy. The general point which should be kept in mind is that the problems facing industry in Cyprus, as in the UK, are less ones of a shortage of finance, and more those of a lack of institutions to actively develop the projects to finance. It is in this latter context that development banks have such a central importance.

7.7 The re-orientation of financial incentives

Cyprus has an extensive range of financial incentives to encourage 'productive economic activities, the export orientation of the Cyprus economy, and to widen the scope of the productive capacity'. The principal incentives under these headings are:

- incentives to encourage investment in fixed assets, including:
 - investment allowances

100% depreciation allowances

reduced profit tax on profits used to finance capital expenditure on new machinery

duty free imports of capital goods including computers.

since losses can be carried forward and set against income in subsequent years, business receives what amounts to a tax holiday since the investment and depreciation allowances combined can reach 145% of investment on plant and machinery, and 130% for investment on industrial buildings in the industrial sector.

- incentives to encourage mergers

merging companies can be granted a further 25% investment allowance on the value of used plant and machinery of the merging firms

- incentives to encourage public companies for 'the better organisation of production units' and the 'more active participation of the small saver';

tax on net profits at 25% rather than 42% for ten years after conversion to public company

tax exemption on dividends up to C£600 pa, and tax allowance of 30% of sum that a person invests in shares of new public companies

- incentives to encourage exports

up to 6% of foreign exchange imported into Cyprus from domestic exports; import duty relief on raw materials for export.

- incentives to encourage new products

10 year tax holiday for manufacturing firms producing new products

- incentives to encourage new technology

spending on scientific research and on patents is deductible against income spread over six years

tax of 0 - 10% on royalties, and fees paid to non-resident persons, rather than 42.5%

There are two kinds of comments to make on these schemes:

- (i) purposes. They reflect a traditional view of the production process, emphasising:

- investment in hardware rather than software
- investment in new products and processes rather than redesigned and modified old ones.
- concentration of ownership rather than inter-firm co-operation

- (ii) methods. They primarily take the form of tax allowances in an economy where corporate tax collection is reportedly problematic. We were repeatedly told that tax evasion was a common practice as the result of false reporting and transfer pricing. In addition a large number of companies, notably co-operatives, are exempt from income tax altogether.

The scale of the problem can be judged from a study carried out on investment allowances, which showed that actual allowances granted between 1974 and

1982 were only 38% of the theoretical allowances which should have been granted on the basis of investment data taken from the National Accounts. Companies were thus either not reporting their investments to the Inland Revenue Department at all, or were under-reporting it in order to show a lower rate of income generally (for income tax evasion purposes) or were companies exempt from income tax in the first place.

In such circumstances, while the cost of the schemes is less to the exchequer than might otherwise be the case, their impact is clearly blunted.

In order to encourage the adoption of flexible specialisation we recommend that the Government's current incentive programme is urgently reviewed. As part of this review we further recommend that a new approach be considered with the following characteristics:

- incentives should be given to investment in software as much as hardware, to marketing expenditure as much as investment in industrial plant and buildings
- incentives should encourage investment in flexible machinery and systems and not simply in all fixed investment for its own sake
- incentives should encourage co-operation between firms as much as mergers between them. Investment for example in a joint retailing outlet, or joint intermediate plant might be given incentives on the basis of the combined asset value or turnover of the participating firms
- incentives which encourage the employment of designers and skilled adaptive engineers are likely to have more impact for a strategy of flexible specialisation in the sectors under study than ones which encouraged spending on scientific research and patents

- the incentives would often be more effective in the form of a cash contribution to a specified expenditure rather than a tax allowance on spending as reported to the Inland Revenue Department. Special funds would allow a more precise targeting of the incentive funds, as well as providing a real incentive to firms who might declare no profit and therefore not be influenced by tax allowances.

- the tax incentive programme should be re-assessed as part of the overall programme of Government incentives, including subsidies provided by such bodies as the ITA, the Export Promotion Organisation and the Ministry of Commerce and Industry itself.

By 1982 the allowance system was costing the exchequer C£63 million a year, of which C£49 million (or 78% of the total) took the form of investment and depreciation allowances.

There is no breakdown by sector, but manufacturing accounted for 25% of the amount of investment allowances which theoretically should have been claimed on the basis of national accounts data. On this basis, manufacturing would have received C£16 million through the allowance system in 1982, a surprisingly low figure. These allowances have probably had greatest effect in the field of fixed investment, particularly in domestically oriented industries where the scope for transfer pricing is least. They have had less effect in encouraging mergers or the formation of public companies, and we saw no evidence during our visits that they have yet had any impact in encouraging scientific research. In terms of a national strategy to upgrade manufacturing, there is a clear case for shifting the balance of incentives within the overall programme towards manufacturing, and within the manufacturing total to shift the balance from the predominance of fixed investment to the encouragement of intra-manufacturing services - design, marketing,

systems consultancy, and skilled labour and managerial training - on which contemporary competitiveness so much depends.

7.8 Foreign Investment

A second feature of the incentives scheme has been the encouragement of foreign investment, both by foreigners and by Cypriots living abroad. The main forms of relief are as follows:

- double taxation agreements and unilateral relief
- exemption from income tax of interest received on foreign capital
- reduced income tax rates for foreign investment income
- reduced income tax rates for pensions received from abroad
- exemption from estate duty
- exemption from capital gains tax
- exemption from import and excise duties for intending residents
- reduced income tax rates for offshore companies
- reduced income tax rates for employees of offshore companies
- import and excise duty exemptions for offshore companies and their expatriate personnel
- exemption from social insurance contributions for the employees of offshore companies

- reduced income tax rates on foreign employees working for companies operating in the Industrial Free zone
- reduced tax on dividends obtained by foreign investors from companies operating in the Industrial-Free Zone

Some of these are recent, but in general the incentives to foreign investors have been an important reason for the considerable inflow of private foreign capital which has ranged from C£30-C£40 million a year during the 1980's. The bulk of this has come from Cypriots living abroad, and most has gone into real estate and tourist facilities. Foreign investment in manufacturing has been relatively small. No figures for the book value of foreign direct investment exist. In 1985 repatriated dividends and profits amounted to C£2.9 million, and during the first half of 1986 they were running at an annual rate of C£3.2 million. If we assume a 10% post tax rate of return on foreign investment these flows imply a foreign direct investment in the region of £30 million.

Initially after the events of 1974, Government policy encouraged foreign investment, but from 1977 the policy changed and foreign control was discouraged. By 1984, however, there arose a renewed concern to attract foreign productive investment. A Committee was set up for this purpose composed of Government departments, as well as commercial and industrial organisations, and as a result of their report to Ministers, a new set of tax incentives was introduced in 1986. In addition the Government had speeded up the process of approval of foreign investment applications by establishing a committee with representatives from the relevant departments who can review applications at the same time, and has also softened the criteria for approval, notably with respect to the requirement for joint ownership with Cypriot residents. These measures reflect the widely held view that more foreign investment should be an important component of any programme for restructuring Cypriot industry.

We have four points to make about this policy. First, it is important that the Government should be aware of the difficulties that have been encountered by other small economies which have made export-oriented foreign manufacturing a centrepiece of their industrial policy. Puerto Rico, Ireland, and Singapore - all of them small island economies wh. entered early into the competition for footloose manufacturing investment - have each run into problems that are now affecting their macro economies as a whole. Part of the problem has been rising wage costs. Part has been the fiscal problems that have arisen from a policy which has required Government outlays (whether on infrastructure or financial incentives) at the same time as limiting the taxes that can be levied on this sector of economic activity. Each has found themselves locked into a dual manufacturing structure where domestic industry has been squeezed (fiscally, through the labour market, and through the difficulties of retaining protection) without receiving the offsetting stimulation from the linkages generated by foreign firms.

Secondly, as we argued in the last Chapter, Cyprus is not in a strong position to remain a competitive location for labour-intensive volume production. Internally its market is small, externally its wages are already relatively high. In as much as the aim is to attract investors through the fiscal regime, then Cyprus has a further disadvantage of being late in the field. The difficulties encountered with the Lanarca Free Industrial Zone reflect the above. In spite of the incentives which mean that the companies and employees located there pay little tax, enjoy low rentals, and can import their inputs duty free, only nine companies are operating there, employing under 100 people, and occupying less than 10% of the available land. Those that are there are geared primarily to the Middle East market. It may be that more effective marketing of the Zone could increase occupancy as some have suggested. But the slow level of take up is in our view primarily linked to the broader limitations which face Cyprus as a location for footloose investment.

Equally serious, the experiment shows signs of the 'Irish syndrome', with substantial public investment (the Government invested C£0.7

million in the construction of the Zone between 1976 and 1984) and only a small tax revenue. Furthermore, in at least one of the cases where the firm in question is exporting to the Cyprus market from the Zone, and thereby saving on cash flow through the later payment of duty, the Zone may well be acting as an investment diverter rather than an investment creator, with a fiscal cash flow loss as a result.

Thirdly, one of the features of the new era of flexible specialisation and 'total competition' is that ownership has become a less significant aspect of control. Ownership of a key input, of the design, or the marketing network, has meant that the ownership of the manufacturing plant has become less important. There has been a growth of sub contracting, and franchising. Control by ownership has increasingly given way to control by contract. Whereas the mass production era saw a particular kind of tariff-hopping foreign investment, with foreign-owned final investments securing the outlets, tied to imported intermediates, now the sale of know how patent rights, and trademarks has become more significant. The foreign supplier will continue to exercise quality control, determine marketing strategy, and even train local labour, but will be content to retain a minority stake or even no equity stake at all. In these cases policies geared to foreign equity ownership will be missing the mark.

Fourthly, if we look at Cypriot industry in this light, we find - contrary to the common picture of relatively little foreign investment - a situation of a surprisingly extensive network of foreign links. Of the 16 bonded factories, 12 are 100% foreign owned, with the remainder having between 40% and 60% foreign share ownership. Of the nine factories in the Free Trade Zone all are foreign-controlled. In addition we have records of 83 manufacturing firms either active or under construction with foreign stakes, of which 19 have 50% or more foreign control. Turning from ownership to contracts, 79 Cypriot manufacturing firms are registered as having trade mark and licensing agreements with foreign companies, of which 29 date from before 1974, 26 from 1975 to 1979, and 50 from 1980. Some of these Cypriot licensees also have foreign ownership, so there

is an overlap between the two categories, but in all we estimate some 140 manufacturing firms have links with overseas companies, or approximately a third of the total of Cyprus manufacturing firms with 20 or more workers. This picture is confirmed by an analysis of the 59 top manufacturing firms (by employment). Of these 14 had a foreign equity stake, in 4 of them 50% or more; 17 had a license or key input agreement; 3 had a foreign management contract, and an overseas sales contract. In all 29 or 50% of the sample, had some form of long-term overseas link.

A substantial number of these firms fit into the model of traditional import substitution. Local companies making cigarettes, soft drinks, beer, spirits, cosmetics, packaging products, paints, batteries, baby products, pharmaceuticals, potato crisps, or kleenex tissues, buy in the know-how or brand name, or, in the case of the soft drink companies, the essence. Many of these are simple final stages to much lengthier industrial processes, offering a way into the Cypriot market for the overseas supplier beneath the high protective walls. A number of them will be affected in the long-term by the Customs Union and the decline in protection. A second, smaller group, are geared to the export market - BATA, Alpha and Atlas in the footwear sector for example, as well as those companies in the Free Zone and using the bonded factories. These tend to have effective foreign equity control, sometimes supplemented by licensing agreements. They face the longer-term difficulties mentioned above.

A third group have foreign links in order to strengthen their independent competitive base. A number of the clothing firms discussed in Chapter 6 fall into this category, or those dairy producers seeking long-term contracts with European multiples. In these cases there is no equity stake as such, but rather a set of supply or design contracts.

In each case, the foreign connection has different implications for the Cypriot producer and for the wider economy. It may also take different forms. In as much as it is not foreign capital which is in

short supply, but rather the relevant know-how, then any policy towards increasing the transfer of the relevant technology must take the above points into account.

Our policy conclusions are therefore as follows:

- (i) the overall quantity of foreign investment in Cypriot manufacturing is modest, in spite of the high level of protection in the consumer goods sector, and in spite of the favourable incentives offered, notably in the Lanarca Free Trade Zone.
- (ii) the bulk of the technology transfer which has taken place, whether or not in conjunction with an equity stake for the foreign partner, has been with respect to import-substituting investment. During the 1980's there has been some growth of technology transfer for production for the regional, and developed country markets, notably in the footwear and clothing industries, and in the Free Trade Zone and the bonded factories.
- (iii) there may be further scope for Cyprus to serve as a production base for regional markets, but in these cases it is important that the Cypriot Government consider the costs and benefits of any incentive scheme to avoid the difficulties now being experienced in other small, open island economies
- (iv) foreign investment is no longer a necessary channel for technology; from a sample of the 59 largest manufacturing firms (accounting for 25% of manufacturing employment) more than half of the firms with foreign

technology contracts had no foreign stake in their equity

- (v) where foreign know-how is required, it is best introduced as the result of a specific contractual agreement rather than a general incentive scheme to encourage foreign investment. Not only will this allow more accurate targeting, in many sectors it is more in line with the policies of the supplying firms themselves

- (vi) the emphasis in such a relationship should be on learning by the Cypriot partner: this is the advantage of some of the supply contracts with European retailers - for instance in the food sector, where the purchaser advised on quality control, plant lay out and hygiene, at the same time as providing up-to-date sales information.

Recommendations:

1. A detailed assessment should be undertaken of the costs and benefits of the Free Trade Zone in order to judge whether the unused part of the Zone should be transferred for use as part of the general industrial estate programme by domestic firms.

2. A study should be conducted of the terms of existing royalty contracts as a basis for considering the present terms under which licensing agreements are made, and as a source of information on best practice for Cypriot firms seeking to enter a licensing agreement or management contract with overseas technology suppliers.

7.9 Design

Design is one of the pivots of the new competition. While various measures can be taken to improve design in the short run, in the longer term the task facing Cyprus is the creation of a design culture. There is a foundation which exists already. Cypriot consumers have a developed sense of design. Some design professions, notably architects, have a strong presence. In secondary schools, there are two specialist courses in existence, one a more general one on graphic art and design, the second a course on clothing design and production, which aims to strengthen the industrial application of design. There is also a course in furniture making.

We have the following proposals on how Cyprus might build on these foundations:

- (i) we recommend that the Ministry of Education establish a Cyprus College of Art and Design. It would aim not to substitute for students going to colleges abroad, but provide a foundation course, and follow up courses, as well as acting as a centre for design in Cyprus. Its prime focus should be on designers, but it would also aim to make others in industry aware of the importance of design. One of the features of Italian technical education is that engineers are required to spend at least one year of their course on design. In addition to its main courses, the College would run summer schools, and evening classes, as well as special short courses taught by visiting designers and artists.

What is important is that it should aim to link art and design with its industrial application. To this end, it should have attached to it an industrial applications workshop, which could include modern equipment such as CAD and laser-cutting facilities for use both by students and industrialists. We also suggest that there be small workshops attached, available

at modest rents, to encourage designers who are starting their commercial life.

We envisage the College taking 40-45 students a year, with 120 students attending at any one time, some specialising in pure art, and some in industrial design. At a cost of C£1,500 per student year, this would imply running costs of C£180,000 a year, with a further C£20,000 to cover the net costs of short courses. On capital costs we think it would be prudent to allow C£0.5 million, C£300,000 to cover the cost of the building, and C£200,000 for furniture and equipment. The cost of the small workshops would be additional. The overall running costs of C£200,000 a year are in line with the two Hotel and Catering colleges.

Although a long-term project, the sooner it can get started the better. Initially we suggest that the Government invites leading design educationalists from abroad to help outline the curriculum and the overall shape of the project. It may be advisable to establish permanent links with one or more design colleges in Europe during the first 5 years of the College's life, and this option too could be explored during the development period. The aim should be to have the development stage completed by the second half of 1988, in time for inclusion in the budget for 1989, with a start on site in that year and completion in two years so that the first full student course would be enrolled in 1991. It would also be possible to run a pilot year in 1990 in hired premises.

The important thing for a project of this kind is that it should avoid bureaucratic management. Not only would the College have a creative function internally, it would also have a similar task externally, linking with firms, schools, the international design community, and so on. It may be that it would be wise to look abroad for the first Director, perhaps to one of the Cypriot artists with an international reputation, or

to the design staff of a European college to which the CCAD becomes attached. Similarly the Board of the College should be composed of people both from within and outside Cyprus, with a reputation in the Art and Design field and creative institution-building.

(ii) attached to the College, we recommend that a Museum of Contemporary Art and Design be established, which would have the following aims:

- extend public awareness of the importance of design products
- provide a permanent exhibition of Cyprus original designs
- provide a venue for specialist exhibitions on particular types of design relevant to Cypriot industry, their history, trends, variety and their industrial results
- provide a tourist attraction, and a point of sale for Cypriot-designed products

Museums have been a rapidly growing sector in advanced industrial countries. Too little attention has been paid to their links with industrial design or to their commercial potential. One of the most successful Italian furniture makers has based his designs on those of the early 20th century Scottish artist and designer, Charles Renee MacIntosh, whose work he saw and copied in a Scottish museum and later patented. The Victoria and Albert Museum in London is currently attempting to link its assets in design to industrial products, such as wallpaper, curtains, furnishing fabrics and garments. They also provided space for the British designer Terence Conran - head of the Heals, Habitat, Mothercare, British Home Stores chain of shops - to establish an exhibition of industrial design which has now been set up permanently in its own site in London's Docklands. Cyprus could play a pioneering role along these lines.

The resulting complex of College, workshops and museum would, we hope, act as the centre of an industrial district, attracting design-intensive firms to set up nearby, not least to use the modern equipment. It should also be designed as an attraction for tourists, emphasising Cyprus's contemporary creativity. The Government should therefore consider putting the design of the complex out to international tender, so that the buildings embody in their architecture the principles which underlie the activities in the complex. Care should also be taken about its location. It needs to be easily accessible to tourists and at the same time have space for workshop and industrial expansion, as well as being near relevant existing industries. If the right site could be found, Limasol suggests itself as a town which unites manufacturing and tourism.

- (iii) in association with the College, the Museum and the sector associations, we recommend that an Annual Competition for Design be established with categories for all leading consumer goods sector, as well as a special category for intermediate industrial design.

- (iv) in making more specific guidelines for Cypriots studying abroad, the Ministry of Education should give priority to study in design colleges. Cyprus should aim to raise the number of design graduates to 20 per annum by 1992. Some of this expansion can be achieved by targeting the existing Government scholarships and loan scheme funds, some through the allocation of the full scholarships provided under bilateral agreements, notably those with Italy, France, the USA, and the UK.

- (v) the Ministry of Education should consider expanding the already valuable art and design work done at the secondary school level. This is partly a question of resources and curriculum development, but we hope, too, that both the College and the Museum would act as educational resources for secondary

schools. The same applies to existing technical education at the secondary and post-school level, which should have design as an important component within their courses.

- (vi) a number of the industrialists with whom we talked suggested that an independent designer federation should be set up. This would be the responsibility of the designers themselves, and we would expect it to follow the increased number of designers and the greater public emphasis given to design arising from the earlier recommendations.

The above proposals address the question of how to strengthen the educational infrastructure for design, and create a stronger design culture in Cyprus. In the short- to medium-term, however, it is important that Cypriot firms strengthen their design capacity in other ways.

- (vii) we propose that the Government should establish an annual fund of C£1 million to be administered by the Cyprus College of Art and Design for encouraging design in the clothing, footwear, furniture and metal working sectors. Applications for matching finance would be made to this fund either individually or jointly by firms wishing to employ designers, as well as to finance travel abroad by designers in order to keep abreast of European fashion.

- (viii) the industry specialists in the Export Promotion Organisation, as well as the industrial associations, should provide regular updates on European design houses with whom Cypriot firms could establish relationships. They should also provide advice to firms on the terms of design contracts, favouring those links which encourage the growth of Cypriot design capacity itself. The industry associations, as indicated earlier, would also be in a position to buy fashion-forecasting reports for use by their members, as well as to

engage designers to help firms whose size precludes them from employing a full-time designer.

7.10 Machinery, Technical Centres, and Research and Development

We suggested earlier that the overall level of mechanisation in Cyprus was not the major source of concern for manufacturing industry, nor, in the consumer goods sectors at least, was the low level of research and development. The problems with machinery had more to do with excess capacity, and inflexibility, than with the level of technology itself. Similarly with products, the problems were more to do with design, quality and finishing rather than with product innovation as usually conceived.

That said, it is important that Cypriot manufacturing be able to keep up with process and product innovation, adapting both to suit its particular conditions. To this end it needs access to information and advice on appropriate machinery, it needs to be able to share items of equipment that smaller firms cannot afford by themselves, and it needs to possess, or have access to, a capacity for technical adaptation. For some sectors, too, there may be scope for research and development of new products.

At the moment information and advice on appropriate machinery is obtained in a variety of ways, through industrialists visiting fairs abroad, through visits from machinery salesmen or public and private consultants, and through informal national and international networking amongst industrialists. The Ministry of Commerce and Industry's Extension Service is also a source of information, drawn among other things from trade journals, and their own technical contacts.

Rather than centralising the technological information and advisory function in a separate institution, we suggest it form part of

sectoral institutions. In some sectors this may concentrate on the various aspects of technology - from advice to joint facilities and training. One example is the Leather and Footwear Testing Unit at the HTI. The Footwear report recommends an extension of this unit, widening the range of common services (to include eventually CAD equipment), appointing a computer specialist to advise on electronic equipment and production systems, and acting as a source of technological information. The advantage of having such a facility at the HTI is that equipment can be used by students in the course of their training, and that the teaching staff can also be drawn into the practical concerns of the industry. The HTI is also well equipped in the computer field, and is currently negotiating for a main-frame computer. While the Government should contribute to a centre of this kind, we see the main income coming from the leather and footwear industry itself.

What is important is that the unit sees itself as having an entrepreneurial task with respect to technology in the industry. To this end there is a case for it being given semi-independent status with the HTI, along the lines of the Regional Medical Equipment Repair and Maintenance Training Centre for the World Health Organisation, currently located at the HTI. The Centre has its own clear autonomy and its own Board, with the Director of the HTI serving as the Chair of the Centre's Board. This model of semi-independent satellite technology centres, with some core public funding but oriented outwards towards industry, is one which could apply to a number of sectors. The Metal Working sector report suggests that an R&D facility for the industry could be established at the HTI - again with the potential of sharing equipment and staff expertise with the HTI.

The Food sector report recommends the establishment of a food processing school and technical centre at the HTI, aimed in part at training, and in part at the provision of technological, product and factory planning advice.

A further possibility would be to establish a prototyping workshop at the HTI, either separately or in conjunction with a Metal Working R&D centre. This would be available to industrialists or individuals wishing to have access to specialist equipment, or, in the case of seed-bed projects, to simple workshop space. Again there would be advantages in having such a workshop as part of a technical institute, and the HTI could usefully be funded to grant Innovation Scholarships to fund the seed costs of such prototype developments.

Clearly more detailed work needs to be done on this potential development of the HTI as a technological centre. The point to note is that there are advantages in attaching the technical information and advisory function to a technical service and development centre. We recommend therefore, that in addition to the specific proposals on the Footwear and Leather Testing Unit, the Metal Working R&D facility, and the Food Processing School and Technical Centre, that further consideration be given to the HTI as a site for a prototyping workshop, and the body responsible for the granting and supervising of an Innovation Scholarship scheme of an initial annual value of C£0.2 million.

In some sectors, the technology centres might best be operated by industry consortia. Joint facilities, for example, may be required in Limmasol and Larnaca as well as Nicosia. The Clothing Sector report recommends that a CAD bureau be established at an approximate cost of S£170,000-200,000, and this could be run by a clothing industry association as in Carpi. There may also be a point when computer-controlled cutting would become viable for the industry on a bureau basis. In such cases we suggest the Government provides half the capital costs as a grant, and makes the other half available on a loan basis - through the development banking system - with the fixed assets as security. In addition the Government should provide matching funds to industry associations or equivalent 'technology centres' to build up a technology search service, including the running of a technical library and data base, for the purpose of identifying appropriate overseas technology.

Technology search and purchasing advice would also be assisted by the following:

- (a) the establishment of a technology equipment fund of C£1 million per annum to be administered by a new Technology Unit within the MCI (incorporating the Extension Service) which would contribute 50% of the cost of technical consultants, and one third of the cost of the resulting equipment investment.
- (b) the setting up of channels whereby the Export Promotion Organisation can report back to the Technology Unit in the MCI, and the sectoral technical centres, on technological intelligence it has gathered in the course of marketing work.
- (c) contracting leading edge technology institutions to provide state-of-the-art advice to industry on a regular basis. We make this proposal specifically for the Energy Conservation sector, but it is a model which may be appropriate for other sectors. Such contracts can also be supplemented by an agreement for the overseas institution to take graduate students from Cyprus on secondment for further study.

As far as research and development is concerned, we suggest more detailed work be carried out on the impact of the present Government incentives, and the needs of industries other than those included in the present study. On the basis of the present study, only in the metal working sector, and a number of the knowledge intensive industries did there appear to be a place for R&D incentives as such. Our preference is for an R&D fund of X£0.8 million annually, which would contribute matching funds for specified projects. We identify R&D in energy conservation and bio-technology, as being two priorities.

In most Cypriot manufacturing it is the capacity to adapt existing technology rather than to develop new processes and products which is

important. There are already examples of significant adaptation (in the furniture sector for example). What is required here is not incentives but a cadre of skilled technical labour. This brings us to the question of training.

7.11 Labour and training

One of the main contrasts between a strategy of flexible specialisation and one of mass production is in relation to labour. Instead of being seen as cost to be lowered as in mass production, it has to be seen as one of the prime assets of any firm. For this reason firms like Rank Xerox have been developing a new accounting system which treats labour as the fixed asset, with machinery being bracketed with raw materials as part of working capital. It is the quality of its labour force that will determine a firm's competitiveness in knowledge-intensive sectors, and the same holds to a lesser degree in the light industrial sectors like those in Cyprus.

A whole range of other attitudes need to change. Whereas under mass production a sharp division of labour was established between conception and execution - the operative working to strict instructions set out by technicians and managers, effective flexible production has seen responsibility for work organisation, technical change and quality control returned to the worker on the shop floor. Quality circles have brought owners and managers together to work on the details of productivity. The zero defect policy of advanced flexibility has been based on the worker's new role in stopping faulty output before it goes any further. In place of conflict on the shop floor the new system has put a premium on co-operation. The productivity gains from new work organisation in some Japanese firms have outweighed the gains from the introduction of electronic machinery.

A number of other features of industrial relations have had to change in order to bring the new system about. Workers have demanded a

greater stake in the future of the firm if they are to co-operate in improving its performance. Hence there has been greater security of employment, in some cases a stake in the enterprise, almost always an improvement in wages and conditions. There has also had to be a re-evaluation of skill, with a greater emphasis being put on high-level multiple skills, allowing workers to reset machinery themselves, maintain it, undertake different operative tasks, as well as to think about the productive process as a whole. Flexible specialised firms tend to devote a high level of resources to training and retraining.

For many Cypriot firms this would involve turning inherited managerial principles on their head. It requires a whole new outlook on labour and the production process. Strikingly, in the course of our visits, we found firms where this new model was in operation. In the most productive furniture firm the manager had introduced a bonus system geared to modifications in the use of plant and equipment and the organisation of production. Operators earn bonuses if they design machine modifications that reduce set-up times. A foreman gets a bonus if he or she makes organisational changes that result in output increases. A labour committee assesses the proposals and changes. During the first year of the scheme wages increased by 20% but unit labour costs fell by 25%. Most important of all, any worker displaced through such changes is not dismissed but shifted to a speciality department that produces small batch products on a workshop basis.

There were other examples of this kind which showed that such changes were possible in Cyprus. The pilot quality circles which have been taking place in a number of manufacturing firms under a CPC/ILO scheme have also reported positive results.

In contrast, say, to the provisions for design, there are established structures for action in this field. The CPC is currently responsible for the above mentioned project on quality circles and 'New Approaches for Productivity Improvement'. The ITA is in the process of systematising and expanding training, with substantial

funds at its disposal. The HTI and the CPC are active training institutions, and some firms themselves fund internal training schemes. The question, therefore, is neither one of new institutions nor one of finance. It is rather how to advance these initiatives as rapidly as possible. The sector reports make clear that without a sharp increase in the employment of skilled workers, and a change in internal labour relations, the upgrading of Cypriot industry will not be possible. We found many firms facing a skill shortage, with metal working exhibiting an actual run-down in skills, and ill-deployment of those skilled workers who remained. Others will need to upgrade skills if the firm is to improve quality and productivity.

Part of the answer is increased training. The sector reports make proposals on this, from a specialised footwear course at the HTI, to a food technology manufacturing course, and joint skill centres for groups of firms in the clothing industry. The metal working report emphasises the need for firms to develop their own programmes, and to have their own training officers for this purpose. Many of the firms commented positively on in-house training, which is a form of provision that has been encouraged by the ITA.

A second source of skilled labour mentioned in the sector reports is Cypriots living abroad, or foreign employees, particularly with respect to technical positions, and the clothing report recommends the relaxation of current restrictions on the employment of foreign personnel in key technical jobs.

But part of the problem of skill shortages is to be found in the wages and conditions that exist for skilled workers within manufacturing. The high levels of labour turnover are one reflection of this. In footwear for example we found that firms with older buildings, and poor toilet and canteen facilities had higher turnover rates. We came across a number of instances of key workers leaving an industry because of poor wages. In the metal working sector there was a clear substitution of inexperienced and unskilled workers for the 78% of workers leaving their jobs who were skilled and semi

skilled. There is the key issue of childcare facilities for manufacturing wage workers (55% of whom are women). In the light of the above we recommend the following:

1. The Government should give as strong a priority to a campaign for the effective use of skilled labour as to its training. This would involve aiming to reduce the quit rate in manufacturing by:
 - improving the working conditions and facilities within factories (maintaining the level of incentives for investment undertaken for this purpose)
 - encouraging new payments systems which would allow a reduction in the differential between manufacturing and higher paid sectors, as well as improving productivity
 - advancing with speed the regulations on health and safety at work
 - initiating a workplace child-care project by conducting an initial feasibility study, with a view to provide matching finance for childcare facilities for manufacturing workers
 - extending the CPC programme for productivity improvement so that its principles are included in publicly funded management and technical training courses
 - establishing a C£1 million Productivity Improvement Fund, to be administered by the CPC, and available to provide matching funds for firms to employ quality of work consultants, as well as to contribute (on a declining basis)

to the costs of projects aimed at improving the conditions of labour and the effective employment of skill within the workplace.

2. To increase the supply of necessary skills:

- the Ministry of Education should consider linking a proportion of the scholarships for study abroad to those subjects which are most needed in manufacturing industry
- the Ministry of Labour should consider ways of encouraging the return of Cypriots from abroad where they have key skills which are in short supply
- continued emphasis should be given in the ITA programme the funding of management training at work
- that in the process of systematising apprenticeships, due weight is given to the need for multi-skilling in flexible manufacturing
- that specialised courses for the priority manufacturing sectors should be established as indicated in the accompanying sector reports.

3. That in order to develop an integrated labour market strategy which is consistent with the industrial strategy, the Ministry of Labour should take responsibility for co-ordinating work on a Cyprus Industrial Labour Plan, covering education, training, wages, health and safety, the operation of the labour market, future labour supply and labour requirements, the employment of women, industrial relations and new productivity initiatives,

as well as studies on labour issues in each sector. The CILP should be submitted to the Strategic Planning Council by December 1989.

7.12 Management

Some of the limitations of Cypriot management will be addressed by the services of the consortia, the development banks, and the various public bodies providing industrial infrastructure. But if we consider the elements of enterprise management (as in Figure 2) it is clear that some things cannot be provided by external bodies. They may help set up systems and provide advice, but the critical input must come from the industrialists themselves.

If for the moment we leave aside the general orientation of the firms, and concentrate on two of the traditional centrepieces of management, accounting and finance, and production, there is something of a policy enigma. For it has been clear for some years that the general standard of management in both these areas was inadequate. The Government has pursued remedial policies, notably through the Cyprus Productivity Centre. The CPC have run management courses, which have been well attended, and provided consultancy services which have been well used. The MCI'S extension service has contributed advice on production, and in addition advice has been given to firms by visiting consultants, whether accounts or sector specialists. The ITA has been funding a successful in-service management programme for unemployed graduates. Yet on the basis of our visits, and the reports of other surveys, this approach has not been sufficient.

As far as accounting systems are concerned, one explanation suggested to us was that firms might not wish to have a sophisticated accounting system, since this would make it easier for the Inland Revenue to assess tax. The adoption of Value Added Tax in Cyprus will require each firm to keep more detailed accounts, and will be an

important stimulus for modernisation. Another part of the explanation may be the old craft management tradition, as well as a simple lack of time to install new systems.

Whatever the explanation, the improvement of basic management systems is a necessary foundation for any industrial strategy, and is particularly important for flexible specialisation, with its switches between products, emphasis on working capital productivity and minimisation of down-time. For many of the firms visited, we suspect that the returns to investment in improved management may far outweigh further investment in fixed assets at this point of time, with the exception of fixed assets like computers which are part of the system improvement. It should be one of the immediate priorities of the Government to launch a programme aimed at bringing the level of internal management systems up to a recognised European standard within four years.

We propose the following for inclusion in such a programme:

- (a) the establishment of an Emergency Management Unit within the MCI staffed by consultants, each with a public service counterpart, to be responsible for the emergency programme. The consultants should include an accountant, management systems specialist, and an expert in production planning. The counterparts should be drawn from the existing civil service and quasi-public bodies, including the CPC.

The brief of the Unit would be to:

- contribute to review of management training (see below)

- provide a pilot service to Cypriot firms to establish the required systems. These firms would serve as a model for other firms in their sector
- develop monitoring procedures by which to assess the improvement in the overall level of management in Cypriot manufacturing
- operate the management equipment fund (see below)
- review the effectiveness of their Management Consultancy Fund (see below)

(b) a senior consultant should be engaged to draw up the details of the emergency programme, and to monitor its performance annually

(c) a Management Consultancy Fund of C£2 million per annum should be set up to provide the requisite consultancy services to firms. These funds would normally cover 75% of the cost of the programme of consultancy, the balance being contributed by the recipient firms. Consultants would include leading European industry specialists such as Schulers of West Germany for the furniture industry, as proposed in the accompanying furniture sector report. The prime purpose of this fund would be to improve management information systems, including accounting, and all aspects of production planning and operation. The fund should be administered by the development bank, who should not normally provide more than 50% of the consultancy services directly.

(d) a Management Equipment Fund of C£1 million per annum should be established as matching funds for the purchase of equipment

necessary to improve management information systems and stock control. This fund should be administered by the Technology Unit in the MCI.

- (e) an urgent review of management training in Cyprus should be undertaken by an external consultant reporting to an ad hoc group representing the Government, industrialists, the trade unions, the banks, and the ITA. On the basis of the consultants' review, the group should make recommendations to the Strategic Planning Council for the expansion of management training within the context of the emergency management programme.

- (f) the review should consider the proposal to establish a high level Cyprus Business School. Like the Business Schools in Europe and the USA, this would aim to provide post-experience courses, as well as a pool of consultants from among its staff. A project of this kind is under discussion, and would clearly be a major addition to the country's educational and consultancy infrastructure. While, from the Government's viewpoint, it would be possible to expand the Mediterranean Institute of Management, (MIM), part of the CPC, there is a good case for a second institution. An element of competition is likely to encourage performance in both, as well as providing a university which might not be present in a single institution. What is important is that any such business school should maintain close links with management educational institutions in Europe, the USA and Japan in order to ensure a continual updating of know-how. It should also seek to educate public service managers and trade unionists as well as private sector managers.

More generally, at this stage of Cypriot development, rather than a single university, we favour the development of specialist higher education institutions, offering pre- and post-graduate courses, as well as refresher courses, and which

can act as centres of initiative and specialist culture in their particular fields. The Art and Design College is one example, the Hotel and Catering Institute another, and a high level Business School would be a third.

7.13 Industrial property

One of the features of successful industrial districts is that they concentrate firms in the same industry within a small area. This facilitates specialisation, co-operation, and the sharing out of work. In Cyprus industrial districts exist to only a limited degree. The small clothing and furniture firms in the old part of Nicosia exhibit this kind of interaction, and though the urban planning authorities want to shift these small producers out of their existing buildings, they are concerned that any new location should be planned as an industrial district so as to maintain the advantages of proximity.

In the other sectors, industry tends to be more scattered. The MCI-run industrial estates have a mix of industries, and have not, to date, attempted to concentrate together industries from the same sector. They are currently considering a plan to have an estate specialising in polluting industries, but this is aimed to yield environmental rather than production economies.

The Industrial Estate programme has been singularly successful, with a shortage of space in a number of areas. This gives the MCI some scope, as does the empty space in the Free Trade Zone. A policy of sectoral concentration and industrial districts would take time to achieve, but we recommend that the MCI incorporate this into its long-term programme. The various sector-specific infrastructural services which we have earlier discussed would be more effectively provided as part of an industrial district.

Similar considerations apply to the knowledge-based industries. The accompanying report proposes the construction of purpose-built 'intelligent' buildings, combined with the provision of certain services which firms might not be able to afford on their own - the joint use of a computer for example, shared word processing, and joint purchasing of inputs to obtain low prices.

7.14 Marketing

There has been for some time a keen awareness of the importance of marketing, particularly abroad. The Export Promotion Organisation promises to be a most valuable resource for Cypriot exporters. In the UK, we have seen many manufacturers starting up or consolidating their own retail outlets.

Earlier reports (for example the GOPA Report in 1982) commented on the absence of market research, and of marketing planning among Cypriot manufacturers. The EPO is being designed to remedy these weaknesses for firms in the export sector, and this will, we hope, have an indirect influence on firms largely confined to the domestic market. Rather than considering the general issues of marketing - which have already been fully discussed in the Hogan Report (1983) and later preparatory documents for the EPO, we are more concerned with the marketing implications of a strategy of flexible specialisation.

First in the domestic market, there is a case for the integration of production and retailing in a number of sectors. But the retailing outlets should not be seen primarily as tied outlets. Rather they are important points of a vertically integrated process, organised so as to promote a particular image, and to ensure stock minimisation between factory and sale. As to the former, the clothing report draws attention to improvements which should be made in the lay-out and design of clothing shops. This aspect of design is in many ways as important as the design of the clothes themselves. The shop

design concept has been central to the success of many European retail chains, from the Body Shop to Next or Habitat. Secondly, stock minimisation points to the need to adopt Electronic Point of Sales (EPOS) systems.

As far as shop design is concerned, firms developing a distinct image may wish to establish their own shop image, rather than go into collaboration with others. With Electronic Point of Sale systems on the other hand there are substantial economies of scale, which do point to the need for inter-firm co-operation. This is reinforced by the problems of lack of specialisation faced in the furniture industry, where each manufacturer with a showroom is forced to produce a full product range with resulting diseconomies in production. We suspect that both clothing and footwear manufacturers will face similar diseconomies from having to produce a full product range for their own retail outlets.

Accordingly, there is a strong case for establishing collective shops and showrooms. The form will vary by product. In some cases it may be appropriate to follow the modern department store model of having leased space within the shop for a particular product brand. In this way clothing firms could promote their own brand, at the same time as benefiting from the economies of joint retailing, including product specialisation. EPOS systems could be designed which allowed the selective feedback of sales and stock information to the individual factories in the retailing consortia. The joint stores would become known for their carrying of a given range of brands.

With respect to overseas markets the Export Promotion Organisation is being structured round the modern concept of marketing as a two-way process between producers and consumers. It is keenly aware of the importance of design and quality. Its aim among other things to:

- provide a flow of information on foreign markets, product regulations, importers, trade finance, and movements in relevant sectors.
- provide finance for industrialists to travel to foreign markets and establish joint representation overseas, as well as to engage specialist market reports and market researchers.
- give advice on the presentation of products, and on strategic product planning as it relates to export markets.
- link in with Government bodies such as the Trade Centres, and the Ministry of Commerce and Industry, both on day-to-day export issues, but also in terms of the development of overall export policy.

Its philosophy - in our view quite rightly - is to support enterprise and sector initiative rather than replace it.

This places the prime responsibility for the development of an overseas marketing presence on the firms themselves. Given the size of firms this should in most cases be done co-operatively, and we have indicated above how this could be encouraged through incentives to the establishment of marketing consortia. In the long run the consortia might run their own chain of shops abroad, linked in by EPOS to the Cypriot producers. We understand there are examples of overseas Cypriot clothing shops which have been valuable channels of market intelligence in addition to their function as sales outlets. In the short to medium run, the consortia would attempt to establish an integrated distribution system, to allow for stock minimisation, and rapid response to overseas sales performance.

In the food sector, the marketing issue at home and abroad is of a different kind, for it involves responding to and helping to shape changes in the whole pattern of consumer culture. The move towards more healthy foods in Europe and the United States has opened up new possibilities for Cypriot products, and suggested ways in which the existing processing techniques might be profitably altered. Within Cyprus itself, the change in consumer culture has not yet taken place. To this end, the Food sector report suggests the establishment of a Cyprus Food Commission to:

- provide information on new food products which could be produced in Cyprus

- encourage an awareness of the links between diet and health

- collate and disseminate information on the food industry in Europe and the Middle East

- identify areas of opportunity for new food product and catering developments

- advise on packaging and quality control for the European market.

In the light of the above our recommendations are as follows:

- (a) The Export Promotion Organisation (EPO) should gear its financial support to enterprises in such a way as to encourage inter-enterprise co-operation in all aspects of overseas marketing.

- (b) A fund of C£1 million per annum be set up, administered by the EPO, to contribute on a matching basis to the costs of joint representation overseas.
- (c) The EPO should act as the agency to stimulate overseas visits by industrialists to joint overseas marketing organisations in Italy, Germany and Scandinavia, and should contribute matching funds to the costs of such visits.
- (d) A revised tax incentive scheme should provide particular encouragement for investment in joint distribution and retail facilities.
- (e) In addition to a sectoral study on retailing to be undertaken by the Strategic Planning Council (see above), a consultant should be engaged to advise on improvements in the distribution and retailing of clothing, footwear, furniture, and food, drink and tobacco. This consultant should have direct experience of advanced retailing systems in the European and North American markets.
- (f) regular meetings should be held between the Hotel Managers' Association and the sector associations of the employers, to report on product quality and potential product development as experienced by one group of professional consumers of Cypriot products. The principal purchasing officers in Cyprus of the British army, and the UN Force, should also be approached as part of such domestic market research.
- (g) The Cyprus Tourist Organisation should widen their Annual Survey to include questions on the purchase and consumption of Cypriot products.

- (h) A Cyprus Food Commission be set up at an annual cost of £100,000.

7.15 Raw materials and intermediates

One of the aspects of flexible specialisation is the existence of a closely integrated network of suppliers, usually sited close to the user plant, providing high quality inputs on a just-in-time basis. This is not the case with Cyprus. The bulk of inputs in the non-food processing sectors are imported. Local inputs have often had quality problems, and are highly priced. It is of strategic importance to each industry that the supply of inputs is planned as closely as the user industry itself.

The Strategic Planning Council should therefore have within its brief the outlining of a strategy for input supplies. In many cases the narrowness of the internal market will mean that Government subsidy is required if local production is to take place. For this reason we propose that a Strategic Industry Fund of C£3 million in the first instance should be established under the control of the Ministry of Commerce and Industry. It would be administered by the CDB and be used to cover the gap between commercial viability and industrial strategic requirements as determined by the Strategic Planning Council. The CDB should take equity in exchange for the subsidy.

Among the projects we propose should be immediately looked into are the following:

- (a) a collective converting operation in the clothing industry by which a consortium of clothing firms would buy up grey cloth and have it finished to members' requirements

- (b) an expansion of the existing cloth dyeing facility, possibly through an injection of capital by clothing firms, which would encourage a closer relation between the dyehouse and customer firms over production scheduling
- (c) a third leather finishing plant
- (d) a joint steel stockholding facility
- (e) a printed circuit board factory.

These are discussed more fully in the sector reports.

In other cases, the problems arise from price and quality of existing local facilities. This is the case in the footwear sector. Lasts are provided by a single Cyprus source, which also supplies other components for the shoes. The lasts have often been found to be of inferior quality and much more expensive than imports. Given the size of the market, it might be better to lower protection, or to have a public or joint footwear industry stake in the supplier rather than setting up a second plant.

In the furniture and food processing industries we found that difficulties existed between suppliers and the user firms. In furniture, the users blamed the suppliers for poor quality, while the supplier blamed the users for not having proper production techniques. It is imperative that this situation improves. The CFI being majority-owned by the Government is well placed to play a proactive role here, but the furniture producers, too, need to be willing to work with the CFI and the CDB (a shareholder in the CFI) to establish long-term co-operative relations between supplier and user over optimum production scheduling and quality. Similarly in

the food industry, the Ministry of Agriculture and the MCI should together establish an integrated production system which optimises returns for the integrated food industry as a whole.

7.16 Finance

We have not presupposed a major expansion of the Government budget because of our awareness of the present financial situation. Some reallocation of existing funds is possible. There is no doubt however that further finance is needed, and it is proposed that a detailed submission be made to the EEC for matching financial support for the programme as outlined in this strategy.

7.17 The programme

The following steps are required to carry forward strategic planning on the basis of the current report

- agreement with all the parties who will be involved in the restructuring of industry: industrialists, trade unions, other sectors, and the various Government and quasi-public bodies. The saying that the Americans are quick to take decisions and slow to implement them, whereas the Japanese are slow to take decisions but quick to implement them should be remembered here. Behind the Japanese approach is a commitment to try and win a consensus for a decision amongst those involved in its implementation. This is what is required in Cyprus. If this means changing the recommendations, so be it. There is no one way to climb a mountain. What is important is that the chosen way should be agreed.

- further detailed recommendations with respect to the five main sectors studied, and to the knowledge-intensive industries.
- further initial studies on existing sectors and sub-sectors in Cyprus, and on non-industrial sectors whose development needs to be linked into the manufacturing project.

For the purposes of discussion and agreement of the present document, the practices elsewhere suggest the following:

- publication and distribution of the present English texts. Industrialists and trade unionists in each industry should be circulated with the relevant sector reports and the summary of the main report.
- translation of the sectoral reports into Greek.
- production of a newspaper summarising the reports in Greek for wide circulation within industry.
- informal discussions with groups of industrialists, of trade unionists, of the banks, and of other interested parties.
- the request for comments to be submitted by a due date, which will be considered and incorporated into a redraft
- the discussion of the full report in each Ministry and quasi-public organisation concerned.

- public presentation of the revised document, and circulation to all parties involved in the consultation.

The process of public discussion of this kind will not only widen the understanding and basis of agreement of the overall document, it will also serve to enrich the recommendations. In this sense the current report and its recommendations provides a framework for this second stage of wider consultation.

In the accompanying chart we present an outline programme for industrial strategic planning over the period of the 5th Emergency Plan. Its main points are as follows:

- that the follow up discussion of the current sector reports be conducted sequentially rather than concurrently, to allow for full concentration on strategy and implementation in a single sector, starting with clothing.
- that two further rounds of studies be undertaken during the 3rd quarter of 1988 and the first quarter of 1990.
- that the work currently being undertaken by the ITA (sector training studies), the Ministry of Labour, and the Department of Research and Statistics, be brought together as a Labour Plan for the industrial sector during the period from mid 1988 to end 1989.
- that the overall Industrial Strategy be further revised in time for incorporation into the 6th Emergency Plan in 1990.

Industrial Strategic Planning 1987-91

	1987		1988		1989		1990		1991		
	IV	I	III	IV	I	II	III	IV	I	II	III
Industrial Strategy	-----										
discussion and agreement											
Sector reports:											
discussion, elaboration, modification, and agreement.											
food	-----										
clothing	-----										
footwear	-----										
furniture	-----										
metal working	-----										
knowledge intensive industries and new technology	-----										
Further sector reports											
I											
paper products											
publishing and printing											
II											
travel & leather goods											
ceramic tiles											
beverages											
III											
cultural and leisure industries											
catering											
retailing											
Labour Plan											

Key: ----- report preparation
 ----- report discussion & follow up

7.18 Summary of Strategy

In Figures 8-10 we summarise our approach and our principle institutional and financial proposals. Figure 8 presents a diamond divided into two parts: the upper half shows the support functions required from the side of industrial strategy, the lower half what is required from the side of the supply of labour. In both cases the key strategic guidance is provided by the vertical points of the diamond, with the services becoming more decentralised in their provision as they come to effect the enterprises directly. For industry, we see the development of the industrial consortia and of development banks as the important steps to be taken at the front line of industrial restructuring, with a greatly expanded programme of training, and of labour supply policies affecting the household and workers at work being the immediate priorities on the side of labour.

Figure 9 indicates the new institutions we propose, notably the Strategic Planning Council within the Government, the expansion of the development banking system, of the industrial consortia, of the technology centres, and the initiative of the design complex centred on a Cyprus College of Art and Design.

Figure 10 outlines the existing funds and the additions we propose to them, which form part of the proposed reorientation of the industrial incentive schemes. The total extra earmarked funds indicated in our proposals amount to C£10 million per annum.

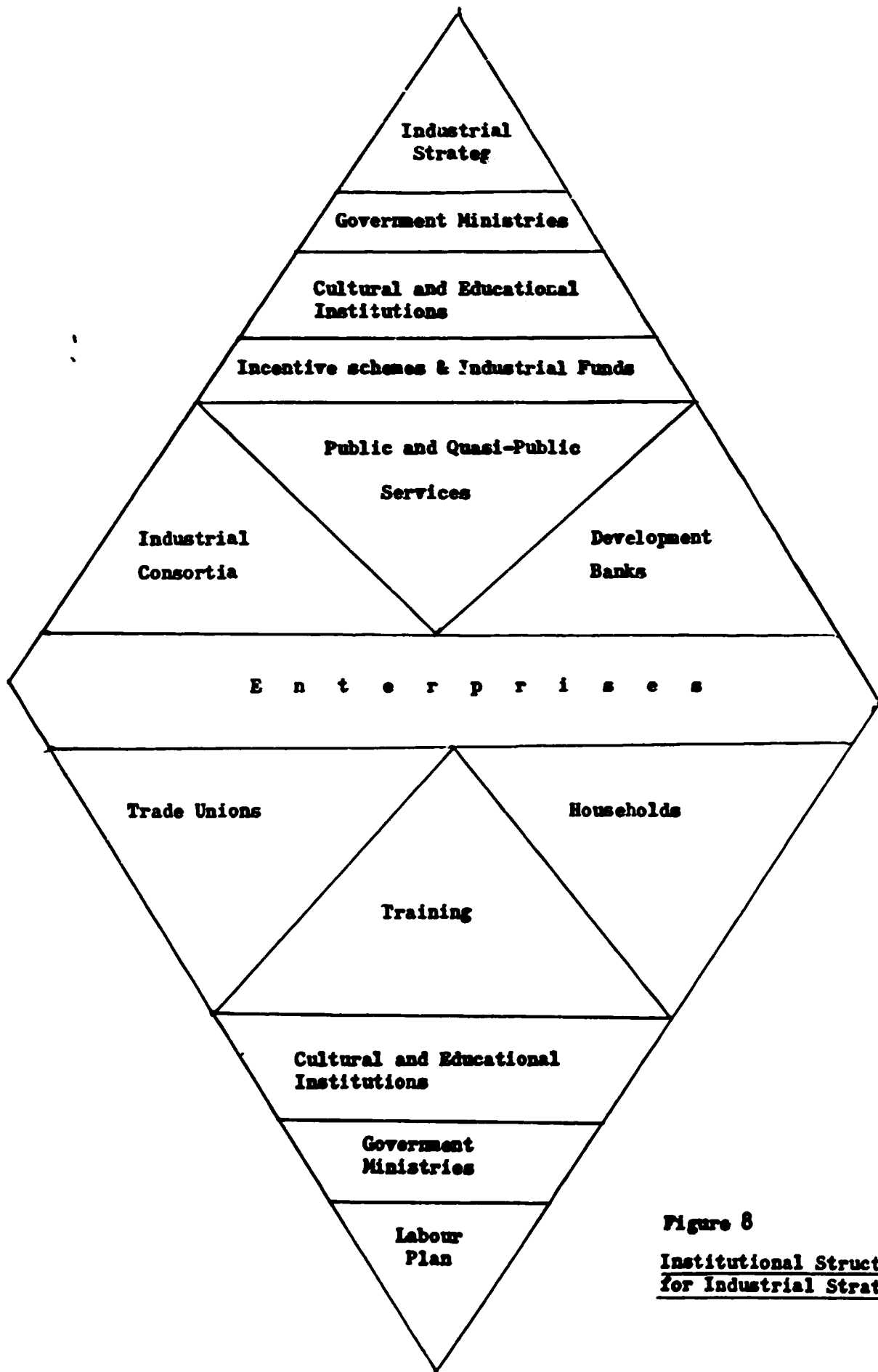


Figure 8
Institutional Structure
for Industrial Strategy.

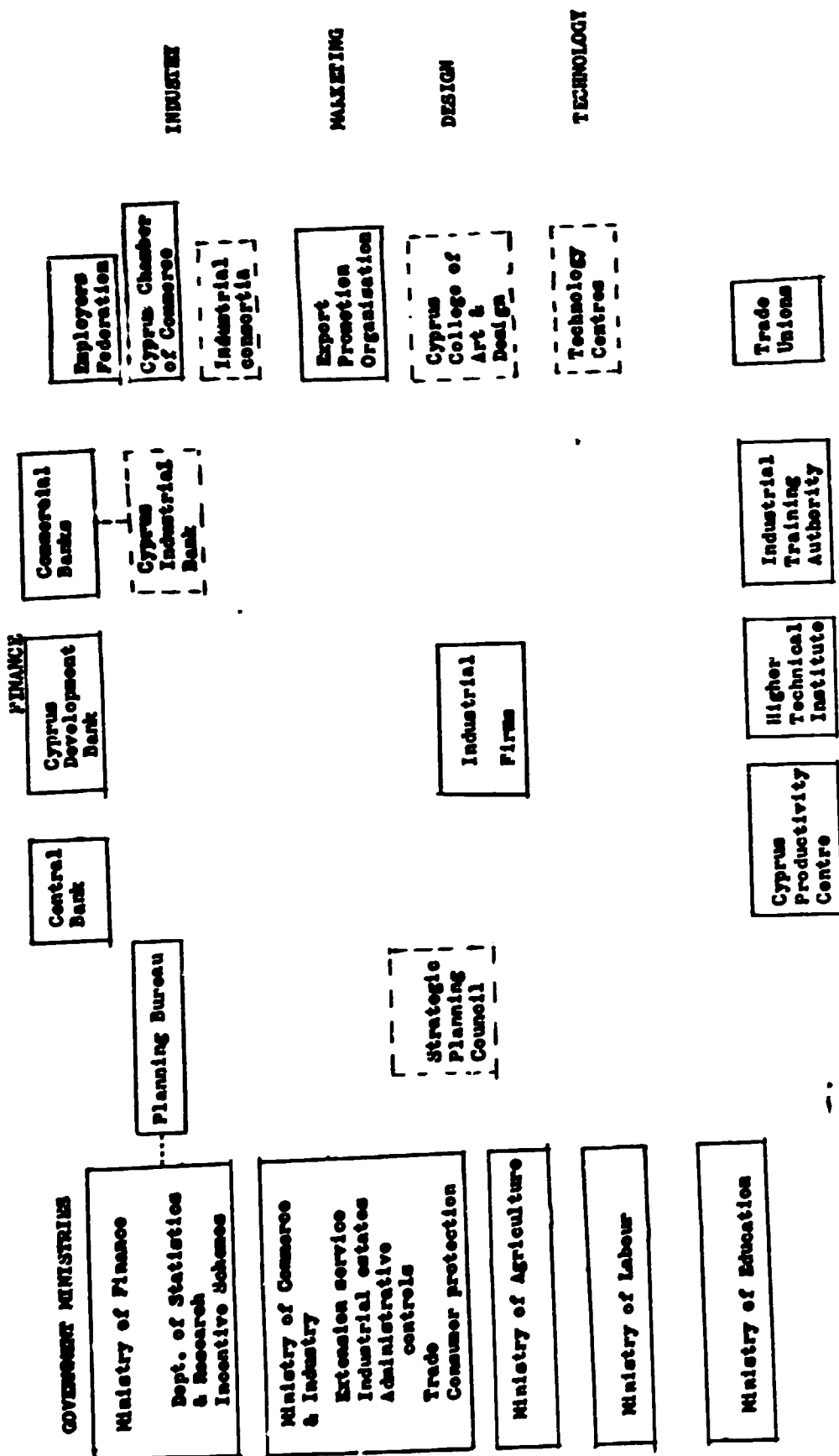
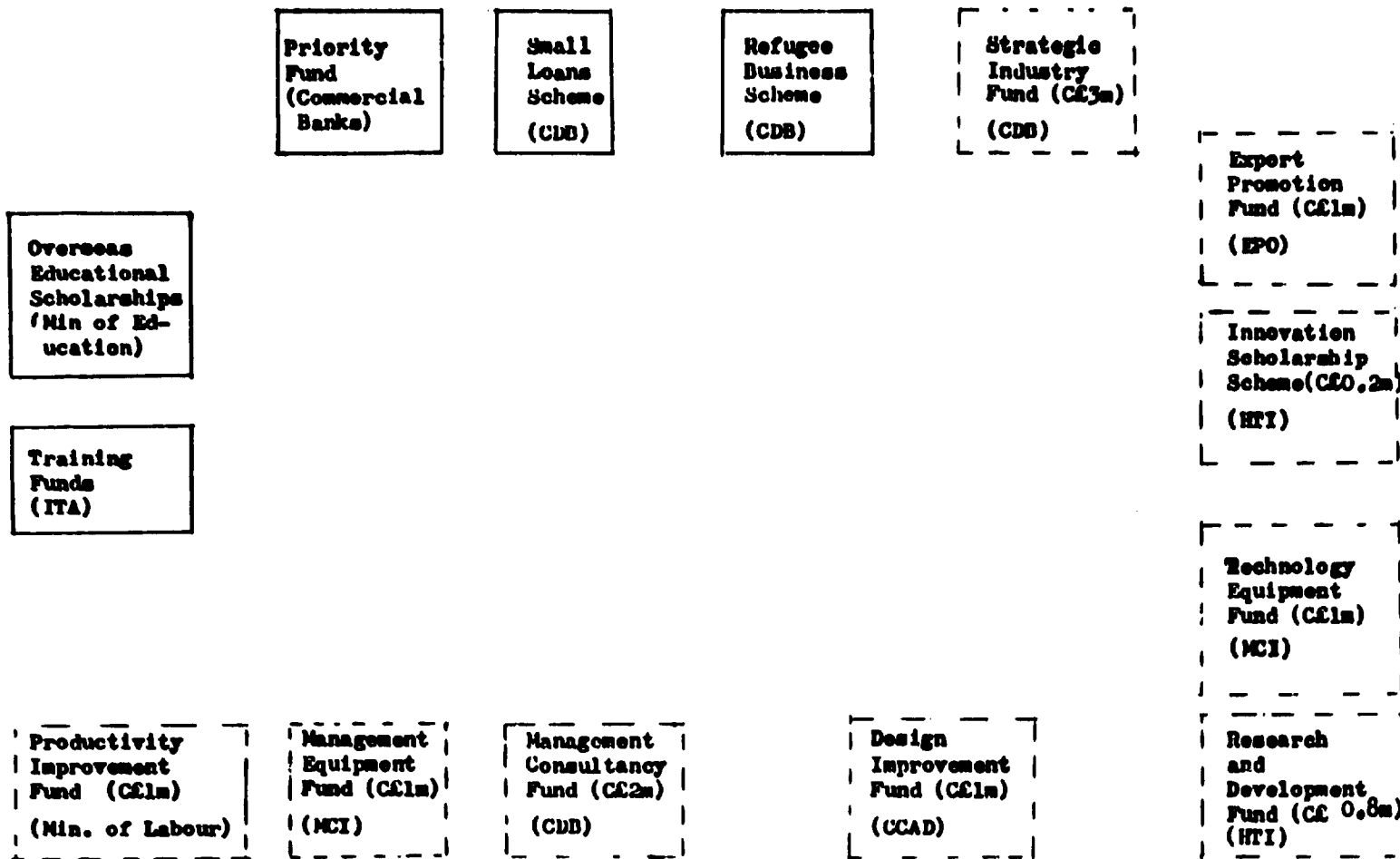


Figure 2
Institutions concerned with a Cyprus Industrial Strategy



Key



existing funds



proposed funds

Figure 10

Incentive funds for Industry

SUMMARY OF RECOMMENDATIONS

1. Cypriot industry should orient itself towards flexible specialisation rather than volume production. This involves identifying market niches, and putting a prime emphasis on design, quality, reliability and a just-in-time system of production.

2. While seeking to gain experience and some market position in Europe on the basis of its own design products, Cypriot industry should maintain its orientation towards the Middle East and Africa particularly where it can act as an adapter of European-type products for the particular requirements of the regional markets.

3. Cypriot industrial strategy should start with existing sectors looking for expansion and diversification on the basis of already established skills, either in manufacturing or in the agricultural and services sectors. The aim should be to foster an organic growth - mixing innovation with continuity - rather than attempting to start from scratch enclave innovations which have no current link with the economy.
 - 3.1 Any studies undertaken on non-manufacturing industries by or for the Government should include a section on the potential for Cypriot manufacturing from the development of those industries.

 - 3.2 Studies should be undertaken on three non-manufacturing sectors with particular significance for manufacturing industry:

- (i) retailing and distribution
- (ii) catering
- (iii) the leisure and cultural industries

4. Given the fragmented structure of Cypriot manufacturing, priority should be the establishment of industrial consortia to provide common services to individual firms. These consortia would be controlled and primarily funded by industrialists, with the participation of the Government and trade unions as agreed.
- 4.1 Groups of industrialists and trade unionists should at the earliest opportunity visit Italian industrial consortia in their respective industries.
- 4.2 A representative of the National Confederation of Artisans of Italy should be invited by the Government to Cyprus to advise on the establishment of consortia and of an appropriate national framework for them.
- 4.3 The Government should commission a study of the German export cartel and the Swedish joint marketing co-operatives to identify features which it would be of advantage to Cypriot consortia to adopt.
- 4.4 The Government should undertake to set up a national framework for industrial consortia, and provide funds through specific incentive schemes to encourage the development of both formal and informal co-operation between firms.
- 4.5 The employers organisations and the trade unions should agree to adopt this programme for the provision of common services.

4.6 Priority should be given within the consortia to providing:

design intelligence
joint sales representation
the setting and supervision of quality standards
computer aided design and materials lay-out facilities
management consultancy and technical assistance
operative training.

5. The Government should establish a STRATEGIC PLANNING COUNCIL for industry, with the following features:

- it would be temporary, running for the four years up to 1991
- it would be multipartite, including in its membership representatives from Government, industry, the trade unions, banking, and the quasi public bodies
- it would meet bi-monthly and make recommendations to the Council of Ministers
- it would have an executive committee comprising the Ministers of Commerce and Industry, Finance, Labour, Education and Agriculture

5.1 The Strategic Planning council should be serviced by a small STRATEGIC PLANNING SECRETARIAT, comprising a small core staff of secondees, and a series of full time temporary work teams concentrating on particular sector or issues.

5.1.1 The Secretariat should have a budget of C£200,000 per annum.

5.1.2 The tasks of the Secretariat would inter alia be:

- to prepare detailed strategic plans for each major industrial sector in Cyprus
- to ensure widespread discussion of the reports
- to submit the reports, with proposals for action and funding, to the SPC
- to produce an updated Cyprus Industrial Strategy based on at least eight sector studies by mid 1990, for incorporation into the Sixth Emergency Plan
- to co-ordinate the production of a Cyprus Labour Plan by the end of 1989
- to co-ordinate the production of a Cyprus Technology Strategy by mid 1990
- to produce other policy papers, as required, including:
 - * an assessment of statistical requirements for the Industrial, Labour and Technological strategies, and for industry on a regular basis
 - * proposals for the revision of the industry incentive schemes
- to submit on a bi-monthly basis a progress report on the implementation of the SPC's recommendations, with explanations for non-performance

5.1.3 The work of the SPC and SPS should be assessed annually, the assessors report being submitted directly to the Council of Ministers. A final assessment of the work

during the period 1987-1991 should be so made by the end of 1991.

6. The Ministry of Commerce and Industry should be the lead Ministry in the practical implementation of recommendations falling within the following categories:

- technology
- management
- relations between the Government and the sectoral associations
- promoting the sector strategies within the Government

This does not imply that the Ministry will necessarily perform the services directly but that it will have the line responsibility for the administration of the funds and Government programmes in this field. To this end, we further propose that:

- 6.1 A sectoral Technology Unit be established within the MCI, incorporating the Extension Service, and organised like the Extension Service on a sectoral basis. Its responsibilities would include:

- advising the Central Bank on machine imports and foreign shareholdings
- advising on protection
- continuing extension service work
- administering the technology equipment fund

- liaising with sectoral industry associations and other Government departments
- working closely with the Strategic Planning Secretariat to whom it would second staff, as and when required.

6.2 An Industrial Approvals Unit should be formed within the MCI to act as a single window agency for all industrial applications seeking Government approval, including industrial projects, technology transfer, joint venture proposals and machinery imports.

6.2.1 The Industrial Approvals Unit should service an Industrial Approvals Board, representing the relevant departments of Government and the Central Bank, with the power to take decisions on industrial applications.

6.2.2 Appeals against the decisions of the Industrial Approvals Board should be directed to an independent ombudsperson

6.3 A Strategic Research Unit should be formed composed of a small staff of people with proven experience in industry research and high quality output

6.4 An Emergency Management Unit should be set up to raise the levels of management within manufacturing industry

6.5 The Director General of the MCI should have a support unit of three people, and the Director of Industry should have a support unit of two people for the period of the Industrial Strategy.

6.6 The Ministry should aim to become a pace-setter in modern administrative methods. To this end we recommend that:

- the team which undertook the Organisation and Methods study of the Ministry of Agriculture be invited to undertake a similar study in the MCI.
- that the Ministry consider extending the practice of flexible work teams to tackle non-routine tasks

6.7 The training budget of the MCI should be expanded by C£20,000 to finance the necessary training and retraining implied by the above changes.

6.8 Officers in the Sectoral Technology Unit should be encouraged:

- to take short term secondments within industry, and in other posts directly concerned with industry (including industrial consortia)
- through training and overseas travel to constantly update their knowledge of international industry

7. The Cyprus Development Bank should be re-oriented to become a development bank specialising in sectoral restructuring and network support. This requires that it has access to new sources of public and private funds to remove the conflict in which it currently finds itself between commercial survival and development banking.

7.1 The Government should clarify whether it wishes the CDB to operate according to the independent commercial/public

agency model, or the quasi-public instrument model, and restructure the formal control of the CDB accordingly.

7.2 The CDB should be encouraged to expand at a rate of four extra staff per year up to 1991, with an assessment of the impact of expansion on the Bank at the end of that year.

8. The Government should encourage the Commercial Banks to set up a joint development bank to be known as the Cyprus Industrial Bank. Its purpose would be to be pro-actively involved in sectoral restructuring. Its finance should come from the deposits currently held in the Priority Fund. It would also be encouraged to undertake non-commercial support services for the Government on a subsidised basis.

9 The Government should urgently review its tax incentives programme, with a view to:

- shifting the balance of incentives in the overall programme to manufacturing
- within manufacturing, shifting the balance from investment in hardware (fixed assets) to investment in software (spending on manufacturing services - design, marketing, management consultancy, skilled labour and management training)
- within fixed investment, encouraging investment in flexible machine systems

- encouraging co-operation between firms in the provision of manufacturing services
- providing incentives in the form of cash contributions to specified expenditures rather than general allowances on declared taxation accounts
- integrating the general incentive programme with other industrial funds currently operating through Government ministries or quasi public bodies
- assessing the impact of the incentives to research and development

10. In the current period, foreign know-how is best introduced as the result of a specific contractual agreement rather than a general incentive scheme to encourage foreign investment. The current incentive schemes towards foreign investors should be reviewed with this in mind.

10.1 A detailed assessment should be undertaken of the costs and benefits of the Free Trade Zone in order to judge whether the unused part of the Zone should be transferred for use as part of the general industrial estate programme by domestic firms

10.2 A study should be conducted of the terms of existing royalty contracts as a basis for considering the present terms under which licensing agreements are made, and as a source of information on best practice for Cypriot firms seeking to enter a licensing agreement or management contract with overseas technology suppliers.

11. The Ministry of Education should establish a Cyprus College of Art and Design with a first enrollment in 1991. Its aim would be to act as a focus for design development within Cyprus and foster the link between art and design and their industrial applications. With 120 students a year, the running cost of the new college would be C£200,000 per annum, with a start up cost of £0.5 million.

11.1 Attached to the College should be an Industrial Applications Workshop which could include CAD and laser-cutting facilities and other modern equipment for use by students and industrialists.

11.2 Small workshops should also be built in the vicinity of the College, to provide accommodation at modest rents for designers starting their commercial life

11.3 The Board of the College should be composed of people from inside and outside Cyprus, with a reputation in the Art and Design field and in creative institution-building

11.4 The first Director may also be recruited from abroad, either a Cypriot artist with an international reputation, or a senior staff member of one of the leading European Design institutions.

11.5 The Government should consider establishing a permanent link with one or more of the leading design colleges in Europe during the first 5 years of the College's life.

11.6 The Government should establish a Museum of Contemporary Art and Design, attached to the CCAD, with the following aims:

- to extend public awareness of the importance of design
- to provide a permanent exhibition of Cyprus original designs
- to provide a venue for specialist exhibitions on particular types of design relevant to Cypriot industry
- to provide a tourist attraction and a point of sale for Cypriot designed products

11.7 The Government should consider establishing the industrial design complex in Limassol as a town which unites manufacturing and tourism, if a suitable central site could be found.

12. To further encourage design the Ministry of Education should:

- (a) give priority in the allocation of scholarships to study in art and design colleges
- (b) expand the already valuable art and design work at the secondary school level
- (c) encourage the Cyprus College of Art and Design and the Cyprus Museum of Contemporary Art and Design to act as educational resources for schools
- (d) ensure that technical education at secondary and post secondary levels contains a significant design component

13. The Government should establish an annual fund of C£1 million to be administered by the Cyprus College of Art and Design to encourage design in the clothing, footwear, furniture and metal working sectors.

13.1 As part of the expenditure of this fund, and in conjunction with the sector associations, the CCAD and the CMCAD, an Annual Competition for Design should be established with categories for all the leading consumer goods sectors, as well as a special category for intermediate industrial design.

13.2 The industry specialists in the Export Promotion Board, together with the industrial consortia, should provide regular updates on European design houses with whom Cypriot firms may wish to establish relationships.

14. A network of technology centres should be established which would provide some or all of the following services:

- access to modern machinery such as CAD materials, measurement and test equipment
- advice on electronic equipment and production systems
- a technological search service on overseas sources of machinery, and advice on its suitability
- a training facility
- a prototype workshop

14.1 A review should be undertaken to consider the establishment at the HTI of:

- a prototyping workshop
- an expanded Footwear and Leather Testing Unit
- a Metal Working R & D facility
- a Food Processing School and Technical Centre
- an Innovation Scholarship of £0.2 million per annum to be administered by the HTI.

14.2 Matching funds should also be offered by the Government to industrial consortia seeking to establish a technology centre as outlined above.

15. Technology search and purchasing advice should be encouraged by:

15.1 The setting up of a Technology Equipment Fund of £1 million p.a. under the administration of the MCI to provide 50% of the cost of technical consultants and one third of the cost of the resulting equipment investments.

15.2 Report-backs by the Export Promotion Organisation to the Technology Unit in the MCI and the industrial consortia and technology centres on technological intelligence gathered in the course of its marketing work

15.3 Contracting leading edge institutions to provide state-of-the-art advice to industry on a regular basis.

16. A Research and Development Fund of C£0.8 million per annum should be set up to be administered by the HTI to provide matching funds for specified projects, including projects in metal working, energy conservation and bio technology.

17. The Government should give as strong a priority to a campaign for the effective use of skilled labour and its training. This would involve aiming to reduce the quit rate in manufacturing by:
 - 17.1 improving the working conditions and facilities within factories through incentives

 - 17.2 encouraging payment systems which would allow a reduction in the differential between manufacturing and higher paid sectors as well as improving productivity.

 - 17.3 advancing with speed the regulations on health and safety at work.

 - 17.4 initiating a workplace childcare project by conducting an initial feasibility study, with a view to the Government providing matching funds for childcare facilities for manufacturing workers.

 - 17.5 extending the CPC programme for productivity improvement so that its principles are included in the publicly funded management and technical training courses

 - 17.6 establishing a C£1 million Productivity Improvement Fund to be administered by the CPC and available to provide matching funds for firms to employ quality of work

consultants, as well as to contribute (on a declining basis) to the costs of projects aimed at improving the conditions of labour and the effective employment of skill within the workplace.

18. In order to increase the supply of necessary skills we recommend that:

18.1 The Ministry of Education should consider a proportion of the scholarships for study abroad to those subjects which are most needed in manufacturing industry.

18.2 The Ministry of Labour should consider ways of encouraging the return of Cypriots from abroad where they have key skills which are in short supply.

18.3 Continued emphasis should be given within the ITA programme to the funding of management training.

18.4 In the process of systematising apprenticeships the ITA should give due weight to the need for multiskilling in flexible manufacturing .

18.5 Specialised courses for the priority manufacturing sectors should be established as indicated in the accompanying sector reports.

19. The Ministry of Labour should take on the task, on behalf of the Strategic Planning Council and its Secretariat, of co-ordinating work on a Cyprus Labour Plan covering education, training, wages, health and safety, the operation of the labour market, future labour supply and labour requirements, the

employment of women, industrial relations and new productivity initiatives, as well as studies of labour issues in each sector. The CLP should be submitted to the Strategic Planning Council by December 1989.

20. The Government should launch a programme aimed at bringing the level of internal management systems up to a recognised European standard within four years.

20.1 An Emergency Management Unit should be set up within the MCI, (see Recommendation 6.4 above). The Unit would be staffed with consultants, each with a counterpart drawn from the Government service. The brief of the Unit would be to:

- contribute to management training
- provide a pilot service to Cypriot firms to establish a model system
- develop monitoring procedures by which to assess improvements in the overall level of management in Cypriot industry
- review the effectiveness of the management consultancy and management equipment funds (see below)

A senior consultant should be engaged to draw up the details of the emergency programme and to monitor performance annually.

20.2 A Management Consultancy Fund of C£2 million per annum should be established to contribute 75% of the cost of management consultancy to firms. The Fund would be

administered by the CDB who would not normally provide more than 50% of the consultancy services themselves.

20.3 A Management Equipment Fund should be started of C£1 million per annum to provide matching funds for the purchase of equipment necessary to improve management information systems and stock control. This fund should be administered by the Technology Unit of the MCI.

20.4 An urgent review of management training should be undertaken by an external consultant reporting to an ad hoc group representing the Government, industrialists, the trade unions, the banks and the ITA. On the basis of the consultants review, the group should make recommendations to the Strategic Planning Council of the expansion of management training within the context of the emergency management programme.

The review should consider the proposal to establish a high level Business School to provide post-graduate and post-experience courses, as well as establishing a pool of management consultants from among its staff.

21. The MCI should incorporate the formation of industrial districts into its long-term planning of the Industrial Estates Programme. This would involve encouraging firms from an industry to locate in the same area, to aid the sharing of services, as well as co-operation between firms.

21.1 The Ministry should also consider the construction of 'intelligent' buildings which offer common technological service such as computer facilities and shared word processing to small high-technology firms.

22. The Export Promotion Organisation should be seen as a support to enterprise and sector initiative rather than a substitute for it. Much remains to be done by the firms themselves both in home and overseas markets.

22.1 The EPO should gear its financial support to enterprises in such a way as to encourage inter-enterprise co-operation in all aspects of overseas marketing.

22.2 An Export Promotion Fund of C£2 million per annum should be set up, administered by the EPO, to contribute on a matching basis to the costs of joint representation overseas.

22.3 The EPO should act as the agency to stimulate overseas visits by industrialists to joint overseas marketing organisations in Italy, Germany, Scandinavia and elsewhere, and should contribute matching funds to the costs of such visits.

22.4 A revised tax incentive scheme should provide encouragement for investment in joint distribution and retail facilities.

22.5 A consultant should be engaged to advise on improvements in the distribution and retailing of clothing, footwear furniture, and food, drink and tobacco. This consultant should have direct experience of advanced retailing systems in the Europe and North America.

22.6 Regular meetings should be held between the Hotel Managers' Association and the sector associations of the employers to report on product quality and potential

product development. The principal purchasing officers of the British army and the UN forces should also be approached as part of such domestic market research.

22.7 The Cyprus Tourist Organisation should widen their Annual Survey to include questions on the purchase and consumption of Cypriot products.

23. In each sectoral strategy, the Strategic Planning Council should outline a policy for input supplies. Among the projects it should urgently examine are the following:

- (a) a collective converting operation in the clothing industry
- (b) an expansion of the existing cloth-dyeing facility
- (c) a third leather finishing plant
- (d) a joint steel stockholding facility
- (e) a printed circuit board factory

23.1 A Strategic Industry Fund of C£3 million per annum should be established, to be allocated by the Ministry of Commerce and Industry and administered by the CDB. In projects to improve the supply of industrial inputs, it should cover the gap between commercial viability and industrial strategic requirements as determined by the Strategic Planning Council.

- 23.2 The Government through its representation on the board of the Cyprus Forest Industries should seek to establish co-operation working relationships with the furniture producers in the interests of the furniture sector as a whole.
- 23.3 The Ministry of Agriculture and the Ministry of Commerce and Industry should work together to ensure long-term co-operative relationships between food producers and food processors.
24. Once the Strategy is agreed a detailed costing should be made of the proposals and a submission presented to the EEC for matching funds for the overall programme of industrial restructuring.
25. Given the importance of agreement on the Industrial Strategy, and the simultaneous need for urgent action, it is proposed that the programme of work to follow up the present report, as outlined in the text be adopted.

APPENDIX I

TERMS OF REFERENCE FOR CONSULTANTS/SPECIALISTS

Terms of reference for the Team Leader

On consultation with other team members, counterparts and decision makers in Government, industry and the trade unions, he will be responsible for the following duties:

- (i) As head of the team, it is the responsibility of this expert to initiate, guide and co-ordinate the required Sectoral and Simulation Studies. This is inter alia, to ensure consistency of approach and to reconcile in compatible conclusions reached in these separate studies.
- (ii) Based on these Sectoral and Simulation Studies, to produce an overall industrial targetting document which, inter alia should:
 - serve as the basis for the industry chapter of the new Five Year Plan;
 - appraise whether the sectors under investigation are amenable to international specialisation and therefore whether they ought to be given targetted status;
 - identify, if relevant, other sectors currently in existence in Cyprus for inclusion among target (priority) sectors.

(iii) To explicitly consider the institutional arrangements under which this strategy might be made to work. This is to involve consideration of both the targetting of existing institutions and the possible formation of new institutions. At least two major types of institutions are to be considered:

- sector level bodies designed to provide the full range of inputs necessary to achieve international competitive status in each sector (see terms of reference of sectoral studies for guidance);

- an overseeing body which is responsible for the formulation of broad industrial targets, as well as for the provision of services and inputs which are common to the individual sectors and for which duplication should be avoided. Examples of this common concern include Export Marketing, Investment Promotion and Technology Search.

(iv) If possible, to suggest further procedures under which the second stage of the Industrial Restructuring Strategy might be pursued, namely with respect to the identification of new, high value added industries.

Terms of Reference for the Sectoral Studies of Existing Industries

It is intended that the Government of Cyprus adopt an Industrial Strategy focussed upon the targetting of sectors. Based upon prior analysis of industrial activity, five sectors have been nominated - Textiles and Garments (mostly garments); Shoes, Leather Products and Travel Goods made of Leather and Synthetic Material; the production of Wooden Furniture; the Metal-Working Industry; and Food Processing and Packaging. Each of the Consultants will be expected to have a sound knowledge of the competitive situation of these industries in the OECD countries, especially in the EEC. This will include a

knowledge of technological developments in each of these sectors, as well as new forms of management (where appropriate) and developments in product technology. Each of these sectoral studies will be required:

- (i) To examine the existing structures of the sectors concerned with a view to identifying problems, deficiencies and limitations.
- (ii) To determine the competitiveness of Cyprus industry in the major markets in Europe with respect to price, product quality, design capabilities, product flexibility and production lead times.
- (iii) To determine the competitiveness of Cyprus industry in the local market as tariffs and other forms of trade restrictions are lowered on goods of EEC origin.
- (iv) To assess the skill implications of restructuring to meet this new competition and to make suggestions on how these skill requirements can be met through existing arrangements. This should include all levels of skill, from machine operation through machine maintenance and repair, supervision, design, technological choice and management.
- (v) To indicate ways and means of effecting diversification/rationalisation in the sectors. In this regard special consideration should be given to, inter alia, vertical integration, sub-contracting of production, specialisation, formation of joint ventures in raw material supply and selling of products, consolidation of production units, production of new products, the run-down of existing products.

(vi) To determine a range of practical options in relation to marketing output abroad. This may involve, inter alia, the establishment of specialised sales offices abroad, joint ventures with foreign firms, production under licence, sub-contracting for wholesalers and retailers, product exchanges and the definition of market-niches.

(vii) To advise on appropriate forms of technological choice and development with respect to;

- process technology, especially the adoption of new electronics based equipment;

- product design and technology, perhaps through the use of CAD;

- new forms of management and work practices designed to ensure flexibility, high quality production and low inventories.

(viii) Where this may involve the acquisition of large-scale equipment, to suggest forms of technology-sharing arrangements or market rationalisation to facilitate efficient use.

(ix) To assess the role to be played with respect to development finance, including for small firms who may have difficulty in providing adequate security.

(x) In consultation with the consultant responsible for the Simulation and Industrial Strategy studies, to provide estimates of rates of diffusion, market competitiveness,

capital costs and labour sue under the three scenarios of slow change, medium change and rapid change.

- (xi) In consultation with the head of team and responsible parties in Cyprus, to explore a suitable institutional arrangement in which a comprehensive form of action can be taken to meet the above-listed components for a strategy of "total competition".

- (xii) To set out a time-frame - with broadly specified actions - in which these objectives can be met. To suggest a set of instruments and measures which are likely to help achieve the restructuring of the sectors together with inputs towards industrial policy formulation.

It is recognised that these five sectors are heterogeneous in nature and that the emphasis to be provided for particular policies will invariably differ between them.

Terms of Reference for the Identification of New Areas of Specialisation

The Government is undertaking various actions in identifying new areas of comparative advantage, with the help of both Commonwealth Funds for Technical Co-Operation (FCIC) (survey of new investment opportunities) and UNDP (institutional proposals for investment promotion). There are certain areas, outside the manufacturing branches of industry, that require special investigation, and where the focus should be on making the best possible use of the large reserve pool that exists in Cyprus of graduate manpower. These might include engineering consultancy and software services but should investigate the general potential in Cyprus for high-technology development. This investigation would be the primary task of this Expert. The consultant will be expected to have a general knowledge

of the competitive situation of high-technology industries in the OECD countries, including consultancy and software services in the EEC.

- (i) To suggest some areas for future specialisation.
- (ii) To assess the skill implications of the above and to make suggestions on how these skill requirements can be met. Special attention should be paid to the programmes, existing institutions and the way in which they co-ordinate/co-operate with the private sector.
- (iii) To determine a range of promotional measures to give entrepreneurs essential support in identifying market opportunities and to investigate the possibility of joint ventures with foreign firms.
- (iv) Where this may involve the acquisition of large scale equipment, to suggest forms of technology - sharing arrangements or market rationalisation to facilitate efficient use.
- (v) To determine the actions and measures regarding development finance, fiscal incentives, including for small firms which may have difficulty in providing adequate security.
- (vi) In consultation with the consultants responsible for the Simulation and Industrial Strategy studies, to provide estimates of rates of diffusion, market competitiveness; capital costs and labour use under the three scenarios of slow change, medium change and rapid change.

- (vii) In consultation with the head of team and responsible parties in Cyprus, to explore a suitable institutional arrangement in which a comprehensive form of action can be taken to meet these objectives. This might in the first instance involve a capability to assist potential investors in searching for alternative sources of technological knowledge and in identifying alternative suppliers.
- (viii) To set out a time-frame - with broadly specified actions - in which these objectives can be met.

Terms of Reference for the Simulation Study

- (i) The primary purpose of this Consultancy is to simulate the effects on the Cyprus economy of alternative scenarios of the competitiveness of Cyprus industry. This will either be done by using the input-output model currently being constructed in the Planning Bureau, or through the use of a model which is approximately equivalent.
- (ii) Primary intentions are to consider the impact of various assumed patterns of innovation in the targetted sectors on
- the balance of payments;
 - the growth of output;
 - employment;
 - on capital requirements;

Data points are to be provided not only by the sectoral consultants but also by the Planning Bureau.

APPENDIX II

CYPRUS MANUFACTURING INDUSTRY 1986

	Employment	Sector Employment as % of industry	GDP Value Added	Sector GDP as % of industry
Food, Beverages and tobacco	7,500	17.3	71.8	29.3
Textiled Wearing Apparel	11,314	26.2	42.5	17.3
Leather products and footwear	3,608	8.3	15.0	6.1
Wood and Wood products including furniture	5,807	13.4	27.4	11.2
Metal Products Machinery	5,506	12.7	31.1	12.7
Paper products, printing and publishing	2,190	5.1	15.0	6.1
Chemicals, Rubber and Plastics	2,724	6.3	20.1	8.2
Non Metallic Minerals	2,318	5.4	16.5	6.7
Other Manu- facturing	893	2.1	4.4	1.8
Total	43,250		245.1	

Source: Industrial Statistics 1986 (provisional)

APPENDIX III

Organisations with whom discussions were held in the course of preparation of the Cyprus Industrial Strategy.

1. Firms visited

Food

Ambrosia Oils
C. & H. Meat Products
Frou Frou
Interpreserves
Keo Wine Products
Lambrianides
Lytras Meat
Morphakis
Pancyprian Company of Bakers
Regis Military Industries
Snackfoods
Sun Island

Bellfoods
Cyprina Canning Group
Gregariou Bros.
Jonsof Cakes Industry
K.Y. Souroullas and Sons
Lanitis Brothers
Maringos Sausage Industry
Nicolaidis Meat
Pronto Dried Nuts
SAM Meat Products
Superchick Hatcheries
S.W.S.

Clothing

Alovet Clothing Manufacturing Ltd.
Covotsos Textiles Ltd.

Helen Fashions Factory
Kallis Manufacturing Ltd.
Magnolia Fashions Ltd.

P.M.C. Stravrinides Ltd.

Seven Sisters Textiles Ltd.
Sunny Face Co.
Trikoza Knitwear Industry

Apollo Industries Ltd.
Harymode of London (Cyprus)
Ltd.
Jevtro
Loucos Trading Co. Ltd.
Orphanos and Zivanaris
(industries)
Reana Manufacturing and
Trading Co.
Solitaire
Synek Ltd.
Vetalia Clothing
Manufacturers Ltd.

Footwear and Travel Goods

Alfa
Ariston
Atlas
Bebechic
Grayflair
Krashias
Prospero

Alfhaston
Athenian Style
Bata
Gallides
Greca
Oscar
Safarino

Footwear and Travel Goods (Continued)

Scarpa
Shoemex
Viostik

Scarpino
Sinshoes
Zivangris

Furniture and Wood Products

A.L. Savvides and Sia
Cyprus Forest Industries
Furco Ltd.
K. Pastos and Sia
M & H Furnishings,
Primokitchens
S & A Papdopoulos Bros
Viokale Ltd.

Coastas Leonidas
Enoxyl
Karantzis
Marios Furniture Ltd.
N. Fasouliotis and Son
Polis Xinaris
Triano

Metalworking

A.C. Technometal
Archimides Ltd.
A. Sazeides Ltd.
Elindes Group
Metalco Heaters Ltd.
Metal Rex
Nemitsas Industries
Pegasus Ltd.
Stylson Ltd.
Viometal Ltd.

Alco
Aritaco Ltd.
Chacon Ltd.
KMC Motors Ltd.
Metalco Ltd.
National Can Cyprus Ltd.
Nicolaidis and Kouritousis
Stelco
Tekina Ltd.

Knowledge Intensive Industries

Advanced Intelligence Automation
Systems AIAS
Cooper Lybrand
J&P Overseas
Middle East Marketing Research
Bureau MEMRB
NCR

CACY
G. Paraskevaides Ltd.
L.K. Computer Software
MIS Services Ltd.
Proplan

Offshore companies

Data Entry International
Johnsons Wax
Raychem
Xpect

Federal Bank of the Middle
East
Pepsi International
Spinneys
York International

Hotels

Amathus Beach Hotel
L'Onda Beach Hotel

Golden Arches Hotel

Banks

Bank of Cyprus
Cyprus Development Bank

Central Bank
Popular Bank

2. Industry Associations

Association of Food Processing Industry
Association of Shoe Industry
Cyprus Chamber of Commerce
Clothing Manufacturers Association
Employers and Industrialists Federation
Hotel Managers Association
Metal Industries Association
Wood Working Industry Association

3. Trade Unions

SEK
PEO

4. Government

Department of Statistics and Research
Ministry of Agriculture
Ministry of Commerce and Industry
Ministry of Education
Ministry of Finance
Planning Bureau

5. Quasi public organisations

Cyprus Productivity Centre
Higher Technical Institute
Export Promotions Council
Cyprus Tourist Organisation
Industrial Training Authority

APPENDIX IV

IDS CYPRUS INDUSTRIAL STRATEGY TEAM

Consultants: Robin Murray (IDS team leader)

Michael Best (University of Massachussets)
David Evans (IDS)
Jane Humphries (University of Cambridge)
Raphie Kaplinsky (IDS)
James Rafferty (SME Services and University of
Buckingham)
Peter Snell (London Food Commission)
Jonathan Zeitlin (Birkbeck College, University of
London)

Research Assistant: Harriet Lamb

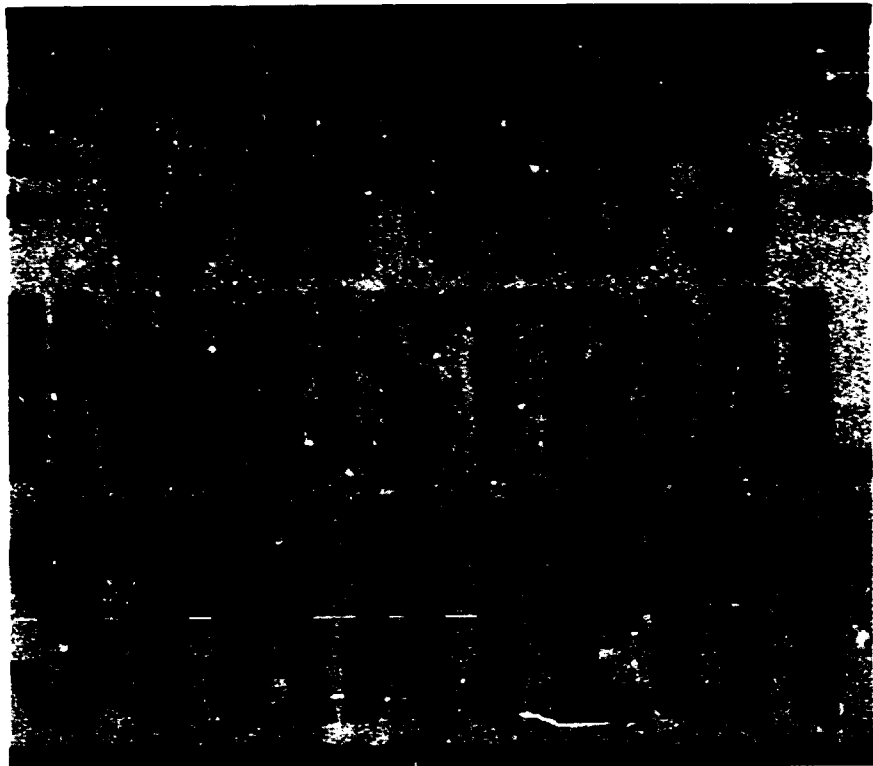
Administration: Bruce Claxton
Zoe Mars
Francine Spencer

Production: Marion Huxley (Production Co-ordinator)

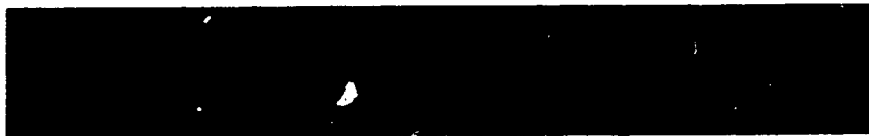
Danielle Hodges
Christine George
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Report of the UNDP/UNIDO Mission



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Prepared for the United Nations Industrial Development
■ Organisation on behalf of the Government of Cyprus ■

Institute of Development Studies

December 1987

A FOOD MANUFACTURING STRATEGY FOR CYPRUS

Peter Snell

June 1987

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FOOD

SUMMARY

This strategy for the food manufacturing industry in Cyprus is in five parts. The first examines the changing nature of the world food system as technological change increases the importance of access to markets and strengthens the power of retailers and caterers relative to producers and processors. The second analyses patterns of demand worldwide and particularly concentrates upon distribution and consumption patterns in Cyprus' two largest markets - Europe and the Middle East. The third section draws out some common characteristics from the diverse subsectors of the food system in Cyprus and studies changes in employment patterns, the overall importance of the subsectors, company performance indicators, raw material supplies, the food distribution structure and consumption trends. The fourth section starts with an appraisal of the overall suitability of Cypriot food products for niche marketing - a common characteristic of successful food sector strategies elsewhere - before analysing the prospects for each food processing sub-sector in Cyprus. The fifth section makes 24 recommendations for developing the Cypriot food processing industry listing them under 3 headings - strategic planning, market development and industrial support.

THE INTERNATIONAL FOOD INDUSTRY

It is important to consider the food processing industry as part of a food system characterised by rapidly declining employment in agriculture (from 28.2 per cent to 10.3 per cent over the last eighty years in Britain) and rapid increases in downstream sectors such as hotels and catering (9.1 per cent to 39.8 per cent over the same period in Britain). Of particular importance to food processing

companies has been the increased market power and concentrations of food retailers. The increased willingness of retailers to respond to consumer demand has opened up opportunities for small producers to gain access to such "niche" markets as health and ethnic foods.

PATTERNS OF DEMAND

65.5 per cent of Cypriot food exports are to Western Europe and 26.0 per cent to the Middle East. Multiple food retailers increasingly dominate the European markets. They appear certain to increase that dominance as the application of computing techniques to sales allows them both to reduce distribution costs and to better respond to their customer's food tastes. The Middle East markets rely far more on traditional traders although domestic food production, and the number of supermarkets are now increasing. In general Cyprus supplies semi-processed foods, mainly to European markets, and highly processed foods to Middle East markets.

THE CYPRUS FOOD INDUSTRY

If importance is assessed according to the value of production cereal preparations (18.3 per cent) and beverages (23.2 per cent of total food, beverage and tobacco production) appear far more important than processed fruit and vegetables (9.6 per cent). However it is beverages and processed fruit which provide a vital outlet for agricultural produce and are the major food export area. Of particular importance are vine products which take 41.5 per cent of all sector exports.

Domestic food spending has risen in real terms but takes a declining share of household expenditure. The food processing industry faced particular problems over the quality and availability of raw materials and growing competition in overseas markets. Food retailing was dominated by single outlet stores.

INDUSTRY PROSPECTS

The Cyprus food processing industry sub-sectors may be protected by one or more of the following barriers to imports.

1. Short product shelf life.
2. High relative transport costs.
3. Government tariffs and other restrictions.

The biscuit, confectionery and ice-cream industries, which together account for 4 per cent of Cypriot processed food together with beverage and tobacco production, are protected largely by the last type of barrier and would therefore be under threat if tariff barriers were removed. In addition the economies of scale in margarine production would hit local producers.

In contrast processed fruit and beverage exports would be expected to expand in freer overseas markets and a variety of Cypriot foods offer potential for niche marketing to the premium ethnic and health food markets.

RECOMMENDATIONS

Cyprus at present lacks strategic planning of the development of its food processing sectors, relying instead on defensive measures such as tariff barriers. A number of recommendations are made as to how such strategic direction can be improved through the establishment of a strategic food policy planning organisation involving government, industry and trades unions to promote cooperative buying and marketing. A number of proposals examine how food marketing can be developed both for domestic and overseas markets. In particular the establishment of a domestic multiple retail cooperative is seen as a possible vehicle through which government can encourage the development of the industry. Lastly a number of recommendations are

made on how best government and the education system can improve its support for the industry.

THE INTERNATIONAL FOOD INDUSTRY IN TRANSITION

1.1 The Food System

1.1.1 Introduction

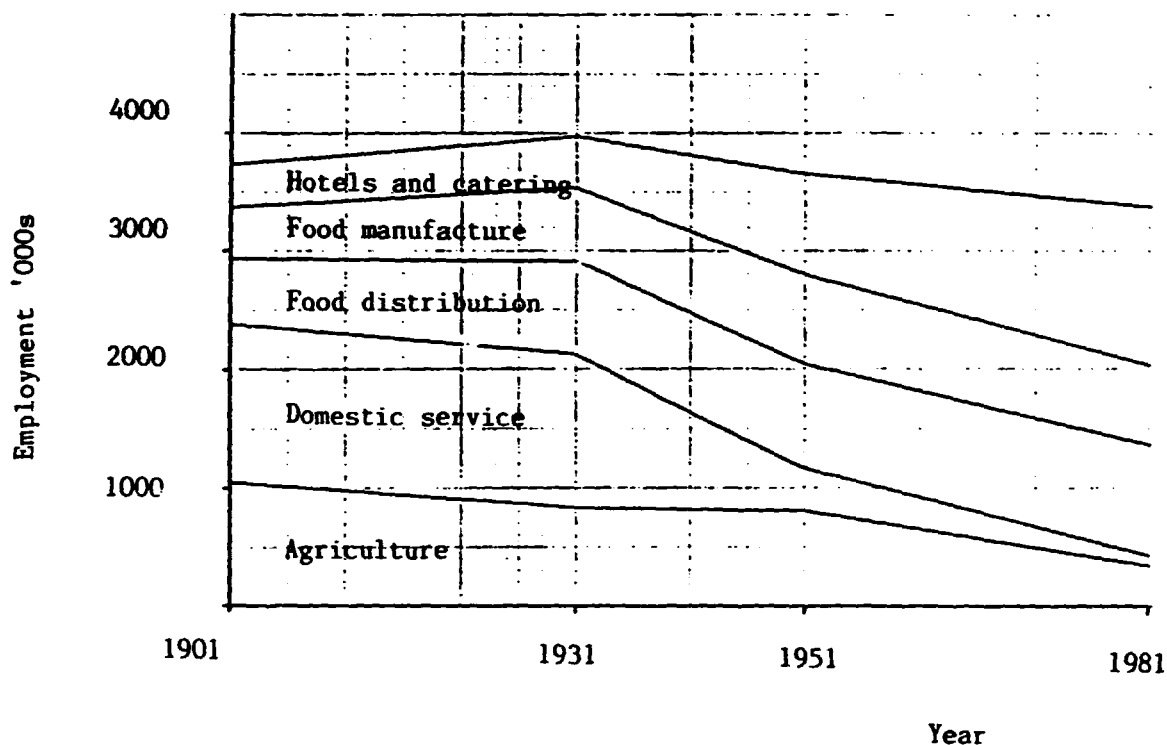
The food manufacturing industry is dependent upon, and has consequences for, other sectors of the national economy to an extent not matched by other manufacturing sectors. It is therefore essential to consider food manufacture as just one stage of a food system which also includes agriculture, wholesaling, retailing and catering, if its importance to the economy is to be fully understood. The food system is the major employer in any national economy. Food manufacturing must therefore be given fitting importance in any manufacturing sector strategy in recognition of its importance not only to employment in manufacturing but also in providing outlets for agricultural produce and domestic inputs for downstream activities such as hotels and catering.

1.1.2 Employment structure

The development of national economies has been characterised by decreasing employment in the agricultural sector compensated for, in part, by growing employment in downstream sectors of the food system. The British economy was one of the first to be transformed in this way as demonstrated in Table 1 and Figure 1. The percentage breakdown of food system employment in 1981 was, agriculture (10.3 per cent), domestic service (2.4), food distribution (28.0), food manufacture (19.5) and hotels and catering (39.8). Thus, in Britain, in the first eighty years of the century agricultural employment has declined from 28.2 per cent to 10.3 per cent of total food system employment, while that in hotels and catering has risen

from 9.1 per cent to 39.8 per cent.

Figure 1 : The changing nature of food sector employment in Britain



1.1.3 Points of control

Patterns of consumption have helped determine which sub-sector of the food system controls the production and supply of food. However these patterns have in part been determined by current technological knowledge. Such changing patterns of control can be characterised in two distinct phases.

1900 - 1960

In the first, the industrialisation of Europe led to the development of mass food processing techniques so that food manufacturers gained a dominant role in supplying food to the growing urban centres. The growth of mass marketing techniques during the 20th century both

benefitted from and facilitated the development of dominant product brands and gave enormous market power to a handful of food manufacturers. Smaller suppliers, who were unable to achieve such economies of scale either in manufacturing or marketing costs, held a diminishing market share. A typical company of this period was Lever Brothers (now Unilever) which initiated the concept of marketing branded products with Sunlight soap bars, and by applying the same techniques to its food interests became the world's largest food company. Profitability was assumed to stem from mass production techniques made possible by product standardisation, and a mass market developed through heavy advertising. New products were often those which could be developed from existing manufacturing techniques and for which it was believed demand could be created.

1960 - present

In the second, retailers, such as Tesco and J. Sainsbury in Britain, grew steadily, revealing their full potential as market intermediaries following the growing introduction of "own label" products and supermarkets in the 1960s and 1970s. Supermarkets permitted scale economies in distribution to be passed on to consumers whilst the growth of products packaged with the retail companies' own label increased their power to bargain with suppliers over price and quality. During this period the two large British food manufacturers with one of the highest stock market ratings were Northern Foods and Avana, both of which achieved high profits and growth largely by producing own label products for the large retailers. The success of such companies was attributed to their flexibility in recognising and responding to new consumption trends as food retailers had little interest in maintaining output on established mass production lines. One large retailer (Marks and Spencer) has built its reputation entirely on product quality and never used media advertising. Other retailers' advertising has tended to emphasise their company's overall pricing and quality policies rather than advertise particular products.

The power of retailers over food manufacturers has increased further as computer controlled warehousing, distribution and stocking policies have produced still further cost savings whilst permitting the retailers to respond more quickly to changes in consumer demand. This trend is likely to continue as electronic fund transfer at point of sale (EFTPOS) techniques permit retailers to build up an individual purchasing profile of each of their customers. However some food manufacturing concerns seem to have learnt the techniques of the food retailers and two current stock market favourites are conglomerates with substantial food holdings; Hilldown Holdings and the Hanson Trust. Both have exploited their ability to fill niche markets for such products as fast food, relying partly on the major multiples and fast food chains but also exploiting a growing trend amongst profitable companies to find new sales through better marketing and more specialised products (Independent, 1987).

However food manufacturing success in Britain is almost invariably achieved in association with the major retailers and the only area that could rival the dominance of retailers over the food system is catering. Growing commercialisation of national economies increases the number of meals eaten outside the home and at present Europe lags behind America in applying high technology to the supply of such meals. Recognising this, some of the largest British food retailers have successfully moved into supplying quality sandwiches and other lunch products in their stores.

1.1.4 Market differentiation

Market differentiation has always been of great importance to food suppliers, as farmers, manufacturers, or retailers have sought to escape having their products perceived as commodities and therefore bought on price alone. Food manufacturers, often constrained by capital investment in mass manufacturing techniques, would seek to boost their product image by promotional expenditure advertising

the, often non-existent, advantages of their brands. Although the retail chains still do compete strongly to offer commodity lines at the lowest possible prices they now recognise the profit to be made from selling smaller quantities of premium priced lines which appeal to the latest consumer "fashions".

The five most important changes in the retail system can be summarised as:

1. Computer based distribution and information technology has reduced costs and allowed retailers to increasingly tailor their products to consumer tastes.
2. Consumers have increasingly rejected the standardised branded lines of the large food manufacturers in order to satisfy personal preferences - in particular for the fresh, natural foods that do not suit traditional capital intensive styles of food processing.
3. Increased foreign travel has increased consumer awareness of foreign foods so that they have become regarded as premium products.
4. Access through a few points of supply to international retail distribution channels has allowed small suppliers to enter far larger markets than would ever have been possible before.
5. To gain access to such channels small suppliers must tailor their supply to the requirements of the new distribution systems. Of particular importance is the use of bar codes on all foods together with continuity and consistency of supply.

Successful growth, niche markets in Britain have included :

- organic vegetables
- additive free foods

- luxury chilled meals
- exotic fruit and vegetables
- prepared exotic and ethnic minority foods
- in-store bakeries and delicatessens.
- fast foods

1.1.5 Technological change

Past changes

The relative market power of the different sub-sectors in the food system has been heavily influenced by technological change. Central delivery allowed distribution costs to be cut drastically as suppliers sent orders to a single central warehouse where bulk deliveries for each store could be put together. Distribution companies such as Christian Salvesen have developed such systems across Europe from Britain, through France, Belgium and Holland. Food retailing giants such as Marks & Spencer and Carrefour are similarly expanding throughout Europe. Such internationalisation has required improvements in the flow of information and led to the increasing use of EPOS and EFTPOS technology.

Point of sale technology

The current dominance of the retail sector can only be increased by such further likely changes in technology. Already some retail chains use weekly computer analysis of sales patterns to allocate shelf space for the following week in order to maximise sales. EPOS (electronic point of sale) techniques list individual items for each customer on the checkout bill and are already in widespread use. EFTPOS terminals which link this information to a customer's name and bank account number are already in use in America and are being introduced on a trial basis in northern Europe. When in widespread use they would provide retailers with an unprecedented amount of information with which to target product development and marketing campaigns. Retailers have in the past responded quickly to revealed

consumer tastes. One leading British retailer withdrew a new product only one hour after it was introduced.

Effects on suppliers

Such a rapid market response requires great flexibility by suppliers. Unhampered by the constraints of past investment in mass production lines, many small suppliers have been able to offer a more flexible response to retailers than the former market leaders and have thus gained market share at their expense (Grocer, 1986). Such small companies have, often for the first time, gained access to national and international markets through the relatively few points of entry of the big retail distribution systems. The use of bar codes on 92% of British food products, coupled with EPOS checkouts, has been used by manufacturers as well as retailers to give virtually instantaneous information on product sales, market share and the performance of competitors brands. To be successful in supplying these often short lived, more fashion conscious markets food manufacturers are having to make increasing use of computer technology to give flexibility for short runs on production and wrapping machinery.

Management controls

The most fundamental changes in management controls have inevitably occurred in the fastest changing area, marketing. Successful marketing now requires not only close liaison at the product development stage but a continuing dialogue between technologists and marketing staff at all stages of a product's life. Product development, re-development and quality maintenance is more important than ever in maintaining a successful market profile. There is a fundamental difference in perspective between a traditional food manufacturer which would perceive itself as processing a particular raw material and the more modern equivalent which would gear itself around servicing a particular market. The collection and use by manufacturers of up to date market information

has become a key management function in food companies.

Inevitably short runs and variable product life places greater stress on stock and financial control systems. Computers have been widely used by manufacturers to minimise stock levels and to continually monitor cash flow and profitability. To be effective modern food industry management must collect and respond to such information. This has created a demand for more flexible processing and packaging equipment. Such equipment is usually more expensive but reduces changeover times, for example, by using computer programs to automatically reset machine settings.

1.1.6 Industrial relations

In production management, increased flexibility requires a multi-disciplinary workforce in high value added "niche" product areas whilst in industries such as sugar and fat refining most routine work has now been automated. Thus, since some of the high value added chilled food products have substantial labour requirements, the general skill level of labour is higher and production management must increasingly rely on team work and leadership. The most progressive British food companies have therefore introduced Japanese concepts of labour relations such as regular financial briefings, company councils and quality circles. The move of large food companies in Britain to new "green-field" sites is partly motivated by a desire to escape the legacy of poor industrial relations built up over years of confrontational management styles. One of the most successful British retailers publicly claims that the quality of a producer's facilities for its employees is a major factor in determining whether it should be selected as a supplier.

Invariably successful industrial strategies have been characterised by tripartite consensus between employers, government and trades unions. Quite apart from the changes in labour relations which individual companies can introduce the government can provide a lead

to such change by providing tripartite organisations to plan and oversee the progress of any strategy.

1.1.7. Raw material control

One major characteristic of the new competition has been the progressive reduction of raw material stock levels. Although this was partly a response to the high interest rates otherwise available on capital tied up in stocks in the 1970s, it was also a recognition that high stock levels reduced a company's flexibility to respond to the market. Reduced stock levels require close cooperation with suppliers. Potential cost savings should be monitored through management account systems which allocate the cost of capital tied up in stocks to the raw material costs of particular products. In some sectors of the food industry, such as pig meat processing in Britain and Denmark, such pressures have undermined vertical integration between pig rearers and pig processors. Traditional reliance on market power based upon vertical integration and control over raw material supplies has been largely been made irrelevant by the growing importance of access to the major consumer markets. The 1980s have been characterised by the growth of retail buying cooperatives rather than by the vertically integrated food processing companies of earlier decades.

By its very nature agriculture takes longer to respond to changed consumer demand than downstream sectors of the food industry. However world agriculture is currently largely insulated from the effects on price of supply and demand trends by extensive government intervention designed to protect farmers' incomes. This leads to bizarre proposals for the disposal of unwanted food. For butter within Europe this has included using 100,000 tonnes to produce lubricating oil and paint. The Commission is currently proposing to levy a punitive tax on margarine to force consumers to eat more butter even though this is known to increase their risk of heart disease (Grocer, 1987).

There is considerable controversy over whether such price support and subsidy policies do in fact benefit working farmers in the long term (World Bank, 1986). Certainly mounting consumer opposition in Europe to the ever escalating costs of farm support may force substantial and unplanned cutbacks with severe effects for many rural communities. Two of the most successful agricultural sectors in Europe are those of Denmark and Holland where government assistance to agriculture has traditionally been channelled towards establishing marketing initiatives (Tracy, 1982). In recognition of this the British government recently established "Food from Britain" to promote better marketing through generic publicity and the development of cooperative marketing agencies.

1.2 Food sector strategies

1.2.1 Private sector strategies

The principal initiator of change in the food industry over recent years has been the retailers. For food producers there are obvious advantages in linking up, both to gain access to an enormous distribution system and to gain the advice on plant layout and product development which the best retailers will provide. Almost all the retailers now claim to be supplying premium markets where product range and quality is more important than price because these have proved to be far more profitable. Unfortunately such claims are not always based on reality and many large retailers still seek to set one supplier against another to force prices down.

To escape such pressure food processors must seek out those retailers which are more prepared to operate almost as an in-house marketing agency. Such retailers should cooperate with manufacturers over product and recipe development and give suppliers advance programmes and sales targets for new products. Of particular importance they should allow a company to keep to itself

production of a product which it has developed and not simply move it around to the lowest cost producer. Such retailers can be a continuous source of market information on product sales and quality to suppliers but they will expect suppliers to respond by continually redeveloping and upgrading their products.

There is no doubt that for every such up-market retailer there are equal numbers or more who compete almost entirely on price. However, in the more discerning market the high quality retailer should take increasing market share. Having found one any supplier would benefit from adopting the seven point policy which follows:

1. Special products - A product must be special, different and of high and consistent quality if it is to be suitable for a premium value market niche.
2. Personal concern - Retailers technologists may be hard-nosed business people but they believe, quite rightly, that the personal pride of a businessman in his product is a genuine guarantee of its quality when they are absent. Family businesses often take a personal pride in the quality of their produce - this is a selling point.
3. Financial stability - The retailers which are the best partners are often the most concerned about being accused of closing down suppliers. They know that small suppliers, who consistently fail to meet quality or sales standards can use the threat of bad publicity resulting from withdrawal of an order to embarrass their customer. To reassure the more responsible modern retailers, companies should ensure they do not become too dependent on a single outlet and seek government guarantees for investment in plant extensions and improvements.
4. Team concern - High quality production is only achieved in a cooperative work environment where quality and growth is seen as equally important for owners, management and workers. Early

involvement of trade unions and all employees in management plans to take advantage of the new opportunities in Europe is vital to their success.

5. Absolute quality - U.K. suppliers have lost vital orders through using non-approved additives or poor quality raw materials in top retailers' products. If a company is paid a premium for a quality, speciality product it is not worth trying to make a bit extra by cutting corners.
6. Cost control - The big retailers have total, computerised control over stock levels, shelf space per product, promotional costs and returns, and forward commitments on new products. Many new suppliers, less well organised in management accounting, can accidentally commit themselves to uneconomic supply contracts simply because they lack management accounting expertise or the cash flow necessary to cope with vastly increased sales. The government could help with both but company management must ensure they never invest in new equipment unless promised sales justify the expenditure required and that sales promotions do not push the sales price below marginal costs. Ultimately the demand for a quality premium product is not particularly sensitive to price changes.
7. Benefits - The best large retailers maintain the best teams of food technologists in the food industry. If a company can offer quality high margin products they will advise on factory design, hygiene, quality control and product development for free. The advice may be costly to implement it but it will allow companies to compete with anyone and the firm that gave the advice cannot use any of those factors to withdraw their order.

1.2.2 Public sector strategies

A number of local authorities in Britain have sought to develop food sector strategies designed not only to promote employment in the food sector but also to promote employees' rights, healthier eating and job opportunities for particularly disadvantaged groups. These have had various levels of success and, in terms of the number of jobs "created" Motherwell Food Park in Scotland is probably the largest.

Food and jobs in Britain

The Motherwell food park, although established in cooperation with the local regional and district councils, is not strictly typical of local authority investment in job creation since it was established primarily by the government funded Scottish Development Agency in response to an independent consultancy report on regional job creation. The park, part of a wider scheme costing \$157 m designed to attract companies to Motherwell was located around an existing processing and distribution company, Frigoscandia, which has been involved in setting up a number of such parks throughout Europe. Management sought to use this facility, good motorway communications and grant aid to attract food companies to a shared site upon which they could gain the mutual advantages of shared facilities. In its early stages there seems little doubt that relocation to Motherwell caused job losses elsewhere in Scotland. However the food park's director, Fred Millan, points out that company spending on the site has exceeded public spending and believes that the grant incentives on offer are less than those available in enterprise zones elsewhere. 50% of companies on the site are Scottish and the director believes that on site marketing companies are of particular long term benefit both in maintaining companies on the site and developing improved outlets for Scottish produce (Wiggins and Snell, 1986).

In general such food sector job creation strategies have sought to

provide;

1. Information on consumption patterns
2. Cooperative organisations to take advantages of the improved buying and marketing power such organisations can provide
3. A link into national and international distribution systems

The popularity of the food park concept derives from the increased ease with which such services can be provided on a single site.

Food and health

Internationally a number of governments in countries such as Australia and Norway have instituted national food and health programmes as the links between diet and the modern epidemics of heart disease and cancer have become more apparent. In Britain, where local government has traditionally been in the forefront of public health work, there has been no such national campaign but a number of local initiatives to promote healthier eating. Such initiatives have included education campaigns in schools and shops, the use of school and hospital purchasing power to develop healthier alternatives to processed foods from private suppliers and the provision of healthier meals and more information to local authority staff and social service recipients of publicly provided meals.

Food and employment opportunity

This concern to promote healthier eating patterns has in some cases complemented attempts by local authorities to provide jobs for those at a disadvantage in traditional job markets. By expanding job opportunities in the area of healthy eating local authorities have built upon existing skills whilst allowing women and ethnic minorities easier access to the fastest growing food processing sector in Britain.

Food marketing

Elsewhere in Europe where governments have long been involved in promoting agricultural and food industry exports there have been some notable successes. Below are listed some past successes of overseas marketing strategies:

Hungary sought to introduce a white wine into the British economy. It was too sweet and heavy for popular British tastes so within months it was replaced by a far lighter, hock type wine which was highly successful.

Denmark had minimal agricultural protection until it joined the E.E.C. and in consequence producers established marketing cooperatives, with government assistance, to seek out and develop new markets. As a consequence its largest cheese exports are now fetta cheese to the Middle East and it is leading the world in satisfying the new Japanese taste for bacon.

Holland has a variety of producer coops, for similar reasons to Denmark, and by offering a wide range of high quality salad crops has been the fastest growing source of vegetables to Britain, particularly to the big retailers. This market penetration was undoubtedly assisted by Dutch government subsidisation of energy prices, thus allowing a considerable extension of the growing season, but the Dutch government has now been fined for this by the European court.

New Zealand's government marketing board is a monopoly purchaser of apples for export allowing it to guarantee strict standards of quality and reliability of supply. This has led to its growing use by the large retailers who sell fruit at a premium and may explain why a recent study suggested that New Zealand's farmers are better paid relative to their compatriots than any other farmers worldwide (World Bank, 1986).

1.3 Summary: The international food industry in transition

The food industry should be considered as part of a wider food system stretching from agriculture through processing, wholesaling, retailing and catering to consumption, if its full importance to the national economy is to be recognised. In all developed economies the importance of agriculture has significantly declined whilst that of distribution and catering has increased. Thus, in Britain, in the first eighty years of the century agricultural employment has declined from 28.2 per cent to 10.3 per cent of total food system employment, while that in hotels and catering has risen from 9.1 per cent to 39.8 per cent.

Control of the food system initially passed largely to the food processors, but technological change in the distribution system and the invention of electronic methods of controlling sales have, over the last thirty years, given the large retailers immense market power. Such changes have however led to very significant market fragmentation and opened up new sales opportunities for small producers, particularly those able to supply high margin niche markets. These include: organic vegetables, additive free foods, luxury chilled meals, exotic fruit and vegetables, prepared exotic and ethnic minority foods and delicatessen and fast foods.

Such niche markets are both profitable and expanding rapidly in those countries where multiple retailing is most highly developed. Computer based distribution and information technology has so reduced distribution costs that its widespread introduction seems inevitable. Such systems can simply be used to impose consumption patterns on customers but, in a competitive market, have allowed retailers to increasingly tailor their products to consumer tastes. Fresh, natural and exotic products, rather than highly processed ones, have proved most acceptable for niche, demand orientated marketing.

The increased power of the large retailers has given smaller

producers easier access to national and international markets but has required the adoption of more flexible production equipment, better financial controls, lower stock and raw material levels and improved industrial relations. By seeking out quality rather than cost conscious retail chains producers can gain access to sources of advice on quality, plant design and markets.

Successful food marketing strategies by other countries have been firmly market led. In more recent years, these have been complemented in Britain by local authority involvement in promoting jobs and healthier eating habits - a concern which has itself produced one of the fastest growing new markets. Food sector job creation strategies invariably involve the provision of information on consumption patterns, support for cooperative buying and marketing organisations and the provision of links with the major distribution systems. In all such strategies the state has had a fundamental role in guaranteeing or promoting quality but has increasingly sought to use the food system to promote healthier eating habits and jobs for those at a disadvantage in existing job markets.

PATTERNS OF DEMAND**2.1 Introduction**

Exports by the Cyprus food industry under Standard International Trade Classification (S.I.T.C.) Section 0, which covers most food products, went overwhelmingly to Western Europe and the Middle East. Percentage food exports by region for 1985 were: E.E.C., 61.1; E.F.T.A., 4.3; Eastern Europe, 5.9; Middle East, 26.0; Other Europe, 0.1; North America, 0.1; Africa 0.0; Asia 0.1; Australia, 0.1. A detailed breakdown of food exports is given in Table 2. Since Western Europe and the Middle East therefore take over 90% of Cyprus food exports this survey of patterns of demand will concentrate on those two markets.

Patterns of demand for the centrally planned economies of Eastern Europe are obviously influenced by central policy decisions. The Gorbachov inspired campaign to reduce alcohol consumption in Russia has thus sharply reduced Cypriot wine exports to Russia. As Eastern European markets become more consumer orientated they are likely to follow the trends already set by Western Europe.

The potentially large markets of America and Australia both have retail markets which are unconcentrated compared with some of those in Western Europe. This is partly due to the distribution distances involved in each country and also, for America, a result of past anti-trust legislation.

For each of the regions studied this survey will first consider the overall structure of the retail market and then the consumption trends for those food products of most importance to Cyprus. Unless stated otherwise all values given in pounds (£) represent Cyprus pounds, and all values given in dollars (\$) represent U.S. dollars.

2.2 Western Europe

Distribution structure

The general changes which have occurred in European distribution have been described above. However, the extent of such changes varies from country to country so this description will first study the food market structure in the six biggest importers of Cypriot foods and then note briefly some of the interesting features of other West European markets.

The biggest West European importer of Cypriot foods, Britain, also has probably the most highly developed retail market. The multiple retail stores have built up such a dominant market share that the British government has twice launched investigations into the possible abuse of that market power in response to complaints from food manufacturers. On both occasions, it has cleared the big retailers of charges that they were forcing suppliers to supply at a loss, noting that many sectors of British food manufacturing were far more concentrated than the retail sector. They did however point out that the top 4 multiple retailers now control 40.7% of the total grocery market (Office of Fair Trading, 1985). Local market concentration can be even higher and just two companies control 59% of London's packaged grocery market (London Food Commission, 1985). Sainsbury's marketing director, Mike Connolly, recently commented "If they [food manufacturers] want to launch a new product in the London TV area, they have no chance unless they persuade supermarkets to take it" (Financial Times, 1987).

Although there is some variation between the various retailers the description which follows is a composite description of the operations of the most profitable existing retail multiples. For each major product line the successful multiple will stock its own label products plus the top one to three independent brand names depending on the size of the individual store. The retailer's own label products will be produced by a variety of small manufacturers

who will have worked closely with the retailer in developing the recipes and who will be regularly visited by the retailer's food technologists who will set and monitor quality control standards. All suppliers, either of branded or own label products, will deliver their products to about ten warehouses throughout Britain. The retailer will then make up composite loads from a variety of manufacturers for each store thus allowing deliveries to be made in bulk. Final orders from each store are compiled and sent to suppliers as little as one day before delivery and, if sales fall below pre-set levels, the multiples stop stocking particular lines.

The reductions in distribution costs and improved market information available to multiple outlet retailers who employ the above methods are so considerable that their dominance of Europe's food markets can only grow. However in France, the second largest European food market in Western Europe, the independent shopkeeper still has the bulk of retail sales and makes extensive use of wholesalers and buying organisations to compete with the large retail multiples. It would appear that the French retail multiples have been slow to appreciate the potential savings of direct bulk purchasing from manufacturers. Even Carrefour, which now has hypermarket outlets in a number of Western European countries including Austria, Italy and Spain, left buying decisions to store managers for many years (British Overseas Trade Board, 1983). Only recently have Carrefour, Euromarche and SASM started to establish centralised grocery product delivery (Henderson-Crosthwaite, 1985). It seems clear though that in future these major chains will control access to the market just as they do in Britain.

In contrast, Italy has maintained a highly fragmented market, partly as a result of 1930s legislation which controlled the growth of retail multiples and partly due to the strong political lobby of small shopkeepers. As a result Italy still has 993,000 retail stores - 1 for every 57 customers. Cooperative buying agencies are widely established and access to the market is through agents and distributors who may be cooperatively based.

Collective purchasing by independents similarly dominates the West German market where it supplies 25% of total retail trade. However, in spite of the constraints imposed by Germany's federal structure, multiple superstores and discount stores are currently increasing market share at the expense of department and cash and carry stores.

Austria's food markets are dominated by consumer coops which have 20% of total sales compared with only 14% for the three largest retailers combined. Even though the largest coop has 11% of total retail trade, buying is reportedly still relatively unconcentrated with wholesalers supplying big and small customers alike.

Although Greek retailing has radically changed in recent years, it is still unsophisticated by northern European standards. There has been a growth in the number of supermarkets and multiple retailers with the largest chain in 1983 supplying 23 outlets. However, at that time, all retailers solely stocked manufacturers brands and purchased through agents. As in Cyprus foreign brands have status value. The government is seeking to organise smaller stores into buying coops.

In view of the growing internationalism of large retail multiples such as Marks & Spencer and Carrefour the Greek government initiative to promote cooperatives may be a sensible way in which to retain national control over food outlets in a country where the retail sector is currently undeveloped. In Finland, a relatively undeveloped country within Europe, 6 cooperative and private central purchasing organisations supply 90% of the provisions trade. They are not normally prepared to promote imported goods until consumer acceptance has been demonstrated by the agent or importer. Since the remaining 10% of trade consists principally of confectionery and health food stores, this form of market organisation forms an effective barrier to new competitive imports (British Overseas Trade Board, 1983).

Consumption trends

In 1985 the U.K. bought from Cyprus over £20,000 worth each of meat products, yoghurt, kachkaval, halloumi and other cheeses, locust bean seeds, bulk grape, orange and grapefruit juice, provisionally prepared fruits, grapefruit segments, roasted coffee, chocolate confectionery, hummus, grape must, beer, bottled and bulk wine, brandy and ouzo (Import/Export Statistics, 1986). Such sales values were only occasionally matched by other Western European countries such as the Netherlands (for ground locust beans and bulk orange and grapefruit juice), Italy (for ground locust beans and prepared grapes), Greece (for prepared grapes and canned vegetables), West Germany (for bulk grapefruit juice) and France and Spain (for prepared grapes). However it is likely that any product successful in one European market has the potential to be successful in others. This survey will therefore first analyse consumption trends throughout Europe for all food subsectors before studying in more depth markets for those products of particular importance to Cyprus. Table 3 lists the major demographic and economic indicators for the major Western European economies while Table 4 indicates per capita consumption and consumption growth figures for a range of food products throughout Western Europe. Headings listed in bold type indicate major food sector groupings.

As a general rule consumption of high protein foods from animal sources increases in those countries with higher per capita national income. There is however considerable variation between countries in whether the favoured source is meat or dairy products. There is also some evidence that fresh fruit and vegetable consumption is highest in southern European countries. Since dietitians constantly urge north Europeans to eat more fruit and vegetables this perhaps does justify the claimed health benefits of the Mediterranean style diet which is becoming increasingly popular throughout Europe. Per capita consumption is increasing for all the countries surveyed for cheese, biscuits, and frozen foods. Sales of health foods were only surveyed in two countries (U.K. and West Germany) but in both were

increasing dramatically.

There is a strong difference between products which enter the international food trade and those which are almost inevitably produced and traded within the domestic economy. Thus although concentrated orange juice is an internationally traded commodity the relative cost of transport for prepared orange juice is so high that very little is traded internationally. Not surprisingly, the main Cyprus exports are in the former category.

The general trend towards increased cheese consumption should offer opportunities for growth but many yoghurts and soft cheeses can be readily copied in the major importing countries. Developing and maintaining brand and quality advantages is probably the best way of defending and expanding a market niche.

Bulk juices are a commodity item and are therefore subject to the wide fluctuations in prices which characterise such markets. Past crop damage in Florida did slightly raise prices. However consumer demand is price sensitive since squash and carbonated drinks can be substituted for juices. Brazil is known to be greatly increasing its citrus production so prices are expected to decline in the future. In general fruit juice consumption is rising throughout Europe but the relative popularity of different fruit juices is changing as Table 5 demonstrates.

Although Cyprus only ranked as 48th in world production of fruit juices it was the third largest supplier to the U.K. in 1981. U.K. per capita consumption of 6.0 litres in 1984 lags well behind countries such as Switzerland (22.7 litres) or the U.S.A. (24 litres) and is rising. By establishing a consistent quality image Israeli (Jaffa) orange juice has been able to develop a premium market and sell at a higher price than other orange juices in some leading U.K. retail stores. Growing concern in the U.K. about additives is likely to encourage a trend from "drink" to juice consumption. U.K. juice sales in 1983 were 61% orange, 12%

grapefruit, 8% apple, 8% pineapple, 7% tomato and 4% blended. Orange and apple juice consumption were rising at the expense of grapefruit and pineapple (Jordans, 1984).

Coffee consumption in Britain, already by far the lowest in Europe, is falling, but as coffee drinkers become better educated this may allow Cyprus coffee to reach a wider market than Cypriot expatriates.

As the popularity of hummus increases in importing countries domestic production is likely to be substituted for imports.

Sales of carobs to western Europe are highly dependent on the continued growth of health food sales. As these leave the specialist stores and are increasingly stocked by major retailers there is no reason why the spectacular growth of health food sales noted in Table 4 should not continue.

The EEC wine lake now contains 15 billion litres (Times, 1987) and Commission plans to eliminate surpluses could affect sales of prepared grapes, grapemust and wines to Europe.

Sales of canned vegetables to Greece reflect in part the inadequate nature of frozen food distribution there and would be affected by any increase in freezer ownership.

Throughout Western Europe the retailing revolution will place increasing demands upon suppliers to fit in with new technology. In particular the use of bar codes is essential to the operation of EPOS and EFTPOS systems. Already in the U.K. 92% of foods are labelled with bar codes and at least one retailer refuses to stock products which are not labelled with such codes. Although insulated markets such as Finland (26% bar coded) have been able to ignore such changes this luxury is not available to producers seeking to sell into West European markets. The use of bar codes on packaged foods in the major European Community economies varies from about

70% (France) to 90% (Netherlands) (Business International Research Report, 1984).

2.3 Middle East

Distribution structure

The retail markets of Western Europe are probably the most developed in the world. The distribution savings and improved market information provided by the retailing systems described above probably make them a model which other areas of the world, including the Middle East, will eventually seek to follow. At present, although the Middle East has long been an international trading centre, its retail markets are relatively undeveloped and there is little published information on them. This description will first give a brief overview of the Middle Eastern food products market. It will then analyse retailing in the four biggest markets for Cyprus in the Middle East - Saudi Arabia, Lebanon, Kuwait and Jordan.

The relative size of the Middle Eastern import markets is shown by Table 6. When the figures were compiled all the local currencies were pegged to the \$US or S.D.R.s and were relatively stable except in Iran, Iraq and Lebanon where internal instability and black market currency dealings forced down the value.

Saudi Arabia has three main population areas and, since internal transport links were poor, exporters to Saudi Arabia traditionally had to deal with separate traders in each area. Sales are principally made through small shops, although some supermarkets have now been opened, particularly in those areas most frequented by European workers.

Lebanon traditionally was a major Middle Eastern food producer with the Bekka Valley a centre for fruit and vegetable growing and dairy

farming. Continued internal fighting has halted agricultural development so production has remained constant since 1970. It has also closed the supermarket outlets in the major cities.

Kuwait is a major market in its own right as well as being a substantial re-exporter to the large markets of Iraq and Saudi Arabia. This leads to intense competition for the Kuwait market whose traders have long held a pivotal position in Middle East trade. In spite of this there is no real distribution infrastructure and although city centres have supermarkets these are operated by individual traders. In 1973 there were 11,300 retail outlets employing an average of 3.1 people. Reported price mark-ups of only 5-10% on basic food items indicate a price sensitive and competitive market.

Jordan offers the food exporter three distinct markets. Like Kuwait it is a major re-exporter to Iraq. The domestic market is split between high quality goods for government controlled outlets and cheaper ones for supply to smaller shopkeepers. For this latter market, many traders act as importers and retailers although the smaller ones may use commission agents to obtain supplies (Euromonitor, 1984).

Consumption trends

Sales of over £20,000 of particular food products to Middle East markets are listed in Table 7.

For Western Europe Cyprus is most often a supplier of raw materials and commodity goods. For the Middle East it is principally a supplier of Western style processed goods - a position under threat from the growing food processing capacity of Middle Eastern countries.

There is still considerable variation in the consumption of different foods in the various Middle East markets as shown by Table

8. The figures are far from complete and present no real discernable patterns of demand. This is probably due in part to the considerable number of expatriate workers, both European and Asian, in many Middle East countries. The following analysis of trends will therefore be restricted to the four major trading partners. The section will end with a particular study of the most important export products to the Middle East.

The biggest customer, Saudi Arabia, has an indigenous population of 10 million, an expatriate population of 1.5 to 2 million, and up to 1.5 million pilgrims performing the haj in Mecca every year. It has invested in substantial food processing capacity and is now able to produce tomato paste, fruit juices, canned vegetables and beans, jam, liquid milk, macaroni, rice bags, yoghurt, butter, cake, bread, sweets, biscuits, dates and mineral waters. Sales of carbonated drinks increased by 25% a year in the early 1980s and by 1982 it was planned to have 9 soft drink factories in operation. The subsidisation of agriculture has substantially increased production of wheat, dairy foods and poultry but 90% of all foods are still imported. As shown in Table 9 food imports have continued to grow.

With oil reserves to last 50 years, and a G.D.P. per head of \$16,650 the Saudi market is one worth keeping.

Lebanon has a population of just 2.7 million, a G.D.P. per head of \$1,552 and food prices rose 63 times from 1966 to 1981. However the civil war which has produced such disastrous economic indicators has also substantially decreased Lebanon's self-sufficiency in food. Areas of particular growth in food imports are shown in Table 10.

The Kuwaiti economy relies on migrant labour even more than Saudi Arabia and only 40% of the population are indigenous. In spite of this the government supported Industrial Bank has chosen to use its proximity to the large Iraqi and Saudi markets to attempt to build up a food processing industry which in 1981 consisted of 367

businesses. In spite of this flour milling and fishing were reported to be the only substantial food processing industries. Kuwait has an average G.D.P. per head of \$16,546.

By contrast Jordan is far poorer with a GDP per head of only \$1,546 and in consequence over 300,000 Jordanians work in the Gulf countries. The dependence of the economy on their remittances, on grants from other Arab countries and on a substantial re-export trade make it very vulnerable to any downturn in other Arab economies. Government plans to increase food exports to reduce dependence on phosphates as the major export should be helped by a substantial Jordan river irrigation scheme. However in 1981 and 1982 minor droughts actually reduced food production leading to a substantial increase in the food imports on which Jordan relies for two thirds of its food requirements (Table 11).

Whatever the threat posed to Cypriot exports by increased import substitution in Middle Eastern markets there can be no question that the infant food processing industries will have initial learning difficulties. The presence of Cyprus in relatively sophisticated product markets such as specialist cheeses, confectionery and dessert mixes should therefore give it a degree of protection against what may initially be simple and non-quality products from the infant industries. Experience in the Cyprus market suggests that in the long term, presence in the market can only be enhanced by the maintenance of product quality and brand image.

2.4 Summary: Patterns of demand

65.5 per cent of Cypriot food exports are to Western Europe and 25 per cent to the Middle East. Distribution structures vary throughout Europe although all show a trend towards large multiple outlets. This trend has proceeded furthest in Britain, where 4 multiple retailers control 40.7 per cent of the total grocery market, whilst just two companies control 59 per cent of London's

packaged grocery market. Two companies, Marks and Spencer of the U.K. and Carrefour of France, have started to develop overseas food outlets. Southern European countries such as Greece, Italy and Spain, have been relatively untouched by these changes. In others, such as Finland, small retailers have combined in cooperative central purchasing organisations, to gain similar cost savings.

Sales of Cypriot food to Britain are over two-thirds of total sales to Western Europe. Two marked features of the British market are the high growth of wine consumption (up 29.1 per cent from 1980 to 1984) and of health foods (up 138.5 per cent). Considerable variations in food consumption patterns do still exist across Europe with, in general, higher consumption of protein foods in those countries with higher per capita income and higher consumption of fruit and vegetables in southern European countries.

Middle Eastern distribution is still largely controlled by relatively small traditional traders. Two thirds of Cypriot Middle East food exports are to Saudi Arabia, Lebanon, Kuwait and Jordan. In general, these exports are of highly processed foods compared with food exports to Europe. However they are threatened by the growing Middle East processing industry, by the potential volatility of the migrant population in countries such as Kuwait, and by the political instability of the Lebanon and Jordan.

THE FOOD INDUSTRY IN CYPRUS

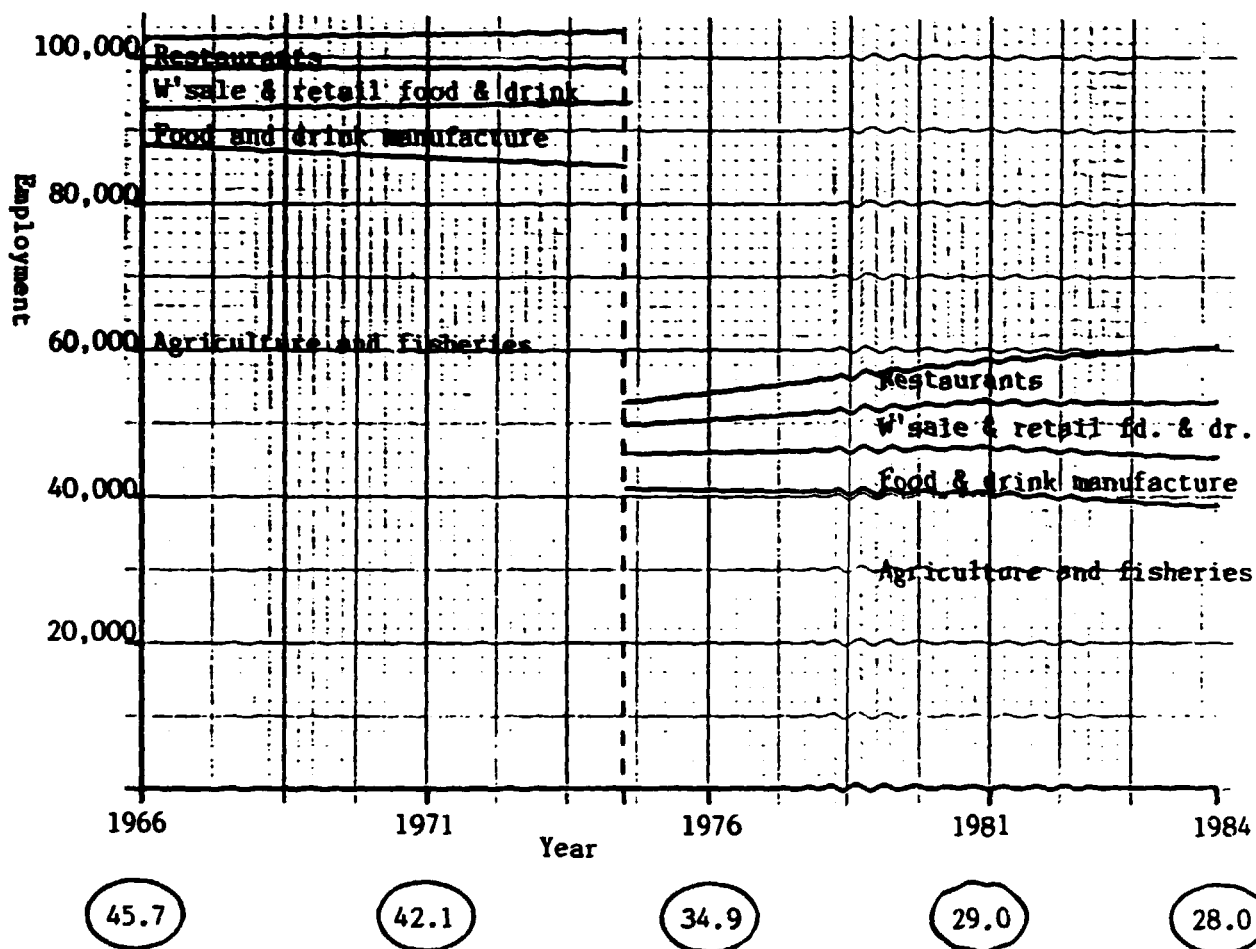
3.1 Introduction

The food, beverage and tobacco sector is the largest manufacturing sector in the Cyprus economy producing 26.6% of gross output, 27.7% of value added and 17.4% of employment in manufacturing in 1985.

Agricultural employment has declined in Cyprus over the last twenty years although, as Table 12 indicates agriculture still accounts for over 50% of food sector employment. The principal differences between the food system in Cyprus and those of more industrialised European countries lies in the high relative importance of agriculture and the continued high levels of in-house food preparation by the hotel industry.

Since the total number employed in producing the Cyprus gross national product is 216,296, food sector employment represents 28.1% of that total. Some indication of how food sector employment in Cyprus has changed is given by Figure 2. This figure is not immediately comparable with Figure 1, which gives total employment in the hotel and restaurant industries in Britain, but when those figures are recalculated on the basis used in Figure 2 it is possible to compare the food system employment breakdown in Britain and Cyprus. Employment in Cypriot agriculture, at 63.8 per cent of total food system employment in 1984, is far higher than Britain's 13.1 per cent (1981) and as a result all other sub-sectors of the food system are of far less relative importance. Thus food distribution (11.8 per cent compared with 35.6 per cent), food manufacture (11.4 per cent compared with 24.8 per cent) and catering (12.9 per cent compared with 27.2 per cent) are all relatively less important to overall food sector employment than in Britain.

Figure 2: The changing nature of food sector employment in Cyprus



Notes

○ - Percentage of those gainfully employed in producing the gross domestic product who were employed in the food system. Employment in agriculture & fisheries taken as 90% of total employment in agriculture, fisheries and forestry.

Employment in food & beverage manufacture taken as 93.7% of those in food, beverage & tobacco post-1974 and 18.9% of the manufacturing total pre-1974.

Food employment in wholesaling & retailing taken as 25.3% of total.

Restaurant employment taken as 50.1% total in restaurants & hotels post-1974 and 12.8% of service sector pre-1974.

All percentages derived from calculations for Table 13.

Source: Statistical Abstracts, 1976 & 1984.

Although the events of 1974 led to a reduction in employment in all sub-sectors of the food system the continuing overall decline in the percentage of the workforce employed in the food system was entirely due to the decline of employment in agriculture. Employment in food and beverage manufacture, wholesaling, retailing and particularly catering grew steadily and by 1984 exceeded pre-1974 levels.

The food system has traditionally been a prime target for government intervention directed towards alleviating the worse effects of the decline of the agricultural sector as an economy develops. Two further factors of importance to the food processing sector are the local availability of raw materials and the perishability of its products. It is often cheaper to transport processed or semi-processed agricultural products so a product such as concentrated orange juice is typically produced near to its raw materials. Other food products, such as bakery products, which perish quickly, are almost entirely produced near to the market. It is therefore essential when trying to develop a food manufacturing sector strategy to consider each sub-sector separately before developing a composite picture.

Overall those sectors which process Cypriot raw materials such as citrus fruit and grapes, export to sophisticated and developed markets in northern Europe, while those which produce more highly processed and higher value added products, such as confectionery, export to Middle East markets.

3.2 Raw materials

The quality and availability of raw materials is vital to the food processing and beverage sectors. This is particularly so when some of the largest subsectors and most important export industries are dependent on local agriculture.

Britain's agriculture minister recently remarked that at current world prices all Britain's agriculture would be uncompetitive

(Gummer, 1987). Whilst this may be an overstatement there is no doubt that in Britain, as in Cyprus, some degree of agricultural support is necessary to promote planned adjustment of the rural economy and reduce reliance on food imports. However, since such support must be a burden on other sectors of the economy it is the duty of government to ensure that it is paid in such a way as to encourage modernisation and increase agricultural competitiveness. One wine producer commented that the wine industry could compete with any if it could obtain its supplies of grapes from the same consolidated efficient grape producers as exist in other parts of Europe. He further argued that payment of standardised prices discouraged quality raw material production. Clearly grape support policies could be modified to promote both such changes. Strategic planning of agricultural support can promote desirable change.

Such is the complexity of current agricultural support that it is not within the scope of this study to analyse by subsector how Cypriot raw material prices compare with world prices. For this report the competitiveness of processing subsectors will be assessed on the assumption that they pay world prices for their raw materials.

Perhaps the most comprehensive recent review of agricultural support around the world was that given by the World Bank (1986). Whilst noting considerable variation between individual countries it said that generally agriculture has been supported in the industrialised temperate zones and taxed within the undeveloped tropical regions of the world in order to subsidise industrial development. Such subsidisation and taxation has inevitably encouraged research and development in temperate crop production and discouraged such investment in non-temperate crops. For Cyprus, the production of tropical crops will become increasingly possible as greater use is made of flexible polymer sheeting techniques and as genetic engineering increases the temperature range tolerated by tropical crops. In the section of this report which covers the potential of knowledge-based industries, the scope for expanding Cypriot

biotechnology is noted. Any expansion of either biotechnological crop research or of irrigated land use should, on the basis of the evidence above, be directed towards non-temperate crops.

There seems to be no strategic plan on how best to utilise the 40 per cent increase which will occur in the irrigated land over the next five years as a result of new irrigation schemes. It is therefore difficult to predict the likely effect of this on processed food output but it seems probable that it will substantially increase the output of fruit and vegetable products.

Government intervention affected raw material supplies in every food sub-sector yet in some cases appeared to work against the long term interests of either Cypriot agriculture or its processing industry. Thus price support for milk was claimed to exacerbate the seasonality of supply and aggravate shortages of sheep milk. Meat products were being designed to make the fullest possible use of imported beef - paradoxically a cheap source of meat relative to the artificially expensive, locally supplied pork.

Other government intervention however clearly benefitted food processors. Such intervention included a wide range of tariff barriers or bans on competitive processed food imports as well as the subsidisation of raw materials such as grain.

3.3 The relative importance of different processing sub-sectors

The various sub-sectors of the food processing industry differ so greatly that it is difficult to generalise about the sector's prospects. This report therefore seeks to detail features common to several sub-sectors in the remainder of this section whilst reserving detailed consideration of each S.L.T.C. sub-sector for the Appendix at the end of the report. In reading either analysis it is essential to develop some perspective on the relative importance of the different sub-sectors.

One such measure is the value of each S.I.T.C. sub-sector's output. Four subsectors contributed more than 10% of the total value of the sector sales in 1985; dairy products (10.7 per cent of total sales value), cereals and cereal preparations (18.3 per cent), beverages (23.2 per cent) and tobacco goods (16.2 per cent). The potential for import substitution is limited by the climatic requirements of food raw materials whilst its economic cost can be considerable in world markets awash with subsidised foods. However the relative importance of a subsector's exports is considerable indicating both its competitiveness internationally and its potential to expand markets for domestic agricultural output. In this, three S.I.T.C. sub-sectors contributed more than 10 per cent of the total value of sector export sales in 1985; dried fruit, preserved fruit and vegetables, juices and carobs (18.8 per cent of total export sales value), beverages (31.5 per cent) and tobacco products (28.0 per cent).

The full government statistics for food sector production, imports and exports are summarised in Tables 13 and 14. More detailed analysis of the original data reveals the overwhelming importance of vine products to total food sector exports. The total export value of preserved fruit and of beverages derived from grapes was, in 1985, equivalent to 41.5 per cent of total processed food beverage and tobacco exports.

The sections which follow are based upon government statistics for production, imports and exports (Tables 13 and 14), for employment (Tables 15 and 16) and for costs (Tables 17 and 18) as well as interviews with leading companies in many of the sectors.

3.4 Company performance

Productivity

Firms employing more than 50 people in the food, beverage and tobacco sectors account for 70 per cent of value added yet account

for just 51 per cent of total employment. The value added per employee is marginally greater in firms employing over fifty people in either food or beverages or tobacco. However the apparently large improvement in labour productivity in larger firms overall is almost entirely explained by the domination of the beverage and tobacco sub-sectors by large firms. Taken together these two subsectors employ 30 per cent of total employment, over 90 per cent of which are in firms of more than 50 workers, yet produce 54 per cent of total sector value added. Within each sub-sector the increase in value added per employee increases far more slowly with firm size and is principally governed by the type of markets supplied (Industrial Statistics, 1985).

Capital investment

In several sectors such as meat processing and tetra-pak juice production high local competition, tariff barriers to competitive imports and generous tax allowances for capital investment had led to high investment in currently underutilised equipment. In others, such as the dairy industry and in bread baking, equipment was dated compared with European equivalent equipment but was appropriate to the volume of Cypriot raw material supplies (for the former) or of its market (for the latter). Of more importance to the modernisation of the industry was the poor quality of processing buildings in all the sectors visited. This was particularly worrying in the meat and dairy industries since these are most frequently implicated as sources of food poisoning.

Ratio analysis

Company accounts were obtained for a limited number of food sector companies and approximate estimates of the number of employees were gathered in interviews with company management. Stock turnover, sales per employee, capital employed per employee and asset utilisation are shown in Table 19. Of these ratios, the first shows the level of stock control, the second is an indication of labour

productivity, the third indicates investment levels whilst the last demonstrates the degree of capital utilisation. For each sub-sector Cypriot companies are shown first, followed by a comparable, random cross section of British companies. Inevitably the use of such ratios is limited by the amount and accuracy of the original information, and by the difficulty of finding similarly structured companies to compare. In spite of such limitations the figures do strikingly illustrate some of the observations made during site visits.

Thus Company A was in many ways comparable with its closest equivalent in Britain, the small east London bread, pastry and confectionary bakery of Percy Ingles yet had far lower stock turnover. This low stock turnover could be partly due to longer delivery times for raw materials. However the apparently comparable figures for sales per employee mask the fact that Percy Ingles run a large number of shops and might therefore be expected to have lower sales per employee if both companies were equally efficient. Company D is a good example of the high levels of capital investment found in Cypriot meat processing factories, having a level of capital investment per employee well in excess of similarly sized British meat processing companies and comparable with the largest. Company K, which had appeared during the site visit to be fully abreast of the latest technological and management techniques, was able to deliver ratios which equalled or bettered equivalent British manufacturers - a remarkable feat in the comparatively limited Cypriot market. Company T, which, since it produced mainly wine was not really comparable with British breweries, gave similar ratios of capital employed per employee to the craft based breweries rather than to their modern high tech equivalents.

3.5 Market research and product development

Product development changes noted during factory visits were derived from two sources. Either they followed overseas technical developments, as with the introduction of juice and yoghurt in Tetra

Paks, or they were developed as import substitutes, as was the case for Edam cheese.

The Higher Technical Institute had studied the need for a course in food technology in Cyprus but had decided that there would be insufficient demand for such a course to justify setting it up. As a consequence firms relied almost entirely upon the overseas training of either their owners or close relatives or senior employees to provide in-house development expertise. Such expertise must become dated. One recent entrant to the meat processing industry was a chicken breeder who claimed he had been forced to process his own meat because of traditional prejudice amongst existing producers against incorporating chicken meat in their products - a widespread practise elsewhere in Europe.

Foreign companies had affected the industry in a number of ways but the only direct licensing arrangements studied were with the two biggest soft drink multinationals who provided a range of back-up technical, training and marketing advice to their Cypriot licensees. Similar arrangements existed in the alcoholic beverages and tobacco sub-sectors. In addition recent plant installations for yoghurt and "tetra-pak" production had been supplied by foreign companies on a design and build basis. At a more basic level overseas ingredient suppliers had been used to assist in recipe development whilst overseas "own-label" customers of Cypriot canned fruit supplied ready printed labels which were of far higher quality than those designed by the producers themselves. In order to keep abreast of modern developments most large company owners made regular trips to overseas trade fairs and some had hired foreign consultants to improve their product range.

Overall, product development appeared to follow technical change elsewhere in Europe rather than to be market led. Even though food consumption, whilst on holidays abroad, has widened the range of foods eaten by northern Europeans, only one company was found which targetted holiday-makers with tastings and promotions.

3.6 Distribution structure

By European standards the food retail market in Cyprus is relatively traditional. Although supermarkets are increasingly taking the place of smaller retail outlets, particularly in towns, they are often single outlet family owned stores. They are therefore unable to wield the purchasing power or make such full use of new technology as do the multiples of northern Europe. As a result most appear to rely almost entirely on the expensive sales van delivery systems which are now used increasingly rarely by large British multiple retailers. Most suppliers appear to operate on a sale or return basis and claim to control stock levels in stores themselves. According to one supplier salesmen could even switch produce from a store with low turnover to one with higher turnover to avoid exceeding the sell-by date. To service such outlets most manufacturers maintain a team of salesmen and delivery vans, a number of which give national coverage. A similar system is maintained by a number of food import agents.

The use of EPOS techniques was noted at Nicosia airport and such techniques were also reportedly used in one retail outlet. However there appears to be no retail own label food production. When competitive food imports are permitted, as for biscuits, they are subject to high import duties and thus sell at a considerable premium. Continued heavy sales of such items therefore seem to indicate that consumers are prepared to pay for perceived quality advantages.

A principal reason for the expansion in the range of foods eaten by north Europeans has been the growing exposure to foods from other culinary traditions during holidays abroad. Even without such trends the growth of the hotel industry has made the tourist hotel market an increasingly important one to the Cyprus food industry. In spite of this importance there appeared to be no formal coordination between the food and hotel sectors to assess the needs of the tourist industry and supply them from local producers. Such

coordination could be used both to maximise local supplies to the tourist trade and to introduce new products to overseas visitors.

3.7 Consumption trends

In 1984 total Cyprus expenditure on food, beverages and tobacco was £284.8 million, of which 17.3% was imported. The F.O.B. (free on board) value of exports of food, live animals for food, beverages and tobacco was £112.0 million - 33.3 per cent of total exports (Economic Report, 1984). Thus, even though food and drink exports may be a significant share of total exports, they are only 39.3% of the value of the domestic market which is therefore of central importance to the food processing industry.

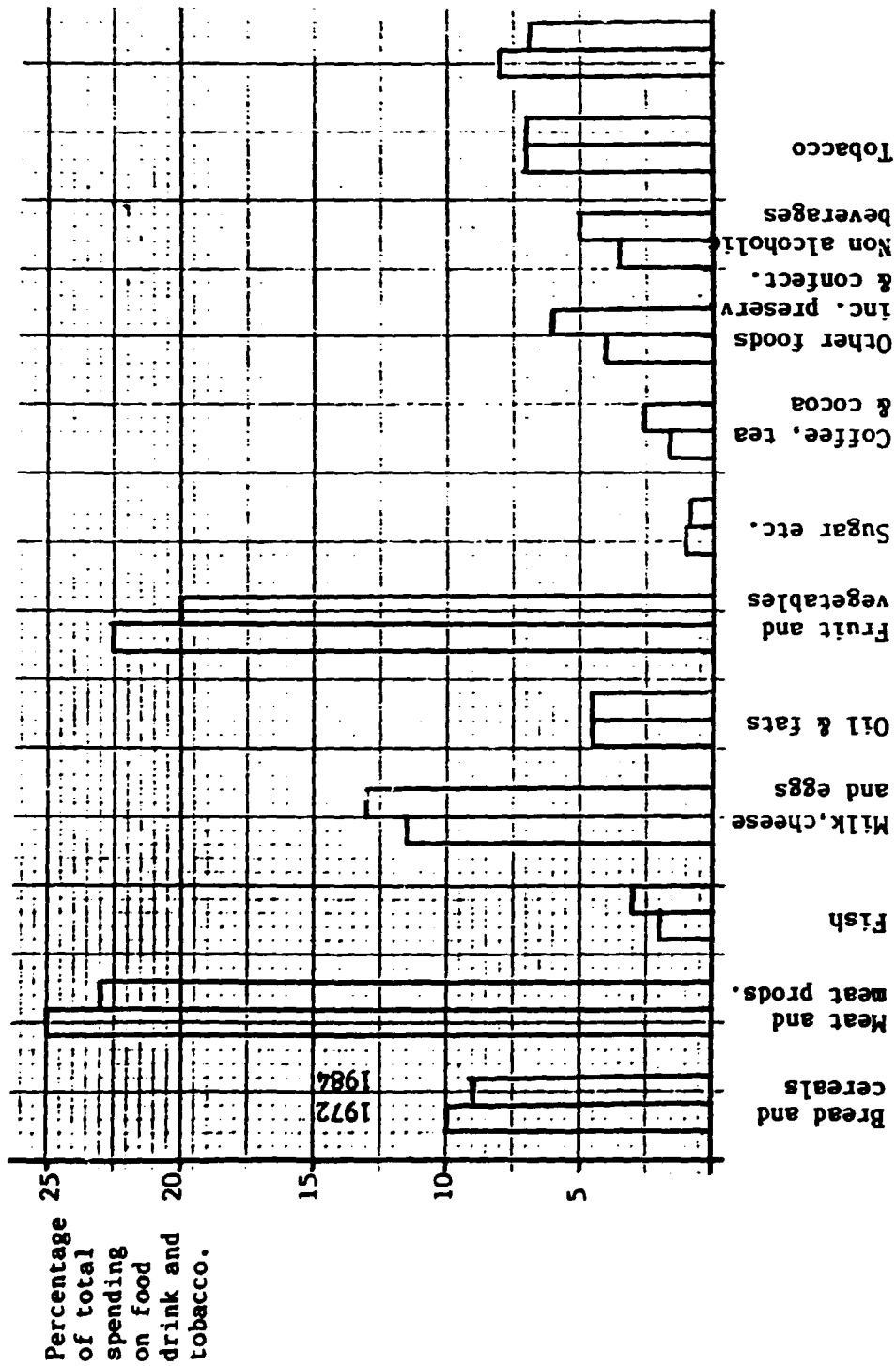
As has generally occurred in industrialised countries real spending on food has increased although its share of total expenditure has declined. Thus at 1981 prices total expenditure on food, beverages and tobacco has risen from £93.5 million in 1972 to £259.6 million in 1984. However as a share of total consumers spending this represents a decline from 36.5% to 26.3% (Economic Report, 1972 & 1984).

The changing pattern of such spending is shown in Figure 3. Current patterns of consumption are demonstrated in Figure 4. A more detailed breakdown is given in Table 20.

Figure 3 demonstrates that relative spending on fish, all non-alcoholic beverages (including tea, coffee etc.) and other foods (which includes confectionery) has increased considerably. Relative spending on bread and cereals, meat, and fruit and vegetables decreased slightly whilst for sugar it decreased dramatically. Processed foods have therefore taken an increased share of consumer spending on food and drink.

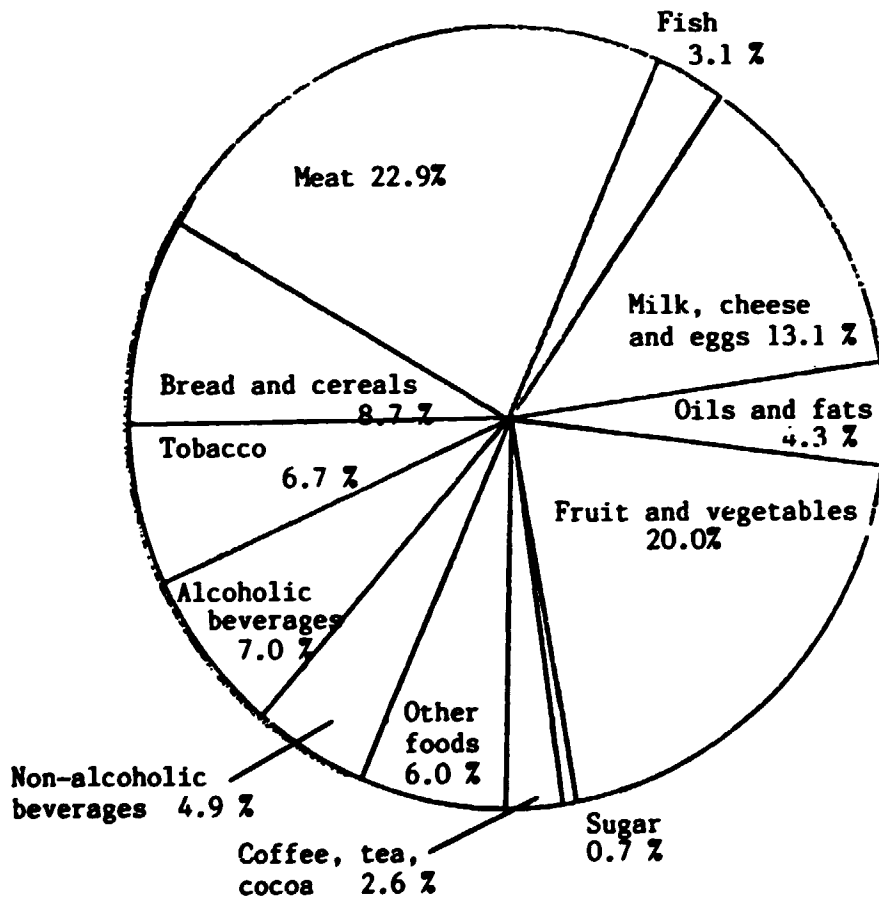
Without a detailed analysis of changes in real prices of the various sub-sectors it is not possible to make detailed projections of

Figure 3. The changing breakdown of consumer spending on food, drink and tobacco, 1972 and 1984.



Source: Economic Report, 1974 & 1986

Figure 4. - The percentage breakdown of consumption of foods, beverages and tobacco, 1984



Source; Economic report, 1986

likely future changes in demand for foods. However a better guide to trends in food consumption can be gained from Table 20. The urban population in Cyprus has access to a wider range of processed foods but less access to home produced foods than its rural counterpart. It is also younger so the differences between rural and urban consumption patterns can sensibly be taken as an indication of future patterns of demand for the food processing industry. On this basis fastest future growth is likely to occur in the consumption of breakfast cereals, pizzas, beef, lountza and other hams, hamburgers, canned fruit and vegetables, tomato sauces, confectionery (pastry and other types), ice-cream, whisky, instant coffee and baking powder. The fastest areas of decline are in the consumption of pigeon and game, olives, black eye beans and salt. Growing urbanisation is also likely to lead to increased eating and drinking outside the home since urban households typically spend 51.8% more on this than their rural counterparts.

3.8 Summary - The food industry in Cyprus

The food, beverage and tobacco sector is the largest manufacturing sector of the Cyprus economy producing 26.6% of gross output, 27.7 per cent of value added and 17.4 per cent of employment. Although agriculture and fishing employs more than any other food system sector (63.8 per cent of the total), employment in it has declined steadily whilst employment has grown in all other sub-sectors since independence. The two fundamental factors which affect where processed foods are produced are the source of raw materials and the keeping qualities of the product.

Relatively minor changes in current government support policies could in some cases be of great help to the food processing sector. In particular subsidies to milk and grape producers could be modified to encourage a longer season and improved quality. There are good strategic reasons to direct future agricultural research and support towards non-temperate crops.

The percentage breakdown by value of production of the sector in 1985 was; meat preparations (3.6), dairy products (19.7), cereals and cereal preparations (18.3), dried fruit, preserved fruit and vegetables, juices and carobs (9.6), sugar, sugar preparations and honey (4.4), coffee, tea, cocoa and spices (4.0), animal feeds (8.1), other food products (2.0), beverages (23.2) and tobacco products (16.2). Imports were a relatively high proportion of domestic consumption for coffee, tea, cocoa and spices (79.0 per cent) and other food products (78.0 per cent). Exports were a relatively high proportion of domestic consumption for dried fruit, preserved fruit and vegetables, juices and carobs (72.0 per cent), tobacco (46.6 per cent) and beverages (44.3 per cent). Of particular importance were grape products, either as preserved fruits or as alcoholic beverages - a total of 41.5 per cent of all food sector exports.

Company size, the application of management controls, the age of equipment and the degree of contact with developments overseas varied widely, both between and within sectors. Large factories employing over 100 people existed in the cereal products, canning, tobacco and beverage industries but in each of these sectors some smaller factories continued to compete successfully. High investment in capital equipment by the meat and fruit processing industries had resulted in it being underutilised. Product development and marketing policy lacked adequate local training facilities and, possibly as a consequence, failed to be adequately market orientated - particularly in exploiting the tourist market.

Total exports are equivalent to 39.3 per cent of total domestic food, beverage and tobacco consumption so the domestic market is of primary importance to the industry. Although domestic spending on food, beverages and tobacco rose by 177.6 per cent in real terms over the twelve years to 1984, its share of total consumer spending declined from 36.5 per cent to 26.3 per cent.

The Cypriot distribution structure is dominated by single outlet

family owned stores and although there are a few supermarkets, no-one has yet introduced the distributional and technological changes which have so dramatically increased retail power in Western Europe. The increased urbanisation of Cypriots has been accompanied by increased consumption of processed foods and increased eating out. Catering for the tourist industry has become an important outlet for domestic food production yet lacks coordination.

IV

CYPRUS FOOD SECTOR PROSPECTS

4.1 Introduction

The food processing industry has been the slowest growing of the Cyprus industrial sectors. As will be suggested below, large parts of it will be relatively unaffected by any reduction in trade barriers following entry into a customs union with the E.E.C. since they are protected by such natural barriers to international trade as the perishability of the product and the high relative costs of transport. However the development of the food sector is extremely important to Cyprus in :

1. Increasing overall employment
2. Supplying outlets for the agricultural sector
3. Providing inputs to the fast growing hotel catering sector

If it is to increase its growth rate a sector strategy must seek to promote improvements in the following areas:

1. Rationalise and promote productivity in traditional mass market, commodity product areas
2. Promote the development of local supplies to the catering and distribution markets
3. Develop niche products for the domestic and export markets

Before recommending in Chapter V how such objectives might be promoted this section of the study assesses the current prospects of the sector in each of the above areas.

4.2 Mass or niche markets

Overall home production of food products is 76.8 per cent of

domestic consumption, beverages 126.7 per cent and tobacco 103.8 per cent. However with food products accounting for 60.6 per cent of total production in the sector the overall level of self-sufficiency is only 88.6 per cent.

In developing a sector strategy for food it is important to consider both mass and niche market outlets. It is the general view of the project team that the latter are far preferable for manufacturing industry since they allow it to escape the low wages and low profitability of traditional mass markets. However it is clear that substantial sections of the food and beverage sector are of vital importance in providing outlets for Cypriot farm produce. In particular the two subsectors with large exports, fruit and vegetables and beverages, are overwhelmingly dominated by grape products. Whilst recognising that the production of premium goods and supply of market niches will improve the industry's prospects any sector strategy must recognise that without continuing penetration of mass markets the effects for both the size of the food processing sector and for agriculture would be devastating. This is particularly true for grape products - the declining international competitiveness of citrus products has already seriously undermined their importance within the sector.

A niche marketing strategy should be directed towards those market sectors showing greatest growth and profit potential. As noted above, one such area in northern Europe has been the health food sector - a sector for which Cyprus already produces a number of important products. Herbal teas, widely drunk in Cyprus, are becoming increasingly popular in Britain where consumption rose by 35 per cent in the year 1984 to more than £3 million. The caffeine of traditional tea has been blamed for overworking the kidneys, upsetting hormone levels, and causing headaches, eczema and stomach ulcers. In contrast herbal teas have been credited with a range of beneficial medicinal properties although the possible cancer causing effects of comfrey tea have also been noted (New Health, 1985). Not all observers are equally enthusiastic about the growing popularity

of such teas and the Association of Public Analysts (1985) noted the contamination of some such teas with poisonous belladonna. To be acceptable in overseas niche markets Cypriot herbal teas would have to be subject to rigorous quality control and supplied in teabags both for convenience and to prevent contamination.

The Ministry of Agriculture reported increased plantings of carob trees over the last few years and this may indicate another area where Cypriot producers are responding to healthy eating trends. Carob powder is being increasingly used as a caffeine free and lower calorie substitute for chocolate by consumers. In addition it is an attractive alternative to migraine sufferers who may be allergic to either the caffeine or theobromine contained in chocolate (Miller et al, 1986). Dried fruits have similar healthy food associations largely because they can be used as substitutes for other sources of sweetness in the diet and are far richer than such other sources in fibre and minerals. Premium products for niche health food markets are those dried fruits produced without the addition of unnecessary preservatives (Here's Health, 1987).

A final area of Cypriot products with potential for niche marketing to the health food sector would be sheep milk products. Trade literature for such products claims they contain "up to twice as many of the minerals like calcium, phosphorous and zinc and all the important B group vitamins" as does cows or goat milk and may be a suitable alternative for some consumers who are allergic to the constituents of cows milk (Walerton Dairy Sheep, 1986). Any attempt to build sheep milk product sales upon such possible health benefits would have to strictly control contamination with antibiotics since one batch of dairy produce containing such contamination could destroy whatever quality product image has been developed.

Each of the following sections of this report will assess competitiveness in mass markets and niche markets and briefly outline those areas where agricultural support policy might seek to

promote change which would be desirable to the food processing sector.

4.3 Meat preparation

Many chilled meat preparations have relatively short shelf lives and for such products the home market is relatively safe with or without tariff barriers. For similar reasons it is unrealistic for Cypriot producers to expect to break into European mass markets even when raw materials are supplied from an EEC approved abattoir. The growing acceptability of frozen meat products may change this in the future and this could threaten the domestic market. Economies of scale in meat products manufacture are relatively small but even so underutilisation of existing equipment is so great that it is unlikely Cypriot meat producers could conversely compete in European mass markets.

The ability of Cypriot meat producers to spend so lavishly on state of the art processing equipment in a market dominated by small firms must indicate that consumers in Cyprus are prepared to pay for premium products. There would therefore appear to be a far greater chance of meat processors entering European niche markets. Since there is little point in trying to compete with German type products, market research into the acceptability of the various Cypriot style products to European markets is a pre-requisite to launching a niche marketing strategy.

A recent consultants report has suggested that current subsidies to meat production can only be justified in as much as they save foreign currency and should not be used to subsidise meat exports. The establishment of a niche marketing export strategy would in that case require some mechanism to limit the production of subsidised Cypriot meat.

4.4 Dairy products

Production units in this industry are too small and non-automated to compete in world mass markets which are in any case oversupplied and therefore not profitable. It seems inevitable that without bans and tariffs producers would face heavy competition on the home market. They would therefore be forced into relying upon premium brand image and, in effect, on niche markets.

In fact there is already evidence that they could be successful in this. One producer has already supplied J. Sainsbury in Britain with halloumi and fetta cheese and it was widely recognised that export sales depended upon a quality image. In particular this was associated with the use of sheep rather than cow milk and a consistent brand image. The existence of unsatisfied demand even within the local market for such high priced products as kefalotyri indicates that there is scope for expanding niche markets in the first instance by improving supplies of sheep milk. Subsequent export opportunities would be helped by the health benefits of sheep milk for some consumers.

As part of such a strategy the government could seek to broaden the season for sheeps milk production. If sheeps milk products do gain popularity in European niche markets there would be a need to stimulate sheeps milk production in rural areas providing an additional source of income. However, in view of the recent consultants report mentioned under meat, it would be vital to provide a mechanism to ensure Cyprus did not end up subsidising the consumption patterns of importing countries.

4.5 Cereal products

There is virtually no international trade in bread, pastry and cakes. For biscuits, Cypriot producers are currently producing a product which sells on price alone and, even at far lower prices, has difficulty competing. There is an urgent need to overhaul the quality of its products which would not compete even on the home market without tariff barriers.

Since at present grain commission and world grain prices differ by very little it would be a good time to reassess the need and usefulness of the commission.

4.6 Preserved fruit and vegetables etc.

The importance within this sector of grape products for mass export markets appears to be based more upon the push of supplies than the pull of demand. There is clear scope to improve supplies for specialities such as capers and vine leaves which could be sold into more profitable niche markets. The considerable processing over-capacity which exists may become better utilised once plans to extend the irrigated land area are completed.

Both industry and government could give a lead in encouraging agricultural production geared more towards the most profitable market outlets. The costs and benefits of current policies towards subsidising grape production are unclear. Their assessment is a prerequisite to finding the most profitable use for the 40% increase in irrigated land due in the next few years.

4.7 Sugar and chocolate confectionery

As long as these products are sold by price alone the local market will continue to have high import penetration and would be threatened by the removal of tariff barriers. Local companies are too small to compete in mass markets and need to move into premium niche markets if they are to survive or prosper. Cyprus' high production of various types of nuts suggests one such market niche.

4.8 Repacking industries

For such products as honey, coffee and cigarettes which are basically repacked with minor reprocessing before onward sale mainly

to Middle East countries, changes in tariff regulations could have significant effects on Cyprus' ability to continue as a major centre for such trade. Although the value added by such trade may be relatively small it undoubtedly bolsters domestic production of honey and provides useful trade links upon which other exports can be built.

4.9 Frozen products

These do not face the distribution problems of chilled foods and although frozen distribution is more expensive than non-refrigerated distribution frozen foods have a very long shelf life. Cyprus frozen vegetable production has not really established itself but the established ice cream industry could be under threat if tariff barriers were removed.

4.10 Beverages

The domestic market for beer and soft drinks would be fairly secure with or without protection due to the high relative transport costs for such goods from outside Cyprus. The grape processing industry does however appear to be vulnerable in a world of excess grape supplies. Whilst Cypriot grape juice concentrate would benefit from the removal of the 28% duty on exports to the E.C. joining the customs union could threaten recently established sales to Japan which are almost as high as total current sales to the E.E.C.

The predominance of bulk wines and grape must (44% of total beverage exports) indicates that the sector is currently dominated by mass market commodity items. The need to enter premium, bottled wine niche markets is recognised by industry leaders and would be helped by a government farm support structure designed to improve the supply of higher quality grapes. The industry appeared quite capable of developing quality products provided materials were appropriate.

4.11 Overall prospects

The food processing sub-sectors are each protected by one or more of three basic types of barriers to trade of which two are natural and one artificial. The first of these is transport cost since it tends to be uneconomical to transport products which are mainly water, such as fruit juices and soft drinks, from overseas to the Cyprus market. The second natural barrier, which is of more importance to food processing in Cyprus, is the limited shelf life of many food products. This is a particular barrier to imports for many meat and dairy products as well as bread, pastry, cakes and fresh ground coffee. The last barrier, which is artificial, is the intervention of government to keep out processed food imports through imposing tariff barriers or bans. Product markets unprotected by the first types of barriers would be under severe threat if government tariff barriers were removed. Such markets include those for biscuits, sugar and chocolate confectionery and ice cream which together account for 4 per cent of Cypriot processed food production.

It would be wrong however to believe such threats can be avoided if Cyprus does not enter the Customs Union. Over the last few years tariff protection on processed foods has been steadily increased which presumably indicates that the indigenous industry is becoming less competitive. The diversion of limited managerial expertise in industries such as that for dairy products from developing overseas markets into creating new otherwise uncompetitive import substitutes is a waste of human resources.

With or without tariff protection for its food processing industry the Cypriot government should recognise the importance of the food system by instituting a strategy for its development. The analysis above suggests that such a strategy should aim to improve:

1. Research and development
2. Market orientated management

3. Management systems
4. Raw materials
5. Training availability
6. Quality control
7. Strategic planning.

4.12 Summary: Cyprus food sector prospects

Potential routes to growth for Cypriot food sub-sectors include improving productivity in existing mass markets, developing the food retail and catering supply sectors, and opening up new niche markets. It would appear that there is little current exploitation of the considerable potential of a number of Cypriot products for niche marketing. Traditional Cypriot products which could sell well in the new niche markets include processed meats and cheeses. In addition, relatively unusual vegetable and fruit products such as vine leaves, herbal teas, capers and mosphito berries do not compete on price alone and could sensibly be promoted by a niche marketing policy. In view of the importance of grapes to the food processing industry, it would be sensible to develop more upmarket outlets for its products than the current bulk wines and grape must which now account for 44 per cent of total beverage exports.

Not a single processed food sector is unaffected by government intervention in foreign trade, since the only one which appears to lack barriers, animal feeds, is undermined by government subsidies to grain imports. Quite apart from the large numbers of tariff barriers or bans on competitive imports there are also a variety of schemes for subsidising or fixing the prices of food processing industry raw materials. This feature of high government intervention is the principal common feature of all the various sub-sectors.

Assumptions about the competitiveness of the various subsectors have therefore to be made on the basis of broader sub-sector characteristics. A number of subsectors are naturally protected by

such features as the short shelf-life of their products. These include meat products, dairy products (excluding cheeses), bread, pastry and cakes. Others, such as beverages and preserved fruit and vegetables, are similarly naturally protected by the high relative transport costs of importing substitutes. In contrast biscuits, together with sugar and chocolate confectionery, already face heavy import penetration and would apparently be unable to compete without extensive tariff protection and bans on competitive imports. The frozen vegetable industry appears to be entirely dependent on bans of competitive imports and since frozen foods have a long shelf life, if properly handled, the ice-cream industry would be under threat if current tariff barriers were dropped. In total these sub-sectors produce 4 per cent of Cypriot processed food exports.

A STRATEGY FOR THE CYPRUS FOOD INDUSTRY**5.1 Introduction**

As Chapter IV has demonstrated, the bulk of the domestic food processing industry is protected by natural barriers to trade such as limited product life or high transport costs. In spite of this it seems that at least 4 percent of Cyprus food production is only made viable because of current tariff barriers. This evidence that the food sector is one of the industrial sectors best-placed to withstand the effects of the removal of tariff barriers should not however be an excuse for complacency. Companies cannot hope to maintain profitability in a domestic market which is relatively static and yet may well be able to expand both employment and profitability if they seek instead to expand into overseas and catering markets. Such an expansion is vital to unemployment generally and to rural viability in particular as the irrigated land area increases by 40 per cent over the next few years.

Throughout this analysis of the food system it has been clear that the route to profitable food manufacturing lies in supplying premium, niche markets. A number of Cypriot products would seem ideally suited to such niche markets as those for health and ethnic foods. However the crucial importance of commodity processed foods such as bulk grape juice to the rural economy mean that any food sector strategy must seek to upgrade traditional food processing sectors as well as promoting niche marketing whenever this is appropriate. In fact these two objectives are totally compatible. One of the lessons of many recent company successes is that every industry has potentially profitable growth areas. To be able to capitalise on them food companies need a firmly market led approach to growth. To assist them in responding to opportunities the government needs to take a strategic perspective on the long term

development of the food system and provide adequate support facilities.

The recommendations that follow cover in turn:

1. A strategic planning approach to the food system
2. Market orientated development of the food sector
3. Avenues for expanding sectoral support

5.2 Strategic planning

5.2.1 Food processing and agriculture

There is clear dissatisfaction within the food processing industry about the apparent inability of agriculture to orientate itself towards a food processing industry which could develop market outlets to the benefit of both. Nowhere is the current gulf between the two sectors more clear than in the dairy industry whose producers distrust the ability of the milk marketing board to police milk supplies and stop contamination.

Recommendation 1:

The Ministry of Commerce and Industry, the Ministry of Agriculture, trades unions, consumer organisations and associations representing agricultural and food industries should meet regularly as a food policy advisory group to develop complementary strategies for the development of the food sector overall.

However producers should be doing more themselves to promote change. It is, for example, vital that freezing varieties of vegetables are grown if Cyprus is ever to have a viable frozen vegetable industry. This will not happen without support and forward contracts from the processing sector.

Recommendation 2:

Food trade associations should identify markets for processed foods which would use inputs from the agricultural sector and which are not being fully exploited at present. Improved supplies of agricultural raw materials could then be promoted either through sales contracts between processors and farmers or through the introduction of variable pricing policies which promoted quality and encouraged the extension of production seasons.

Subsidisation of the rural economy is a feature of all developed economies and is essential to avoid extensive depopulation and devastation of the rural heritage. However such subsidisation is, in the long term, threatened by its own cost unless it promotes efficiency and change. The current system of support does appear to have been based more upon appeals for help from farmers than upon strategic intervention.

Recommendation 3:

Food sector subsidies should be increasingly reallocated so as to promote the development of the industry rather than act as a barrier to change. In changing the relative emphasis of such subsidies the government would of course have to recognise that current world prices are artificially low due to dumping by major economic groupings such as the E.E.C.

There appears to be no central direction of how the 40% increase in irrigated land by 1990 should be used, yet farmers' planting decisions will clearly be heavily influenced by current subsidy regimes.

Recommendation 4:

The government, in discussion with the consultative groups detailed under Recommendation 1, should identify and promote the most beneficial use of newly productive land within Cyprus.

5.3 Improving food sector marketing

The Dutch and the Danes, world leaders in the food trade, have long demonstrated the importance of market orientated strategies for food and this section will outline suggestions for improving the marketing of Cypriot foods. There is no reason why domestic consumers should be treated to any lower standards than overseas customers and an educated and discerning domestic market gives the best possible base from which to launch an overseas sales drive. The first section of recommendations which follow are therefore equally applicable to the domestic or export markets. The following two sections contain recommendations specific first to export markets and then to domestic markets.

5.3.1. Developing markets

The use of bar codes in Cyprus on product labels appeared almost entirely restricted to those products, such as canned foods, being produced for foreign companies under their own label. There are already retail chains in Britain which will not stock products not labelled with bar codes and products cannot be relabelled overnight.

Recommendation 5:

The Ministry of Commerce and Industry should, as a matter of urgency, set up an agency to promote, and if necessary, subsidise the introduction of bar codes onto all Cyprus food products.

Quite apart from this urgent problem the general standard of labelling, with a few notable exceptions, was of far lower quality than for goods with labels supplied by overseas customers. Cyprus appeared to have the means to produce good quality labels and promotional material but all too often these were not used or, if they were, minor mistakes detracted from their general sales appeal.

Recommendation 6:

The agency set up to introduce bar coding should also be responsible for improving labelling quality and promotional literature.

Cyprus produces a wide range of foods which could be broadly categorised as health foods. These include sheep milk products, trahanas (a soup made from yoghurt and crushed wheat), traditional turkish delight (made without sugar), dried fruits, carob products and a range of the herbal teas which are widely used in Cyprus. In addition some British supermarkets which would like to stock organic vegetables are at present constrained by the seasonality of supply. There are clear opportunities for Cyprus to exploit this market opening, since it can produce such vegetables to complement the European "season". It would be relatively easy to assemble a product range under a single brand title although some initial work would need to be done in developing more convenient products by, for example, putting herbal teas in tea bags.

Recommendation 7:

The strategic food policy unit should identify a health food product range and set up a marketing strategy for these, initially in the domestic market as a trial for overseas marketing.

Growing foreign travel has over recent years considerably broadened the range of foods eaten throughout Europe, particularly in Britain, the main Cypriot market at present. Cypriot style meat products, traditional cheeses, olive oil, capers, vine leaves, wines, nut products could all be upgraded under a single brand title to create a premium market niche for Cypriot foods.

Recommendation 8:

The strategic food policy unit should identify a range of "ethnic" Cypriot foods and through trial marketing to the tourist trade identify a popular product range and suitable overseas markets. It should then develop a suitable marketing strategy to capitalise on such products overseas.

5.3.2 Developing export markets

It is clear from the pattern of exports that former links with Britain have continued importance whilst other possible E.E.C. markets are virtually unexplored. There is a clear role for the Export Promotion Organisation in doing this. Two areas would be of particular importance. If a link-up could be established with large retailers it might be possible to use them as both a distribution channel and a source of market information.

Recommendation 9:

The Export Promotion Organisation, in association with industry councils should contact leading overseas retailers to determine their food product requirements and the ability of Cypriot suppliers to meet them.

Also if products such as Cypriot meat products are unknown in foreign markets it should be possible to establish links with new product testing agencies which, through running taste panels, could assess how acceptable such products would be in various potential export markets.

Recommendation 10:

The Export Promotion Organisation in association with industry associations should be charged with assessing potential growth areas in major export markets.

In view of the notable success of marketing organisations in countries as diverse as Denmark, Bulgaria and New Zealand it was depressing in Cyprus to hear so many stories of unchannelled competition working against the common interest. Such competition might include undercutting a fellow national producer on price or undermining the image of Cypriot products by dumping inferior product onto a previously premium priced export market. Since there are many European and Middle Eastern countries where Cypriot products currently have little presence the varying strategies used with success elsewhere could be introduced on a trial basis in different countries to see which were most effective.

Recommendation 11:

The Ministry of Commerce and Industry or the Export Promotion Organisation should on a trial basis assess in potential export markets the various marketing strategies used by successful marketing agencies in other countries. These would include the use of sole marketing agencies, rigorously enforced minimum standards for export products and marketing a range of products under a single national brand-name.

Apart from adopting different marketing strategies for particular regions of the world it would also be possible to adopt joint marketing strategies for particular ranges of products, the most obvious of which would be health foods and Cypriot specialities.

Recommendation 12:

The Ministry of Commerce and Industry or the Export Promotion Organisation should on a trial basis develop and assess the concept of marketing a range of products under a single national brand-name.

In the rapidly changing world food system access to markets is becoming the crucial determinant of market power. Cyprus already has a role as an assembler of orders, or food broker, for Middle Eastern countries, producing such spin-off benefits for the Cypriot economy as the honey packaging industry. It is therefore sensible to expand this role both in supplying Middle Eastern and European markets.

Recommendation 13:

Either government or industry should explore the potential for Cyprus to act as a bridge between northern and southern countries and to develop its role as a food broker. This could involve assembling a range of foods, both from domestic and European suppliers, for sale to Middle East and African countries or alternatively making links with a range of southern countries to be able to supply a wider range of products over a longer season to northern countries.

5.3.3 Developing the domestic retail market

To any of the retail giants of northern Europe, Cyprus would appear as a consumer market ripe for development. Indigenous food industries would be threatened by having food retailing dominated by one transnational giant.

Recommendation 14:

Any application from an international retailer for planning permission to set up a Cypriot chain of food retail superstores

should be opposed.

It would be very easy for one indigenous organisation to set up a high tech central delivery warehouse in Cyprus supplying satellite supermarkets in each of the major towns with all the electronic gadgetry of EPOS and EFTPOS. The possible distribution savings of such a system are so great that a company could quickly gain substantial market share and be in a strong position with suppliers. This would be dangerous to Cyprus' infant food processing industry if it were simply used to drive down prices.

Rather than ignore the possibility it would be sensible if those who would lose out from such changes preempted them by setting up central purchasing agencies of the type which exist in Finland.

Recommendation 15:

Cooperatively organised central purchasing organisations should be set up, owned by small retailers and wholesalers who would otherwise be put out of business as the retail sector developed in Cyprus. As for such organisations in Finland they should buy products domestically wherever possible. They should play a positive role in encouraging the manufacture of import substitutes, improving product quality and promoting and easing the rationalisation of suppliers.

The first step towards establishing such a cooperative organisation would be to make a comparative study of the diverse range of retailing organisations throughout Europe to determine which systems are most appropriate to Cyprus. It is important that such a study be conducted by people who are to be directly involved in introducing such a scheme and that it be conducted immediately if Cyprus is to stay abreast of developments elsewhere in Europe.

Recommendation 16:

Industry associations representing the food manufacture and retail trades should be asked to nominate suitably competent and knowledgeable representatives who, in cooperation with a front line officer of the Ministry of Industry, will visit and evaluate cooperative retailing systems throughout Europe. If necessary an overseas consultant should be asked to set up the visit but it is important that the final evaluation report be prepared by government officials and trade representatives who will be directly involved in implementing Recommendation 15.

A number of the dietary changes which have occurred as European countries developed are now recognised to be harmful to health to such an extent that some observers believe diet-related disease to be the single largest cause of death in much of northern Europe. In particular, the substitution of fat for carbohydrate and reductions in fibre intake are seen to be particularly damaging. The "Mediterranean" diet using olive oil and salads has traditionally been associated with low rates of heart disease and the Cypriot government has a duty to ensure the people of Cyprus continue to enjoy the benefits of a healthy diet.

Recommendation 17:

The Ministry of Commerce and Industry and the Department of Health should recognise the crucial role of food in the nation's health by establishing a monitoring group to ensure that dietary change does not adversely affect the health of Cypriots. This group should have a permanent secretariat of at least 4 people and an adequate budget to promote healthy eating. It should intervene directly in food manufacture and marketing to stop developments likely to be to the long term detriment of Cypriots' health.

Catering is a major outlet for food processors in Cyprus and is

likely to grow further as the tourist industry develops. There are no formal meetings between the hotel and catering industry and food producers to determine how best the needs of the tourist industry can be met. This both reduces the total size of this market to Cypriot producers, and is a wasted opportunity to introduce tourists to Cypriot food.

It is beyond the scope of this report to suggest how best this omission can be corrected but links could be forged either through purchasing or supply cooperatives of the type recommended for retailing, or through industry associations or through a government sponsored forum. The analysis of what scope exists for the development of sales to the catering sector and what form any formal links should take must be conducted by an impartial authority.

Recommendation 18:

A consultant should be asked to assess the potential for expanding domestic food sales to the catering industry. Such a study should include an analysis of the possible use of tourist food sales to boost sales of Cypriot products overseas, and the establishment of closer links between the hotel and catering trade and the food producers to develop long term plans for boosting home produced food sales. The consultant should produce quantitative details of the size of potential markets and base the recommendations for future liaison on full discussions with interested parties.

5.4 Improving food sector support

Although it is crucial that food policy in Cyprus becomes more market orientated there is considerable scope for improving technical and strategic support for the industry and thus improving its ability to service new marketing opportunities.

The central purchasing agency recommended above could play a key role in the development of the food processing industry. By maintaining direct involvement in such organisations the government could use them to lead the food processing industry towards manufacturing import substitutes, upgrading product quality and promoting rationalisation amongst suppliers to a level at which competition remained but the overcapacity of such as the tetra-pak and meat industries were avoided.

Recommendation 19:

Government support for the food processing industry would be of most long term benefit if it were market orientated. One way to do this would be to replace current systems of price ceilings and import restrictions by cooperatively organised central purchasing organisations. Apart from food retailing (Recommendation 15), public institutions and the hotel trade might also benefit from such increased buying power. Through active involvement and support for such organisations government should seek to promote import substitution, improved product quality, and rationalisation of the food industry in cooperation with the food policy advisory group envisaged in Recommendation 1.

Electronic records of sales purchases in tourist centres or of Cypriot meals eaten by overseas tourists of each nationality could possibly be used to identify potential export markets for local products.

Recommendation 20:

The catering consultant detailed in Recommendation 17 should assess whether the establishment of a computer data base of tourist food consumption patterns would be practicable and useful.

The lack of education or central research facilities for the food processing industry is clearly an anomaly when the industry is so vital to the national economy.

Recommendation 21:

A study should be urgently prepared on the establishment of a food processing technical and educational centre, attached to the Higher Technical Institute, the Catering College or a similar appropriate institution, to service the food industry, as well as to contribute to the upgrading of technical and scientific skills within the industry. The study should consider what common technical facilities should be provided at the centre for use by the food industry.

In addition, to be better able to service the needs of industry, the Ministry of Commerce and Industry would surely be better organised on a sectoral basis so that the inevitably limited staff could be more flexible in adjusting their workload to respond to the needs of industry. It is to be hoped that protection of local industry through central purchasing organisations would replace the current cumbersome system of price controls and import licences and free staff employed there for other duties. It is surely right that the relative importance to the food industry of, say, standards or extension services should not be immutably fixed by the relatively arbitrary staff levels of each department. Rather that ministry staff should be able to move to those areas where the industry feels they have most need of support. At present for example many producers, particularly of meat products, clearly want more information on E.E.C. rules for plant hygiene and layout to enable them to export to such markets.

Recommendation 22:

The technological back-up for the industry should be reinforced by the reorganisation of the Ministry of Commerce and Industry

on a sectoral basis.

To be able to usefully assist the food industry it is vital that support staff in the Ministry of Commerce and Industry are regularly able to update their skills and links with new developments elsewhere.

Recommendation 23:

The Ministry of Commerce and Industry should increase provision of in-service training opportunities for those staff members who are in regular contact with industry.

Cooperative buying of food processing raw materials can reduce the costs of imported goods and could become the same driving force for domestic raw material supplies as was envisaged for the retail central purchasing organisations in Recommendations 15 and 18 above.

Recommendation 24:

The food policy group detailed in Recommendation 1 should identify possible cooperative buying opportunities for reducing raw material costs for either agriculture or food processing. It should promote the establishment of buying cooperatives in each sub-sector. Since such ventures as the establishment of shared storage or processing facilities would promote sector development some government support for their introduction would be justified.

It is clearly desirable that the food processing industry should only expand in those areas where it is internationally competitive. It is very difficult to assess which these are for as long as raw material prices are greatly affected by government policies which either artificially raise prices (as for meat) or depress them (as for cereal products). The government has a continuing duty to

intervene in pricing for reasons of social policy but such intervention gives confusing price signals to the processing industry and may discourage its development.

Recommendation 25:

The Ministry of Commerce and Industry and the Ministry of Agriculture should commission a study of the cost for the economy of grain and grape subsidies as has been done for milk and livestock and assess such subsidies accordingly. Whatever farm support policy is implemented it should ensure that the costs of raw materials to food processing are kept at world prices.

SUMMARY OF RECOMMENDATIONS

Recommendation 1:

The Ministry of Commerce and Industry, the Ministry of Agriculture, trades unions, consumer organisations and associations representing agricultural and food industries should meet regularly as a food policy advisory group to develop complementary strategies for the development of the food sector overall.

Recommendation 2:

Food trade associations should identify markets for processed foods which would use inputs from the agricultural sector and which are not being fully exploited at present. Improved supplies of agricultural raw materials could then be promoted either through sales contracts between processors and farmers or through the introduction of variable pricing policies which promoted quality and encouraged the extension of production seasons.

Recommendation 3:

Food sector subsidies should be increasingly reallocated so as to promote the development of the industry rather than act as a barrier to change. In changing the relative emphasis of such subsidies the government would of course have to recognise that current world prices are artificially low due to dumping by major economic groupings such as the E.E.C.

Recommendation 4:

The government, in discussion with the consultative groups detailed under Recommendation 1, should identify and promote the most beneficial use of newly productive land within Cyprus.

Recommendation 5:

The Ministry of Commerce and Industry should, as a matter of urgency, set up an agency to promote, and if necessary, subsidise the introduction of bar codes onto all Cyprus food products.

Recommendation 6:

The agency set up to introduce bar coding should also be responsible for improving labelling quality and promotional literature.

Recommendation 7:

The strategic food policy unit should identify a health food product range and set up a marketing strategy for these, initially in the domestic market as a trial for overseas marketing.

Recommendation 8:

The strategic food policy unit should identify a range of "ethnic" Cypriot foods and through trial marketing to the tourist trade identify a popular product range and suitable overseas markets. It should then develop a suitable marketing strategy to capitalise on such products overseas.

Recommendation 9:

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Recommendation 10:

The Export Promotion Organisation in association with industry associations should be charged with assessing potential growth areas in major export markets.

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permission to set up a Cypriot chain of food retail superstores should be opposed.

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Recommendation 17:

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Recommendation 18:

A consultant should be asked to assess the potential for expanding domestic food sales to the catering industry. Such a study should include an analysis of the possible use of tourist food sales to boost sales of Cypriot products overseas, and the establishment of closer links between the hotel and catering trade and the food producers to develop long term plans for boosting home produced food sales. The consultant should produce quantitative details of the size of potential markets and base the recommendations for future liaison on full discussions with interested parties.

Recommendation 19:

Any government support for the food processing industry should be market led. The government should ultimately seek to replace current systems of price ceilings and import restrictions by cooperatively organised central purchasing organisations for public institutions, the hotel trade and retail outlets. Through active involvement in such organisations it should seek to promote import substitution, improved product quality, and rationalisation of the food industry in cooperation with the food policy advisory group envisaged in Recommendation 1.

Recommendation 20:

The catering consultant detailed in Recommendation 17 should assess whether the establishment of a computer data base of tourist food consumption patterns would be practicable and useful.

Recommendation 21:

A food processing school and technical centre should be

established at the Higher Technical Institute to be justified not just in terms of the adequacy of student numbers but also with an assessment of its potential contribution to the development of the food industry through the provision of product, technological and factory planning advice.

Recommendation 22:

The technological back-up for the industry should be reinforced by the reorganisation of the Ministry of Commerce and Industry on a sectoral basis.

Recommendation 23:

The Ministry of Commerce and Industry should increase provision of in-service training opportunities for those staff members who are in regular contact with industry.

Recommendation 24:

The food policy group detailed in Recommendation 1 should identify possible cooperative buying opportunities for reducing raw material costs for either agriculture or food processing. It should promote the establishment of buying cooperatives in each sub-sector. Since such ventures as the establishment of shared storage or processing facilities would promote sector development some government support for their introduction would be justified.

Recommendation 25:

The Ministry of Commerce and Industry and the Ministry of Agriculture should commission a study of the cost for the economy of grain and grape subsidies as has been done for milk and livestock and assess such subsidies accordingly. Whatever

farm support policy is implemented it should ensure that the costs of raw materials to food processing are kept at world prices.

Table 1:
The changing nature of food sector employment in Britain
- employment by sectors (000's)

<u>Sector</u>	<u>Year</u>			
	<u>1901</u>	<u>1931</u>	<u>1951</u>	<u>1981</u>
Agriculture	1050	830	810	350
Domestic service	1340	1300	380	80
Food distribution	550	770	850	950
Food manufacture	440	620	760	660
Hotels & catering	340	460	850	1350
TOTALS	<u>3720</u>	<u>3980</u>	<u>3650</u>	<u>3390</u>

Source: Wiggins & Williams, 1985

Table 2:

Value of Cypriot domestic exports within S.I.T.C. section 0
classified by country, 1985 (£000m).

<u>EEC</u>	<u>Value</u>	<u>EFTA</u>	<u>Value</u>
France	3,006	Norway	51
Belgium & Luxembourg	894	Sweden	465
Netherlands	735	Finland	181
West Germany	2,650	Switzerland	210
Italy	2,686	Austria	1,569
U.K.	24,008	Total	2,476
Ireland	306		
Denmark	1	<u>Arab countries</u>	<u>Value</u>
Greece	1,353	Tunisia	5
Total	35,639	Egypt	734
		Sudan	23
<u>Europe</u>	<u>Value</u>	Lebanon	3,019
Spain	154	Syria	990
Malta	67	Iraq	190
Yugoslavia	145	Jordan	1,646
Total	366	Saudi Arabia	3,496
		Kuwait	1,838
<u>Eastern Trading Area</u>	<u>Value</u>	Bahrain	677
Soviet Union	1,570	Qatar	368
G.D.R.	192	Abu Dhabi	39
Poland	81	Dubai	1,037
Czechoslovakia	1,142	Fiyairah	132
Hungary	295	Sharjah	281
Bulgaria	118	Oman	355
Total	3,398	North Yemen	239
		Total	15,069
<u>Asia</u>	<u>Value</u>	<u>North & Central</u>	
Israel	41	<u>America</u>	<u>Value</u>
Sri Lanka	29	U.S.A.	485
Malaysia	13	Canada	55
Total	83	Total	540
<u>Africa</u>	<u>Value</u>	<u>Oceania</u>	<u>Value</u>
Sierra Leone	4	Australia	64
Ivory Coast	1	Total	64
Zaire	8	<u>Shipstores</u>	<u>Value</u>
Ethiopia	8		306
Zambia	3		
Total	24		

Total domestic exports under S.I.T.C. section 0 = £57,965,000

Source: Import, export statistics, 1985

Table 3:

Demographic and Economic Trends in Western Europe 1980 to 1984

	Austria	Belgium	Denmark	Finland	France	Italy	Netherlands	Norway	Spain	Sweden	Switz.	U.K.	West Germany
<u>Population</u>													
% of total	2.3	3.0	1.6	1.5	16.6	17.3	4.4	1.3	11.8	2.5	2.0	17.2	18.5
% growth 1980/84	0.0	0.2	-0.1	1.1	1.9	-0.3	3.5	1.3	3.5	0.1	1.2	0.8	-0.5
<u>Economics</u>													
GDP \$ per head 1984	9670	8610	12710	10940	10440	6940	9750	16600	3960	11340	16467	9040	11020
% share total 1984 consumer exp.	2.4	3.3	1.8	1.6	20.4	13.9	4.6	1.6	5.9	2.9	3.5	16.8	21.3
Expenditure per head \$ 1984	5560	5980	6450	5780	6690	4380	5670	7000	2720	6120	9800	5320	6200

Source: Euromonitor, 1985.

Table 4:

Consumption trends in Western Europe 1980 to 1984

	Austria	Belgium	Denmark	Finland	France	Italy	Netherlands	Norway	Spain	Sweden	Switz.	U.K.	West Germany
Share of total foods % 1984	2.1	2.9	1.5	1.6	20.0	17.5	2.8	1.6	10.8	2.6	3.4	12.1	21.1
Food expenditure per head \$ 1984	1010	1080	1075	1200	1365	1140	712	1400	1030	1140	1990	800	1280
Non-alcoholic beverages per head \$ 1984	44	92	56	30	51	13	33	66	15	28	45	27	38
Alcoholic beverages per head \$ 1984	158	180	235	247	114	79	115	225	79	210	199	399	127
Fresh meat & poultry per capita cons kg 1984	60.5	69.2	129.3	64.3	80.6	65.9	53.0	42.8	58.3	36.9	32.8	51.3	70.9
% growth 1980/4	-1.8	0.5	30.3	16.4	2.3	-4.2	2.2	-1.6	5.6	-2.3	3.8	-4.2	-5.0
Processed meat per capita cons kg 1984	30.1	14.4	87.9	31.0	15.1	14.1	11.2	22.4	13.6	18.8	9.9	14.4	33.3
% growth 1980/4	-5.3	1.8	49.6	13.1	13.4	-10.3	4.5	2.4	0.8	-5.0	2.6	1.5	-6.6
All fish per capita cons kg 1984	2.9	2.6	20.6	4.3	7.1	7.6	11.1	14.9	19.3	6.0	2.0	1.9	2.0
% growth 1980/4	-3.1	-0.4	-1.5	28.8	5.4	1.4	-7.3	-2.4	-9.0	9.0	9.5	-2.7	-2.0
Fresh fruit & veg per capita cons kg 1984	199.3	142.1	167.6	134.6	168.9	277.6	159.8	132.7	258.7	154.1	111.1	128.2	116.6
% growth 1980/4	-11.6	-3.9	-0.2	7.4	10.5	-7.2	-7.0	-0.7	3.7	-1.3	1.4	-2.6	-12.6

Table 4 (cont'd)

	Austria	Belgium	Denmark	Finland	France	Italy	Netherlands	Norway	Spain	Sweden	Switz.	U.K.	West Germany
Dairy produce													
Expenditure per head													
\$ 1984	156	140	165	163	164	135	110	165	76	175	235	102	150
per capita cons kg 1984	5.3	13.4	10.8	8.5	19.4	14.2	13.5	10.4	3.9	15.2	11.8	5.8	16.3
% growth 1980/4	0.0	0.1	12.4	19.9	7.3	0.7	2.1	2.4	2.9	10.4	1.1	3.1	18.6
Yoghurt													
per capita cons kg 1984	7.9	4.8	9.0	8.9	11.5	1.0	17.2	2.2	6.3	9.2	19.9	3.0	7.3
% growth 1980/4	3.1	-1.7	-1.7	3.6	23.8	16.1	-1.5	42.9	7.0	2.7	-1.2	27.0	7.9
Bakery products													
per capita cons kg 1984	62.2	67.7	49.3	48.1	76.9	108.7	67.2	63.6	51.3	70.0	37.09	70.3	76.6
% growth 1980/4	4.6	-4.9	4.6	-3.1	7.9	-2.8	-0.4	-2.9	1.5	3.2	-3.7	-6.1	-7.8
Biscuits													
per capita cons kg 1984	7.2	10.6	5.9	4.9	8.2	8.0	19.7	5.8	5.4	11.5	5.6	10.5	6.4
% growth 1980/4	20.0	5.0	20.0	4.3	15.4	22.9	18.8	20.0	7.7	7.7	6.7	2.6	18.2
Frozen foods													
per capita cons kg 1984	9.6	10.2	17.9	5.9	11.9	4.2	14.2	18.7	2.6	22.7	11.5	18.7	12.2
% growth 1980/4	26.7	54.0	25.9	12.3	58.8	42.4	10.4	24.4	35.4	11.2	24.2	39.9	48.2
Canned foods													
per capita cons kg 1984	13.1	11.5	14.7	6.7	25.2	19.1	32.3	12.4	21.4	30.0	11.1	21.7	31.9
% growth 1980/4	3.4	2.9	4.4	-3.0	3.9	-1.4	1.8	18.4	-0.5	8.9	2.3	2.9	-3.8
Canned vegetables													
per capita cons kg 1984	6.2	5.3	6.2	2.5	16.2	15.3	23.5	2.8	10.9	10.3	6.4	14.0	19.0
% growth 1980/4	6.7	4.2	6.0	-2.4	0.9	-3.3	0.0	-9.4	-1.3	17.5	-3.1	6.0	-5.5

Table 4 (cont'd)

	Austria	Belgium	Denmark	Finland	France	Italy	Netherlands	Norway	Spain	Sweden	Switz.	U.K.	West Germany
Canned fruit													
per capita cons kg 1984	3.6	2.4	1.8	2.1	2.4	0.8	4.5	1.8	6.2	12.0	2.1	3.8	6.2
% growth 1980/4	-3.8	-8.2	-4.1	12.4	2.4	21.2	5.7	-3.9	-0.8	22.9	0.0	-6.5	-10.6
Dried foods													
per capita cons kg 1984		3.1			2.4	0.9	1.6					3.7	3.2
Oils & fats													
per capita cons kg 1984	18.9	21.8	35.8	7.2	9.0	16.7	22.5	13.4	22.6	14.6	6.3	9.6	12.0
% growth 1980/4	-2.0	4.9	38.5	-11.6	-23.6	-28.3	-1.2	-6.1	0.7	-2.6	3.6	2.4	-1.9
Confectionery													
per capita cons kg 1984	7	10	10	7	7	3	10	14	3	8	12	13	12
% growth 1980/4	4.6	13.0	24.4	15.3	3.9	2.2	-2.0	25.6	3.7	-10.1	6.1	9.8	-3.6
Sugar confectionery													
per capita cons kg 1984	2.4	4.4	5.5	3.6	2.9	2.0	5.7	6.3	1.9	3.7	2.8	4.7	5.8
% growth 1980/4	-4.6	21.2	22.8	-11.2	0.6	-12.7	8.6	51.2	8.4	-2.8	-7.2	-8.9	4.7
Chocolate confectionery													
per capita cons kg 1984	4.5	5.6	4.5	3.7	3.8	1.3	4.2	7.6	1.6	4.2	8.5	8.0	5.7
% growth 1980/4	10.4	7.2	26.4	62.2	6.4	39.6	-13.8	10.1	-0.8	-15.7	11.3	24.7	-10.9
Savoury snacks													
per capita cons kg 1984		2.5			2.4	1.2	3.3					3.7	2.8
% growth 1980/4		46.1			14.9	18.3	7.4					9.9	24.4

Table 4 (cont'd)

	Austria	Belgium	Denmark	Finland	France	Italy	Netherlands	Norway	Spain	Sweden	Switz.	U.K.	West Germany
Spec. health foods													
exp. per head \$ 1984												8.4	9.9
% growth 1980/4												138.5	27.0
Hot beverages													
per capita cons kg 1984	6.4	8.3	11.8	13.8	6.5	4.0	8.3	8.3	4.3	9.3	5.1	3.8	7.2
% growth 1980/4	26.4	18.4	6.2	12.3	16.8	2.7	6.4	-3.7	10.2	-2.8	-10.2	-4.0	12.9
Coffee													
per capita cons kg 1984	6.2	8.1	1.8	13.6	6.4	4.0	7.8	8.1	4.3	9.0	4.7	0.9	7.0
% growth 1980/4	26.3	18.2	6.5	12.6	17.3	2.9	9.5	-3.7	10.2	-2.7	-11.8	-7.1	-3.6
Tea													
per capita cons kg 1984	0.1	0.1	0.4	0.1	0.2	0.1	0.5	0.2	neg	0.3	0.3	2.9	0.2
% growth 1980/4	27.3	36.4	0.0	-12.5	12.3	-11.4	-26.3	0.0	-11.1	-3.4	23.5	-3.0	8.1
Fruit juices													
per capita cons 1.1984	10.9	12.6	15.6	27.9	6.9	2.7	16.3	8.9	3.3	15.1	27.7	6.0	20.4
% growth 1980/4	17.1	35.2	0.0	-9.8	32.2	8.6	-6.6	-1.4	28.3	-2.7	27.1	13.3	9.7
Alcoholic drinks													
per capita cons 1.1984	152.3	154.1	161.4	66.9	130.3	109.1	106.5	49.5	119.0	56.7	120.2	123.4	178.5
% growth 1980/4	10.0	0.1	17.4	-0.1	-4.0	-1.5	6.7	-8.2	1.6	-4.5	2.3	-1.4	1.9
Wine													
per capita cons 1.1984	38.1	22.1	20.5	9.1	84.7	90.3	13.3	3.8	56.5	11.3	48.2	9.2	27.1
% growth 1980/4	7.2	7.5	46.2	9.6	-5.5	-1.9	6.2	-12.2	-9.7	18.5	2.4	29.1	5.7

Table 4 (cont'd)

	Austria	Belgium	Denmark	Finland	France	Italy	Netherlands	Norway	Spain	Sweden	Switz.	U.K.	West Germany
Spirits & liqueurs per capita cons 1.1984	1.6	2.2	1.6	2.9	2.0	1.9	2.7	1.3	1.3	2.1	2.1	1.7	2.3
% growth 1980/4	0.8	-5.6	7.9	5.3	-1.9	1.2	0.0	-29.4	-1.1	-22.3	3.1	-4.7	-26.3

Source: Euromonitor, 1985

Table 5:

O.E.C.D. fruit juice imports 1978 and 1981

<u>Type</u>	metric tons	
	<u>1978</u>	<u>1981</u>
Orange juice	592,922	910,228
Grapefruit juice	71,065	74,053
Pineapple juice	74,430	116,070

Source: UNCTAD, 1982

Table 6:

The C.I.F. value of all imports to Middle East consumer markets in 1981 and 1982

	\$ million	
	<u>1981</u>	<u>1982</u>
Bahrain	4,081	3,690
Iran	15,743	12,000
Iraq	17,310*	15,180*
Jordan	3,174	3,462
Kuwait	6,498	7,784
Lebanon	3,243*	3,092*
Oman	2,258	2,725
Qatar	1,500	1,919
Saudi Arabia	35,296	40,743
Syria	5,166	4,033
U.A.E.	8,632*	8,262*

* F.O.B. values

Source: Euromonitor, 1984

Table 7:

Cypriot exports in excess of £20,000 to the Middle East
listed by country, 1985

<u>Country</u>	<u>Cyprus food group imports of over £20,000</u>
Saudi Arabia	Sausages, halloumi and other cheeses, biscuits, cakes, powder preparations, jam, bulk fruit juice, honey, sugar and chocolate confectionery, sauces, vinegar etc., hummus, grape must.
Lebanon	Halloumi and other cheeses, cakes, powder preparations, flour, biscuits, ground locust beans, canned vegetables, chocolate confectionery, margarine.
Jordan	Halloumi, table jellies.
Kuwait	Halloumi and other cheeses, cakes, powder preparations, honey, chocolate confectionery, vinegar etc., hummus table jellies.
Dubai	Halloumi and other cheeses, powder preparations, honey, vinegar etc.
Egypt	Whole and ground locust beans, chocolate confectionery, lemonade.
North Yemen	Canned vegetables, honey, sauces.
Iraq	Grape must.
Other countries	Halloumi, chocolate confectionery, macaroni, powder preparations, honey, jams, mineral water.

Source: Import, export statistics, 1985.

Table 8:

Consumption patterns in the Middle East, 1981 (kg. per head)

	Bahrain	Iran	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Syria	U.A.E.	Yemen
Beef, veal	10.5	5.2	6.0	6.5	7.4	4.34	)	)	)	8.9	2.1
Mutton, lamb	3.7	8.0	8.8	20.0	5.2	11.99	)	)	)	35.8	2.1
Poultry	23.6	7.1		31.0	10.7	16.64	47.3	23.1	5.1		6.6
Cheese	5.7	4.6	2.9	6.5	10.2	1.18		5.0	6.1	5.3	2.9
Butter	2.0	3.3		3.4		6.55		2.1	2.9	1.5	1.3
Eggs	15.1	5.3	10.0	10.8	19.2	4.50	14.4	91.5 (number)	7.4	10.4	2.7
Cream	0.1			0.2							
Ice cream	1.1			0.2							
Margarine	2.8	8.6	0.5	3.3		1.42			0.1		0.4
Pasta	2.0			1.1				1.7	1.3	1.5	
Citrus fruit	25.4	)	)	36.0		25.7	)116.9))))
Non-citrus fruit	92.6	)	)	39.0		91.36	)40.9))))
Potatoes	23.9	18.6	19.4	18.0	80.8		13.6		28.4	42.6	
Rice	65.2	48.3	15.8	58.0		55.69	66.1	45.4	7.8	44.0	4.3

Table 8 (cont'd)

	Bahrain	Iran	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Syria	U.A. E.	Yemen
Fresh vegetables	65.2	95.0	80.0	112.0		21.00	)	113.1	115.0	213.3	90.0
Dried vegetables	6.8		6.9	7.5			)	3.0	20.9		
Sugar	9.4	29.3		33.5	29.4	20.59 (inc.honey)	43.3	15.2	28.1	77.0	16.7
Biscuits	22.8										3.4
Honey	0.02	0.2		0.2				0.2	0.1	0.5	0.1
Chocolate	2.0			3.8		0.23			0.3	2.2	
Chewing gum	0.9			0.8							
Confectionery	2.3			3.2		2.08		2.3		8.3	
Jams & preserves	1.1			1.6		0.53		1.3	5.0	2.8	
Edible oils	10.8		2.9	9.5		6.90	10.1	11.7	10.5	29.7	5.1
Pet foods	2.3			0.1							
Canned fruit	2.3			1.8		3.81					
Canned vegetables	11.7			6.6		8.09			12.6		
Canned soup	0.6			0.5					0.1		

Table 8 (cont'd)

	Bahrain	Iran	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Syria	U.A.E.	Yemen
Frozen vegetables	1.4			2.3		1.83				2.1	
Frozen fruit	0.06			0.7		0.63					
Milk - fresh	)		3.9	)	)	)	45.7	112.6			13.3
- dried	)40.1		0.8	)57.6	18.51	)58.3	8.3	1.7	11.2		1.5
- condensed	)		3.0	)	)	)					3.6
Nuts	3.1										
Tea	1.1										
Wine					2.0						
Canned fish						0.39					
Fish							10.4		0.5		
Flour								19.7			
Yoghurt									1.6		

Source: Euromonitor, 1984

Table 9:

Saudi Arabian food imports, 1979-1981

	(S.R. billion)		
	<u>1979</u>	<u>1980</u>	<u>1981</u>
Vegetable products	3.9	5.3	7.1
Live animals, animal products	2.8	4.1	4.9
Prep.foods, beverages & tobacco	3.4	4.1	4.8

(Retail price index averaged 3.3 per cent growth 1979 - 1981)

Source: Euromonitor, 1984

Table 10:

Lebanon's major growth areas for food imports,
1979 and 1981 (metric tonnes)

<u>Product</u>	Year	
	<u>1979</u>	<u>1981</u>
Cheese	12,000	16,000
Beer	3,500	9,200
Edible oils	13,800	28,100
Potatoes	72,000	130,000
Wine	400	1,500
Coffee	5,800	12,000
Sugar	24,900	67,000
Eggs	1,000	4,200

Source: Euromonitor, 1984

Table 11:

Jordans food imports, 1979 to 1981

	<u>1979</u>	<u>1980</u>	<u>1981</u>
Value of imports of foodstuffs & live animals ('000 J.D.)	108,280	118,799	167,930

Source: Euromonitor, 1984

Table 12

Employment by sub-sector in the food system in Cyprus in 1984

<u>Sub-sector</u>	<u>Number employed</u>	<u>Percentage of total</u>
Agriculture & fishing ¹	38,788	63.8
Food & beverage manufacture	6,941	11.4
Food & beverage wholesaling ²	2,495	4.1
Food & beverage retailing ³	4,673	7.7
Restaurants ⁴	7,866	12.9
TOTAL	<u>60,763</u>	<u>99.9</u>

Notes:

1. Employment in agriculture and fishing is taken as 90% of that employed in agriculture, fishing & forestry.
2. Includes only those employed specifically in food or drink wholesaling and excludes general wholesaling, etc.
3. Includes only those employed specifically in food or drink retailing and retailing of the agricultural input pesticides.
4. Includes all employment in restaurants but excludes all employment in hotels.

Source: Statistical Abstracts, 1984

Table 13

Cyprus food products, beverages and tobacco production,
imports & exports by value, 1985

S.I.T.C. section	Commodity	Production (£)	Imports (£)	Exports (£)	Home consum- ption (£)
0	Food products (total)	97,383,430	44,474,107	16,916,578	126,792,380
01	Meat preparations	5,793,457	1,410,524	174,328	7,029,653
02	Dairy products	17,148,210	5,439,524	3,045,517	19,542,217
03	Fish & fish preps.		4,561,127	65,029	4,496,098
04	Cereals & cereal preps.	29,457,985	4,178,124	1,155,921	32,480,188
05	Dried fruit, pres. fruit & veg, juices & cereals.	15,405,561	3,298,518	7,830,613	10,873,466
06	Sugar, sugar preps. & honey	6,994,138	3,853,979	1,372,411	9,475,706
07	Coffee, tea, cocoa & spices	6,383,546	7,484,561	1,334,241	12,533,866
08	Animal feeds	12,946,124	9,259,956	87,100	22,118,980
09	Other food prods.	3,254,409	4,987,794	1,851,418	6,390,785
11	Beverages	37,345,700	5,268,897	13,128,538	29,486,059
12	Tobacco & tobacco manufactures	26,012,530	10,730,020	11,675,903	25,066,647
0,11 +12	Grand total	160,741,000	60,473,024	41,721,019	181,344,420

Sources: Industrial statistics, 1985
Import, export statistics, 1985

Table 14

Cyprus food products, beverages and tobacco production,
imports and exports as percentages, 1985

S.I.T.C. section	Commodity	Home production		Imports		Exports	
		% total	% cons- umption	% total	% dom. cons.	% total	% dom. cons.
0	Food products (total)	60.6	76.8	73.5	35.1	40.5	13.3
01	Meat preparations	3.6	82.4	2.3	20.1	0.4	2.5
02	Dairy products	10.7	87.7	9.0	27.8	7.3	15.6
03	Fish & fish preps.	-	-	7.5	101.4	0.2	1.4
04	Cereals & cereal preps.	18.3	90.7	6.9	12.9	2.8	3.6
05	Dried fruit, pres. fruit & veg, juices & carobs.	9.6	141.7	5.5	30.3	18.8	72.0
06	Sugar, sugar preps. & honey	4.4	73.8	6.4	40.7	3.3	14.5
07	Coffee, tea, cocoa & spices	4.0	67.4	12.4	79.0	3.2	14.1
08	Animal feeds	8.1	58.5	15.3	41.9	0.2	0.4
09	Other food prods.	2.0	50.9	8.2	78.0	4.4	29.0
11	Beverages	23.2	126.7	8.7	17.9	31.5	44.5
12	Tobacco & tobacco manufactures	16.2	103.8	17.7	42.8	28.0	46.6
0,11 +12	Grand total	100	88.6	100	33.3	100	23.0

Sources: Industrial statistics, 1985
Import, export statistics, 1985

Table 15:

Cyprus aggregate employment for food, drink & tobacco sectors
(1985)

Code	Industry	Employment in firms with more than 50 workers	% of sector employment in firms with more than 50 workers	Total employment
31	Food, drink & tobacco	3848	51	7,554
311 & 312	Food	1821	34	5,316
313	Beverages	1588	89	1,784
314	Tobacco	439	97	454

Source: Industrial statistics, 1985

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Table 16

Cyprus food & beverage employment by sub-sector

Code	Industry	Average Wage (C£)	Total employment
3111	Preparing & preserving meat	3,410	384
3112	Dairy products	3,982	776
3113	Canning & preserving fruit & veg.	2,610	580
3115	Vegetable & animal oils & fats	3,225	199
3116	Grain mill products	3,807	164
3117	Bakery products	2,651	1,978
3119	Chocolate & sugar confectionery	2,335	293
3121	Food products n.e.c.	2,753	653
3122	Prepared animal feeds	3,146	289
3131+ 3132+ 3133	Alcoholic beverages	4,337	1,182
3134	Soft drinks, etc.	4,005	602

Source: Industrial statistics, 1985

Table 17
Value of materials used in production - percentage breakdown, 1985

I. S. I. C. Code	Industry	Raw Materials	Packing Materials	Fuels	Value of other materials	Water	Electricity	Maintenance	Outside Services	Transport
3	Manufacturing (total)	83.7	4.9	2.2	0.4	0.1	3.4	1.5	2.1	1.7
31	Food, beverages & tobacco	79.4	11.4	1.9	0.4	0.2	2.9	1.4	0.1	2.3
311+312	Food (total)	82.4	9.4	1.7	0.2	0.1	2.9	1.1	0.1	2.1
3111	Prep. & pres. meat	86.2	6.2	1.0	0.3	0.2	3.2	1.0	0.0	1.9
3112	Dairy products	76.8	13.2	1.6	0.3	0.2	3.3	1.4	1.4	3.1
3113	Canned & pres. fruit veg. & juice	51.8	37.4	2.3	0.3	0.2	3.3	2.5	0.0	2.4
3115	Veg. & animal oils & fats	90.5	6.1	1.0	0.1	0.1	1.6	0.3	0.0	3.6
3116	Grain mill products	87.8	1.6	0.1	0.1	0.4	6.5	1.4	0.0	2.5
3117	Bakery products	76.9	5.8	6.0	0.3	0.3	4.7	1.7	0.1	4.2
3119	Choc. & sugar confection.	86.3	7.8	0.9	0.2	0.1	2.0	0.8	0.1	1.8
3121	Food prods. n.e.c.	82.4	11.4	0.7	0.4	0.2	1.9	0.6	0.1	1.6
3122	Prepared animal feeds	94.8	1.3	0.3	0.1	0.0	1.8	0.4	0.0	1.3
313	Beverages	67.6	16.9	3.3	1.1	0.5	3.6	2.7	0.3	4.0
3131+3132 +3133	Alcoholic Beverages	73.1	12.2	4.6	1.3	0.4	3.7	1.9	0.3	2.4
3134	Soft drinks	56.4	26.3	0.8	0.8	0.7	3.4	4.3	0.2	7.2
314	Tobacco manufactures	76.4	18.7	0.6	0.2	0.1	1.8	0.9	0.7	0.6

Source: Industrial Statistics, 1985

Table 18

Percentage spending on fixed assets by industry, 1985

Code	Industry	Land	Buildings	Machinery	Transport Equipment	Furniture & Fittings	Other
3	Manufacturing (total)	4.1	22.4	55.2	9.7	3.2	5.4
31	Food, beverages & tobacco	2.6	13.5	59.9	11.8	2.7	9.5
311+312	Food (total)	3.0	19.0	58.2	15.0	3.1	1.6
313	Beverages (total)	2.2	5.8	61.4	5.4	1.9	23.2
314	Tobacco manuf.(total)	0.0	0.0	72.9	23.3	3.8	0.0

Source: Industrial Statistics, 1985

**Table 19: Company performance indicators by sub-sector -
Britain and Cyprus (1984/85)**

	Stock turnover	Sales per employee*	Capital employed per employee*	Sales per total assets
Bakeries				
Company A	14.9	9,434	2,060	2.5
Company B	9.1	8,641	-	-
Company C	7.9	15,711	-	-
Percy Ingles	192.0	10,379	2,538	2.7
La Boulangerie Francaise	58.4	31,439	6,531	1.9
Assoc.Fam. Bakers (Home Counties Ltd.)	42.1	45,041	17,013	1.8
R.H.M.	11.8	130,812	37,720	2.5
J. Lyons	6.4	32,171	11,200	1.6
Meat Processors				
Company D	8.9	25,802	8,657	-
Company E	3.6	16,857	-	-
Company F	6.2	31,624	-	-
Company G	15.7	19,416	-	-
Company H	8.6	29,076	-	-
Company I	6.2	24,004	-	-
Company J	16.5	13,934	-	-
H.H. Collins Ltd.	28.2	20,519	2,401	5.0
R.Tucker(Butchers)Ltd	174.6	76,498	4,782	8.3
Mattessons	17.3	38,441	12,883	2.2
Hillsdown Holdings	9.8	52,544	10,576	3.1
Walls Meat Co.	17.0	18,762	7,829	2.0
Soft Drink Producers				
Company K	22.4	37,967	16,383	-
Company L	29.4	20,681	-	-
Schweppes	13.2	41,974	14,071	1.6
Apollo soft drinks	3.9	54,221	20,988	1.6
L.Rose & Co Ltd.	3.3	100,217	35,526	1.7
Beecham Bottlers Ltd.	9.6	51,852	14,225	2.0
Panda Drinks Ltd.	31.0	130,120	15,430	3.3

	Stock turnover	Sales per employee*	Capital employed per employee*	Sales per total assets
Canning Companies				
Company M	1.0	18,470	-	-
Company N	58.0	13,076	-	-
Company O	36.3	12,328	-	-
Princes Buitoni Ltd.	8.1	269,267	17,640	-
H.J.Heinz Co. Ltd.	4.6	53,194	21,194	-
Snedleys Ltd.	3.6	58,318	5,495-	-
Campbells U.K. Ltd.	6.9	76,964	31,985	-
Confectionary Manufacturers				
Company P	28.0	10,197	-	-
Bowntree Mackintosh	6.7	35,694	17,867	1.4
Whiteheads (Nottm.) Ltd.	4.8	11,692	1,077	1.7
Tobler Suchard Ltd.	4.7	39,745	14,317	1.6
J.W. Thornton Ltd.	11.4	17,547	7,903	1.6
Dairy Product Manufacturers				
Company Q	3.5	32,214	-	-
Company R	22.6	11,263	-	-
Unigate p.l.c.	12.8	52,081	13,512	2.3
Hildale Farms Ltd.	42.6	-	-	3.3
Dofu Cheese Ltd.	24.8	793,000	78,778	5.0
Raines Dairy Foods Ltd.	31.8	438,407	109,767	2.3
Edible Oil Processors				
Company S	11.5	144,591	-	-
Van den Burghs & J.Ltd.	6.6	122,478	60,400	-
Marfleet Refining Co.	10.6	148,533	8,438	-
Banford Brothers Ltd.	8.5	366,500	38,563	-
Breweries				
Company T	-	-	9,862	-
Bruce's Brewery	22.6	17,790	9,605	1.1
J. Shipstones & Sons Ltd.	11.4	13,106	18,557	0.6
Allied Breweries Ltd.	10.8	18,319	21,770	0.7
Carlsberg	8.8	165,401	47,671	2.0

* Conversion rate £1 = £1.33 sterling.

Sources: Company accounts and I.C.C. Business Ratios

Table 20:

Cypriot per capita expenditure by item and
urban/rural place of residence

<u>Commodity</u>	<u>£ per person per year</u>		
	<u>Total</u>	<u>Urban</u>	<u>Rural</u>
ALL GOODS AND SERVICES	1,301.14	1,469.60	1,016.07
FOOD AND DRINKS	443.35	470.93	396.09
<u>Bread, flour, cereals, etc.</u>	<u>28.35</u>	<u>28.47</u>	<u>28.14</u>
Bread	15.00	14.72	15.45
Rusks, toast	1.65	1.78	1.44
Macaroni	2.11	1.98	2.33
Flour	1.42	1.05	2.01
Rice	1.48	1.26	1.83
Biscuits	1.96	2.19	1.58
Pyngouri etc.	0.85	0.78	0.96
Trahanas	0.66	0.61	0.74
Cornflakes etc.	0.37	0.51	0.13
Milupa, cerelac etc.	1.41	1.55	1.18
Pizza (not cooked)	1.02	1.46	0.32
Other pastry products	0.42	0.58	0.17
<u>Meat</u>	<u>108.54</u>	<u>111.08</u>	<u>104.44</u>
Beef fresh	9.63	12.33	5.24
Beef frozen	1.74	2.37	0.72
Pork fresh	21.67	21.84	21.40
Lamb & mutton fresh	32.21	31.56	33.27
Lamb & mutton frozen	1.72	2.06	1.16
Poultry fresh	24.50	25.22	23.33
Sausages	1.77	2.02	1.34
Salami	1.80	1.71	1.96
Meat, tinned	2.27	1.83	2.90
Lountza	1.45	2.00	0.55
Rabbit	4.06	3.53	4.91
Pigeon & game	3.10	1.47	5.74
Ham	1.04	1.35	0.53
Hamburger (not cooked)	0.47	0.70	0.10
Other meat products	1.12	1.08	1.19
<u>Fish</u>	<u>9.58</u>	<u>10.86</u>	<u>7.51</u>
Fish, fresh	5.63	6.58	4.08
Fish, frozen	2.30	2.58	1.82
Fish, tinned	1.33	1.38	1.25
Other fish products	0.33	0.31	0.37

Table 20 (cont'd)

<u>Commodity</u>	<u>£ per person per year</u>		
	<u>Total</u>	<u>Urban</u>	<u>Rural</u>
<u>Oils and Fats</u>	<u>28.61</u>	<u>25.80</u>	<u>33.17</u>
Olive oil	8.86	7.00	11.87
Cooking oil	14.49	14.13	15.09
Margarine	0.55	0.62	0.42
Table butter	1.82	1.99	1.53
Cooking fat	0.43	0.51	0.30
Olives	2.47	1.55	3.95
<u>Dairy products and eggs</u>	<u>50.84</u>	<u>53.52</u>	<u>45.74</u>
Milk, fresh	12.10	14.05	8.94
Milk, tinned condensed sweetened	3.59	3.66	4.26
Milk, powder for infants	1.82	1.97	1.56
Yogurt	4.45	4.75	3.96
Halloumi	12.00	13.07	10.24
Cheese	10.22	9.83	10.86
Eggs	5.20	5.17	5.26
Other dairy products	1.18	1.01	0.69
<u>Pulses, vegetables and fruit</u>	<u>92.55</u>	<u>101.43</u>	<u>78.13</u>
Haricot beans, dry	3.13	2.96	3.42
Black eye beans, dry	1.14	0.79	1.70
Broad beans, dry	0.47	0.48	0.44
Lentils	0.60	0.61	0.55
Other legumes (chick peas)	0.40	0.52	0.22
Fresh vegetables	36.13	38.76	31.89
Vegetables tinned	0.43	0.54	0.25
Potatoes	8.40	7.98	9.09
Fresh fruit	36.45	42.33	26.92
Fruit, tinned	0.33	0.41	0.19
Nuts, dry fruit	2.90	3.34	2.19
Garlic	0.09	0.14	0.01
Onions dry	0.97	1.06	0.83
Tomato paste, ketchup	1.00	1.38	0.40
Other	0.09	0.13	0.01
<u>Sugar and confectionery</u>	<u>19.66</u>	<u>22.06</u>	<u>13.91</u>
Sugar	2.68	2.41	3.11
Marmalade	0.33	0.34	0.30
Honey	0.63	0.58	0.71
Chocolates	4.30	4.83	3.46
Cookies/Pastry from confectionery	5.78	7.61	2.80
Candies (sweets)	0.65	0.72	0.54
Chipitos	0.78	0.74	0.85
Chips	0.74	0.79	0.67
Chewing gum	0.18	0.18	0.18

Table 20 (cont'd)

Commodity	£ per person per year		
	Total	Urban	Rural
Jelly	0.42	0.47	0.34
Other confectionery products	0.57	0.73	0.33
Ice-cream	2.59	2.67	0.61
<u>Alcoholic beverages</u>	<u>12.80</u>	<u>13.18</u>	<u>12.20</u>
Wine	1.15	1.25	1.00
Beer	8.14	8.23	8.00
Brandy	2.86	2.78	2.99
Whisky	0.58	0.82	0.19
Other alcoholic beverages	0.07	0.10	0.02
<u>Meals and drinks taken out</u>	<u>69.42</u>	<u>79.84</u>	<u>52.58</u>
Tyropitta etc.	2.20	2.54	1.66
Chicken, roasted	0.43	0.65	0.07
Souvlaki, koupes, etc.	4.76	5.84	3.02
Sandwich	3.11	2.84	3.55
Coffee in a coffee shop	9.63	7.44	13.10
Squash, tea etc. in a coffee shop	0.73	0.67	0.82
Soft drink, in a coffee shop	3.18	2.86	3.69
Expenses in cafes	3.49	4.59	1.71
Lunch in a restaurant	15.61	19.89	8.68
Dinner, in a restaurant/tavern	24.41	29.66	16.02
Nescafe, in a coffee shop	0.24	0.30	0.13
Take away food	1.64	2.57	0.13
<u>Other food</u>	<u>23.00</u>	<u>24.69</u>	<u>20.27</u>
Infants' meat soup	0.18	0.13	0.24
Chicken/meat soup (cubes)	0.40	0.45	0.34
Infants vegetables & fruit soups	0.19	0.20	0.17
Coffee	5.10	5.07	5.16
Tea	0.30	0.28	0.32
Cocoa	0.07	0.08	0.05
Instant coffee	2.66	3.29	1.63
Other (anise, etc.)	0.47	0.52	0.38
Salt	0.74	0.52	1.10
Spices	0.63	0.48	0.88
Vinegar	0.17	0.18	0.15
Baking powder	0.16	0.22	0.06
Afroza	0.08	0.07	0.09
Other food (rose water etc.)	0.53	0.62	0.38
Soft drinks	7.45	8.38	5.93
Mineral water	0.35	0.48	0.13
Lemon/orange squash	2.22	2.35	2.01
Fruit juices	1.26	1.34	1.13
Other non-alcoholic beverages	0.06	0.02	0.12

Source: Household Income and Expenditure Survey, 1986

APPENDIX - FOOD INDUSTRY SUB-SECTORS

The sections which follow consider each sub-sector of food and beverages separately giving a brief overview of their structure, the importance of imports and exports within the sub-sector and current and proposed tariff protection for it. Each S.I.T.C. sub-sector is considered in turn below and in each case is introduced by the S.I.T.C. subsector code.

0.1 Meat preparations

Sector structure

The meat processing sector is dominated by small companies of up to 30 employees making a wide range of up to 30 products and up to 100 lines. Traditional Cypriot sausages, prepared with wine, and traditional Cypriot ham (lounza) are a mainstay of production in some firms but are supplemented by German and British style sausages, hamburgers and other non-Cypriot imported food tastes.

The percentage value of such production is shown in Table 21. All the Cypriot traditional products have continuing appeal, whilst the range of products is enhanced by the number of German style sausages available, some which are the dried and fermented type. A number of owners had been trained in Germany whilst almost all appeared to make regular visits to trade shows there. Advice on new sausage recipes was readily available at these, through suppliers of ingredients such as spices and from independent consultants from Germany who had been used by a number of companies.

Compared with the British meat industry the range of products produced by such small companies was impressive as was the range and newness of the equipment - much of it very partially utilised. The hygiene standards were universally poor, often because of inadequate buildings. Lack of temperature controlled environments in most

Table 21

Percentage breakdown of meat product production in Cyprus, 1985

SITC Code	Commodity	Value as per cent of total meat products
011500.2	Hamburgers	4.2
012100.1	Bacon	11.9
121100.2	Mourtatella (luncheon meat)	2.3
012100.3	Salami	18.5
012100.4	Lountza (ham)	18.0
012100.5	Smoked ham (hiromeri)	2.3
012100.6	Ham	16.0
013400.1	Sausages	17.4
013400.2	Pastourma	1.3
012100.9	Other meat preparations	8.2
		----- 100

Source: Industrial Statistics, 1985

factories, inadequate flow arrangements to separate raw and cooked meats, the storage of dry goods in production areas and the very patchy use of overalls and hairnets would have stopped most factories from gaining E.E.C. approval for the export of meat products. A number of companies did anticipate upgrading their premises once the new local authority sponsored abattoir was built. They claimed there had been little point in doing so for as long as the meat they used was unable to gain EEC clearance.

The largest employer in the sub-sector employed 70 people and was based entirely upon exploiting one of the many anomalies in the EEC system of subsidies by partially processing beef and sending it back

to its country of origin. The dangers of such reliance on the quirks of the Common Agricultural Policy had been shown in 1985 when all the workforce had been laid off when the anomaly was briefly stopped.

One of the most recent developments has been the development of ham style products based on chickens which the owner claims he only established because he needed an outlet for old chickens from his egg hatchery. The refusal of existing meat processors to use such meat, which is widely used elsewhere in Europe, reveals an adherence to traditional skills which may be commendable in protecting quality but could be dangerous in facing a price based challenge from overseas producers.

Government support

The meat processing sector is almost inevitably situated close to its market due to the perishability of its products. Thus in Cyprus 82.4 per cent of consumption is produced in Cyprus compared with imports equivalent to 20.1 per cent of domestic consumption and exports of a mere 2.5%. The government has effectively subsidised meat production until recently through the grain commission by buying grains at world prices and selling at lower prices. Although the recent decline in world grain prices had in January virtually wiped out the difference between the world and the grain commission price there is an administrative expense of the grain commission of £10.00 per tonne which is paid by the government. This is a continuing subsidy to meat producers if they would otherwise have to pay suppliers a premium which reflected such purchasing costs. In addition livestock producers are protected by bans on the import of all meat unless it obtains an import license. The supply of such licenses is normally restricted to times when meat shortages force up local prices unduly. Meat processors are similarly protected by tariffs of up to 30%.

It is Cyprus government policy to negotiate continued similar protection after customs union entry (known as "exclusion" from the customs union). The E.C. initially offered such exclusions for only 10 years but the Cypriot negotiators appeared confident that they would ultimately be able to obtain a more generous offer.

0.2 Dairy products

Sector structure

The dairy sector is like meat, dominated by many small companies most of which employ less than 20 people but who produce fewer lines than those of the meat products sectors. Sheep, goat and cows milk are all used for processing and the supply of each is very seasonal with surpluses, particularly of cows milk, at some times of the year and shortages, particularly of sheep and goats milk, at others.

The percentage value of dairy production is shown in Table 22. Traditional products such as halloumi, anari and other cheeses which are often made solely of sheeps milk are popular on both local and export markets particularly in the Middle East. In spite of this dairy imports are equivalent to 27.8 per cent of domestic consumption whilst home production and exports are the equivalent of 87.7 per cent and 15.6 per cent respectively. For products such as fetta cheese, milk from sheep or concentrated milk from cows produces a very similar product. It has thus been possible for countries such as Denmark which have a highly developed dairy industry to produce fetta in large quantities for the Middle East market. Thus fetta cheese is their largest single export with sales of double more traditional exports such as Danish Blue.

In contrast much of the Cyprus dairy industry uses relatively traditional methods to produce such products although one company with relatively little prior experience of yoghurt production recently entered the sector through the purchase of a complete

Table 22

Percentage breakdown of dairy sector output by value, 1985

S.I.T.C. Code	Commodity	Value as per cent of all dairy products
022301.1	Pasteurised products	35.3
022301.2	Fresh cream	1.4
022301.3	Yogurt	11.6
022301.4	Airani	0.3
023000.1	Butter	0.2
024001.1	Cheese	10.7
024001.2	Halloumi	34.0
024001.3	Fetta	3.6
024001.4	Anari	2.8
024001.5	Trahanas	0.2
024001.9	Other dairy products	0.1
		100

Source: Industrial Statistics, 1985

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"high-tech" factory from European suppliers on a design and build basis. Such factories do have access to the technology used by the Danes but on a far smaller scale. All the factories face problems with raw material supplies - in particular through variation in the total solids content (which affects yields and quality) and antibiotic contamination (which stops the action of the bacteria which make the cheese).

A few factories have introduced quality tests on milk deliveries particularly from sheep milk producers with whom the dairies deal directly and therefore think they have more control over. A recent

government consultative report recommended that the milk marketing board be expanded and should handle all milk deliveries in bulk. Dairy industry owners were generally against such plans believing that in the past the marketing board had shown itself unable to control quality and bulk supplies of milk could more easily be contaminated from a single source. The dairy industry was extremely critical of current marketing board policy which paid a standard price throughout the year even though milk supplies, particularly of sheep and goat milk, were seasonal. Monopoly marketing is more effective for cow milk than sheep milk so the dairy industry is often able to pay less than the theoretically fixed government price in dealings with individual sheep owners. In the long term however such discrepancies would seem likely to further encourage the drift from sheep to cow ownership even though it is only cows milk which is substantially overproduced.

The range of cheeses of local origin is extensive, varying from soft cheeses such as fetta to high value hard cheeses such as kefalotyri which is only produced from sheeps milk. Although the Danes now effectively dominate the Middle East market for the easily copied fetta, their halloumi has had less success with sales declining in recent years, possibly indicating the greater difficulty of competing on higher quality products. Kefalotyri, in contrast, is apparently only produced in Cyprus and even though it sells for over £3.00 per kilo, sells readily. One company reported that it was unable to produce sufficient to satisfy the local market from the available supplies of sheep's milk and therefore saw no point in seeking export markets. A number of companies are bringing in plants to produce Edam following a government ban on imported Edam in 1986. This was designed to produce an additional market outlet for surplus cow's milk. However quality was variable and limited imports were re-allowed in early 1987.

The dairy industry has one of the strongest sub-sector trade associations which has represented association members in the local media and also arranged joint purchases from overseas of yoghurt

packing cartons for all members. This has enabled a sufficient order to be assembled to satisfy the suppliers minimum order requirement. However such cooperation is at an early stage and although one factory could print all the yoghurt cartons needed in the industry its manager claimed that no owners would be prepared to give away details of their sales figures through passing on carton orders to another company.

Government support

As with meat, the dairy sub-sector is greatly affected by government support measures for dairy producers. The subsidisation of grain supplies and the marketing arrangements detailed above, apparently have the conflicting effects of both reducing milk prices (for the former) and increasing them (for the latter). The fixed price regimes perpetuate seasonal fluctuations in supply whilst their variable implementation apparently encourages producers to switch from sheep to already oversupplied cows milk production. Penalties and testing for bad quality or contaminated milk were thought by the dairy industry to be inadequate.

Apart from this intervention in the supply of dairy sector raw materials the government has directly intervened in producing halloumi cheese for export markets using surplus cows milk. This intervention was strongly criticised by some producers who claimed that the lower quality government product has undermined the traditional premium market image they had established for their own products based on sheeps milk.

However government intervention is clearly not all detrimental to the dairy industry. A combination of bans on competing imports and duties of up to 12% on other cheeses does help the industry. Also the recent establishment of a range of minimum standards for dairy products, in cooperation with the trade association, has bolstered the domestic quality of the industry's products.

0.4 Cereals and cereal preparations

Sector structure

The sector is probably one of the most variable of all with manufacturers ranging from one person village bakeries to a large operation employing several hundred workers. Flour is supplied from six mills of which one, in Limassol, claims to produce 40% of all flour of which 70% is supplied to its own bakery. The bulk of grain is supplied by the grain commission.

The percentage value of cereals and cereal products is shown in Table 23. The short shelf life of many bakery products has ensured that home production accounts for 90.7 per cent of domestic consumption with imports equivalent to 12.9 per cent and exports to 3.6 per cent. Major import items are breakfast cereals (8% of the total), biscuits (30%), rice (16%) and infant cereal foods (10%). Although many processors produce more than one, it is probably easiest to describe the production of bread, "fancy goods" and biscuits separately.

A variety of breads are produced ranging from the traditional round village loaf containing a large proportion of durum wheat to most of the European styles of bread which use strong and soft wheats. The price of the village loaves, which account for a decreasing proportion of the market, is set by the government and seems to be based on the profitability of the largest bakery which cross subsidises its village loaf production from its profits on non-price controlled items. This has not closed all the independent bakers even though it must seriously undermine their profitability. However the strategy of the largest bakery, in which the government has a controlling interest as a result of large loans in the past, may have been self-defeating since a more recently established company producing only European style breads can now undercut existing suppliers of such breads or take excess profits.

Table 23

Percentage breakdown of cereal and cereal products sector
output by value 1985

S.I.T.C. Code	Commodity	Value as per cent of all cereal products
044000.0	Meal of maize	0.6
046010.1	Wheat flour	8.4
046010.2	Semolina	1.8
046010.3	White flour	5.1
047010.1	Barley flour	4.4
047010.2	Fouscari	1.3
047010.3	Bran	2.8
047010.4	Groats	0.6
047010.6	Meal of barley	3.6
047010.9	Other grain mill products	0.1
048300.1	Macaroni	3.2
048300.2	Ice-cream wafer cones	0.5
048300.5	Ravioli	0.7
048410.1 & 2	Bread	18.1
048410.3	Bread rolls	3.5
048410.4	Koulouria	1.5
048410.5	Kebab bread	2.9
048410.6	Tahinopitta etc.	4.1
048410.7	Cakes and pastries	15.7
048410.8	Biscuits	5.7
048411.1	Sliced bread	3.7
048411.2	Toasted bread	3.0
048411.3	Keileifi flakes	1.7
048411.4	Salty cakes	4.1
048411.9	Other bakery & confectionery products	3.1
		----- 100

Source: Industrial Statistics, 1985

Production facilities vary widely from small traditional village ovens through to semi-automated processes with belt ovens, automatic dough dividers etc. Automation to the level common in European process bread plants does not exist but with production of 31 bread lines, in the largest bakery, for a relatively small market such automation is not really justified.

The second largest area of production is in producing cakes and pastries. Although sometimes connected with bread bakeries there are also many specialist producers. A wide range of puff pastries are produced on semi-automated lines in the most modern factories whilst an extensive range of cakes is also produced albeit almost by hand with only the simplest of mixers and ovens. However the importance of freshness in all these products protects traditional small scale production units.

This is not so true for rusks and biscuits which can, if properly wrapped, have a shelf life of months. Rusks (dried breads) flavoured with spice seeds such as aniseed and sesame were produced, as for bread, and cut up before being dried in a bread making oven. A range of biscuits were produced which seemed to concentrate on sweet biscuits of "Marie" and similar types selling well below the price of imported equivalents. Exports of biscuits and cakes, mainly to Middle East markets have been an important sales outlet and account for 46% of total sub-sector export sales. Dessert mixes, produced largely for export account for a further 26%.

Government support

This sector is obviously a principal beneficiary of past government policy to subsidise grain prices. In addition pastry and biscuits are protected by a general tariff of 60% and there are total bans of competitive imports of some specific products such as macaroni.

0.5 Dried fruit, preserved fruit and vegetables, juices and carobs

Sector structure

This sub-sector is the only food sub-sector where domestic production greatly exceeds consumption (141.7%). Domestic demand is not all for locally produced foods so imports account for 30.3% of domestic consumption, whilst exports are equivalent to 72.0%. A detailed breakdown of the sub-sector is given in Table 24.

The importance of value added in this sector is shown by a comparison of the value of concentrated juices (£452 per tonne) and natural juices ready for drinking (£352 per tonne). The similarity of the value is remarkable considering that the concentrate contains 4-6 times more fruit content than the product made from it, and indicates the importance of adding as much of the final value as possible within the Cyprus economy.

The importance of this sub-sector to rural areas and to the Cyprus economy is indicated by the heavy institutionally backed investment in the processing industry. The Co-op backed canned food company which produces under the Cyprima brand has an extensive range of different types of often very modern processing equipment including freezing facilities. It was in receivership in early 1987 but according to management representatives this was because of poor results at other Co-op investments. Even if the cannery remained profitable it seemed clear that it was operating at a fraction of capacity although in part this was due to a requirement of the receiver that it produced only to firm orders. In addition the Hellenic Bank group of companies, which is largely owned by the church, owns S.W.S., a large but not particularly modern canning company which averaged zero gross profit in the five years to 1984/85.

Table 24

Percentage breakdown of fruit and vegetable products by value, 1985

S.I.T.C. Code	Commodity	Value as per cent of all fruit & veg.products
051000.0	Nuts	20.8
051000.4	Almond shelled	5.8
052000.1	Raisins	1.0
052000.9	Other dried fruits	0.1
053300.1	Jams and marmalades	2.5
053501.1	Concentrated juices	1.3
053501.2	Tomato paste	3.3
053501.3	Tomato ketchup	0.4
053501.4	Lemon juice	0.4
053501.5	Fruit drinks	12.2
053502.1	Natural juices	12.1
053901.1	Canned juices	19.6
054890.1	Carobs kibbled	2.7
054890.2	Carob kernals	6.2
054890.4	Roasted carob powder	1.6
055521.2	Canned vegetables	5.0
055521.3	Pickles	0.4
055521.4	Houmous	0.9
055521.5	Pickled vegetables	0.8
055521.9	Other preserved products	2.7
055522.1	Olive kernels	0.2

Source: Industrial Statistics, 1985

A number of industry members pointed out the importance of remaining competitive by constant innovation. The two most profitable companies visited had been in the vanguard of recent technological change; one through the introduction of tetrapaks and the other

t ough continued technological innovation at all stages of production. Particularly impressive in the second company was a commitment to weekly training sessions, an impressive marketing strategy and a management control system set up and continually updated by consultants from Britain. The contrast with those companies which merely processed commodities could scarcely have been greater.

Although there had been a large number of technological improvements over recent years in such areas as juice extraction the greatest change by far in this sector has been the introduction of "Tetra Paks" or similarly formed cardboard aseptic packaging techniques for juice. The introduction of one litre and 200 ml. packs to Cyprus was as popular as in other countries allowing the company which introduced it to significantly increase market share and forcing its competitors to follow. There are now two such plants in Cyprus producing fruit juice and a further one producing a yoghurt-fruit juice drink. Even though each could produce enough of each to supply the entire domestic market it seems likely that at least two other companies will shortly introduce similar packs in an effort to regain market share.

Apart from fruit juices the export opportunities for Cypriot processed fruit and vegetables are largely based around citrus and vine fruits. Processing of such fruits as grapefruit segments is extremely labour intensive but they are marketed in Britain under major own label brand names such as John West and Sainburys. Seedless grapes are largely processed in bulk for further processing into fruit salad in other countries such as Italy. The difference in quality between the labels used by producers for products sold under their manufacturing brand label and for products sold under European brand names was marked.

Most of the processing factories also produce canned, or even in one case, frozen vegetables largely for the domestic market. There is little contract production of such produce for processing and so the

varieties grown are often not particularly suited to it. This inevitably reduces consumer perception of final product quality. Although frozen vegetables are the highest net food import in this sub-sector (10%) the value of import substitution inevitably depends on the relative efficiency with which competing vegetables can be produced in Cyprus.

Significant advantages are readily available to Cypriot producers in closely related product areas serving more specialised market niches. Included amongst such product areas are preserved vine leaves (one processor suggested that the leaves were probably worth more than the grapes nowadays), preserved capers, and mosphito berries. For all of these products there is little organised agricultural production so their processing is often carried out by the smaller factories who are better able to organise collection of produce often growing 'wild'.

An interesting reversal in the fortunes of one food crop, the carob, has recently occurred. Demand has risen in increasingly health conscious European markets, where it is used as a substitute for chocolate, and as a consequence the Ministry of Agriculture report strong demand for new trees. They exercise considerable control over the varieties used by farms since they selectively supply those varieties which they believe are best suited to promoting desired agricultural output. Carob powder is produced in government sponsored processing plants.

The largest group of imports are dried pulses (21% of the sub-sector), followed by preserved fruit (13%, in part, at least, for use in producing fruit cocktails), frozen vegetables (10%) and shelled nuts (9%). Orange juice imports which appear to be 12% of the total sub-sector imports are almost exactly balanced by the figure for exports indicating some overseas trade to iron out fluctuations in seasonal supply and demand. The largest group of exports are prepared or preserved grapes (36%), followed by dried grapes (20%), grapefruit segments (9%), dried broad beans (10%) and

carob products (7%).

Government support

There are a wide variety of schemes to support traditional agricultural sectors such as vine and citrus growing. These schemes vary from direct grant support to minimum price support at levels above world market prices. Whilst the former of these would be expected to reduce the price to processors the latter would increase it. Processors also complain that government restrictions on competitive imports of cans and cardboard cases also increase their costs above the level of overseas competitors. Ministry officials doubt however whether overseas packaging material prices would be kept so low if there was no longer a competitive Cypriot packaging industry.

The import substitution products of the industry do themselves receive significant protection with general tariffs of 52% for vegetables in vinegar or syrup, 44% for canned fruit, between 4% and 40% for fruit juices, 54% for tomato puree and 30% for frozen vegetables. In negotiations over the customs union, Cyprus has sought exclusion from change for most of these tariff barriers and, although in the first negotiations the EEC was only prepared to consider such arrangements for a 10 year period, Cyprus negotiators expect to obtain a better deal in the final arrangements.

0.6 Sugar, sugar preparations and honey

Sector structure

The percentage value of production in this sector is shown in Table 25.

Although sugar products need not be produced close to the market a high proportion (73.8 per cent of consumption) are, with imports equivalent to 40.7 per cent and exports to 14.5 per cent. Imports

are dominated by refined sugar (56%), followed by sugar confectionery (20%), and natural honey (18%). However exports of honey (88% of total exports in the sub-sector) exceed imports by over 70% demonstrating the significant industry which has developed in Cyprus around packaging domestic and imported honey for Middle Eastern markets. The greatest area of concern to producers in the

Table 25

Percentage breakdown of sugar products by value, 1985

S.I.T.C. Code	Commodity	Value as per cent of all sugar products etc.
061100.1	Packing of sugar	0.8
061601.1	Honey	18.7
062010.1	Caramels	6.6
062010.3	Turkish delight	2.5
062010.4	Sherbet	1.2
062010.5	Ground coconut	2.7
062010.6	Mostich	2.9
062010.7	Cream powder	1.8
062010.9	Other sugar confectionery	14.6
062011.2	Halva	2.0
062011.3	Tahini	5.6
062011.4	Sesame	5.8
062011.5	Potato chips and crisps	22.8
062011.6	Ice	1.5
062011.9	Other food products	10.4
		100

Source: Industrial Statistics, 1985

in the sub-sector is the high import penetration of sugar confectionery for which imports are 27% of domestic consumption while exports are a mere 4% in spite of high tariff barriers.

Government support

Honey is protected by a 16% tariff barrier to non-EEC countries whilst sugar confectionery is protected by an 80% barrier.

0.7 Coffee, tea, cocoa and spices

Sector structure

The percentage value of production in this sector is shown in Table 26. Imports are dominated by unroasted coffee for domestic

Table 26

Percentage breakdown of coffee, tea, cocoa and spices production (1985)

S. I. T. C. Code	Commodity	Value as per cent of whole sub-sector
071300.1	Coffee	66.8
071300.3	Instant coffee	2.4
073000.1	Chocolate	20.3
073000.2	Other sugar confectionery prods.	0.5
073000.3	Baking chocolate	3.1
075000.1	Spices	4.5
075000.3	Aromatic	2.4
		----- 100

Source: Industrial Statistics, 1987

processing (43%) and instant coffee packed for retail sale (15%), together with chocolate confectionery (20%). Exports consist almost entirely of domestic exports of roasted coffee (20%) and chocolate confectionery (34%), together with re-exports of instant coffee (30%).

The most significant areas for employment are coffee production and chocolate confectionery production. The largest coffee producer, producing 70% of the market needs, employs 280 people and claims demand continues to increase.

The chocolate confectionery industry is heavily protected in the same way as the market for sugar confectionery yet imports represent 66% of the domestic market whilst exports represent 23%. The split between chocolate and sugar confectionery in government statistics can be misleading since in practice the same firms normally produce both. One producer spoken to suggested that because the confectionery industry had a cheap and low quality brand image it would be unable to cope with any reduction in tariff protection. He was making moves up-market in an attempt to escape such pressures. Almost inevitably for an industry supplying such a small domestic market, production lines seen were small, primitive but highly flexible and made use of mills to prepare chocolate from cocoa powder and cocoa butter.

Government support

Chocolate goods are protected by a 70% external tariff, roasted coffee by a 36% tariff.

0.8 Animal feeds

Sector structure

The percentage value of production in this sector is shown in Table 26. Imports are dominated by soybean residues (60%) and fish meal

(11%), whilst exports are minimal quantities of residues from food processing. Overall imports represent just under half domestic consumption (41.9%) although this figure would be larger if the quantities of cereals used for animal feeds were included in this total.

Table 27

Percentage breakdown of animal feed production value, 1985

S.I.T.C. Code	Commodity	Value as per cent of whole sub-sector
081990.5	Fowl feeds	43.8
081990.6	Pig feeds	5.4
081990.7	Cow feeds	26.9
081991.1	Sheep and goat feeds	16.0
081991.2	Rabbit feeds	5.2
081990.9	Other mixed animal feeds	2.7

		100

Source: Industrial Statistics, 1985

Government support

This subsector is in no way supported by the government and in fact the agent for one overseas company which produces compound animal feeds said the availability of subsidised grains on the local market had made it virtually impossible to compete.

0.9 Other food products

Sector structure

The percentage value of production in this sector is shown in Table 28. Although domestic production is equivalent to 50.9 per cent of domestic consumption imports are inevitably high in this "catch-all" sub-sector at the equivalent of 78.0 per cent of domestic consumption. Exports were equivalent to 29.0 per cent in 1985.

Table 28

Percentage breakdown of other food products production value, 1985

S.I.T.C. Code	Commodity	Value as per cent of whole sub-sector
099070.1	Vinegar	19.8
099091.1	Ice-cream	63.3
099095.1	Jelly	16.9

		100

Source: Industrial Statistics, 1985

The biggest import item was cola concentrates (23% of the sub-sector total) followed by infant foods (18%), margarine (13%) and prepared soups (11%). Export volumes were far smaller and included vinegar (31%) and sauces (17%).

The biggest industry in this sub-sector is protected both by the cost savings of producing close to the market and by extensive tariff barriers. Although the range may be a little traditional by European standards it is fairly wide and made using full milk

ingredients. Profitability did not appear to be a problem. One company maintains continuity of employment throughout the year by redeploying salesmen to make fridges in the winter.

Government support

Apart from a general tariff of 34% on ice cream the government apparently has a policy of excluding competitive imports. The Ministry of Commerce and Industry recently instructed a new American ice-cream parlour company to find local replacements for the imported concentrates it uses to produce ice cream, or face a ban on such imports.

1.1 Beverages

Sector structure

The percentage value of production in this sector is shown in Table 29. Beverages is one of only three sub-sectors within food, drink and tobacco where domestic production exceeds domestic consumption (126.7%). Imports (equivalent to 17.9% of domestic consumption) are low compared with exports (44.5%). The largest import item by far was whisky (50% of total imports) followed by beer (13%). Exports are split more equally between bulk wines (26% of total beverage exports), bottled wines (19%), grape must (18%) and eau de vie de vin (11%).

Within the sub-sector soft drinks are the largest single product with a series of well known Cypriot brand names. One of these was developed after the Ministry of Commerce and Industry banned the importation of "Sunkist" concentrates which are produced by a Californian growers association on the basis that an identical product could be produced from local oranges. Pepsi and Coca-Cola both have local bottlers producing for the local market under licence. The one such producer visited was very market orientated, planning joint marketing campaigns with the multinational supplier

and running regular training sessions for sales staff.

Table 29

Percentage breakdown of beverage production by value, 1985

S.I.T.C. Code	Commodity	Value as a per cent of all beverage production
111011.1	Mineral water	1.5
111020.1	Soft drinks	27.8
111020.2	Squashes	4.5
111020.3	Rose water	0.2
112110.1	Grape must	6.8
112120.1	Sherry	2.0
112120.2	Other wines	16.9
112300.1	Beer	24.6
112401.1	Brandy	8.1
112401.2	Ouzo	0.6
112401.3	Liqueurs	0.4
112401.4	Whisky	0.3
112402.1	Eau-de-vie-de-vin	3.9
112402.2	Pure spirit	1.5
112402.9	Other spirits & beverages	0.8
		----- 100

Source: Industrial Statistics, 1985

Within the sector squash prices are controlled by government so in effect they must compete on quality alone. Price controls for soft drinks were abandoned following a joint approach to the Ministry of Commerce and Industry by all producers. One manufacturer claimed that since the Ministry will only raise the price if approached

jointly by all producers, those producers who produce very little of a particular product have a vested interest in not backing such an approach to undermine their competitors' profitability. In consequence it was argued that squashes were currently underpriced.

Beer production is only for the domestic market and only started in 1951 to satisfy growing local demand based around the tastes of British soldiers during and after the war. A second brewery was set up in 1969 yet, although competition is fierce, the original brewer still uses a longer maturation, non-pasteurised brewing method which is more expensive than the newer competitor who produces Carlsberg under licence.

Wine, brandy and grape must production is geared around the need to find outlets for the Cypriot grape crop. One producer claimed this had exceeded requirements for the past 20 years. The government sets a minimum price for grapes and although companies can refuse to accept them this is rarely done since it is quite likely to result in deliveries being dumped at the entrance to a winery. As a result many grape deliveries are already starting to ferment before arrival at factories and it initially was very difficult to produce unfermented grape juice for retail sale. One producer claimed that the quality of grape deliveries was of far more importance than their variety in producing quality up-market wines.

The industry has demonstrated remarkable agility in responding to enormous fluctuations in its export markets. Following Britain's entry into the EEC there were major reductions in tariff concessions. Although Cyprus is still allowed reduced tariff quotas for table and liqueur wines falling sales of sherry mean that it can never sell all its quota of the latter whilst its sales of the former are artificially limited. In addition the Soviet Union has virtually stopped importing bulk red wines and spirit and so, to avoid the creation of a mini wine lake, sales of grape concentrate have been increased. Although there are some such sales within Europe the most significant market is now Japan which imports grape

concentrate for the production of saki from Cyprus. It formerly bought from Spain and changed its source of supply after Spain's EEC entry apparently to retaliate for the consequent imposition of duties.

Government support

Cyprus has a general tariff on wine imports of between £4.72 and £5.55 per gallon and on beer of £1.80 per gallon. In addition it intervenes extensively in the production of grapes setting a minimum price which producers claim would make their products uncompetitive. As a consequence the producers also receive a subsidy.

The fixed minimum price has effectively become the price for most grape production and is seen by some producers as hindering moves to improve the quality of supplies by varying prices for different quality supplies.

1.2 Tobacco and tobacco manufactures

Sector structure

The percentage value of production in this sector is shown in Table 30. Home production is equivalent to 103.8% of domestic consumption with imports equivalent to 42.8% and exports equivalent to 46.6%. Imports are dominated by cigarettes (63%) followed by various types of tobacco raw materials (29%). Exports and re-exports are even more totally dominated by cigarettes (96%). As cigarette consumption has declined with increasing concern over the health risks of smoking, production of cigarettes has also declined (by 29% over three years).

Table 30

Percentage breakdown of tobacco production by value, 1985

S.I.T.C. Code	Commodity	Value as a per cent of all beverage production
121063.1	Fumigated tobacco leaves	0.2
121003.3	Virginia tobacco leaves	3.3
122200.1	Cigarettes	96.5

Source: Industrial Statistics, 1985

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THE CLOTHING INDUSTRY IN CYPRUS

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CLOTHING

SUMMARY

Any strategy for the clothing sector in Cyprus must take as its point of departure the profound transformation of the international clothing industry over the past decade. Throughout the advanced economies, there has been a pronounced movement away from the high-volume production of low-cost, simply styled garments for a homogenous mass market, towards the flexible production of a wider range of styles for increasingly differentiated groups of consumers. While price remains important, especially at the low end of the market, the struggle for competitive advantage has increasingly come to centre on retailers and manufacturers' efforts to target specific groups of customers defined in new ways; to seduce consumers with fashionable, well-designed garments; and to respond rapidly to short-term trends in sales of a wider range of styles manufactured in smaller batches. The challenge facing clothing suppliers is thus no longer that of turning out long runs of standard garments at the lowest possible cost, but rather of designing and manufacturing the widest possible range of garments at the lowest cumulative cost. The key problem has been to overcome the traditional trade-off between flexibility and productivity, and here new micro-electronic technologies such as CAD/CAM and computerised management information systems have begun to play a vital role alongside revised methods of manufacture and broader operative training.

One major consequence of these trends has been to reduce the importance of clothing imports to Western Europe from low-wage developing countries. Lead times are too long, minimum production runs too large, quality control too difficult, and the capital costs of stocks too high to make sourcing in the Far East worthwhile except for the cheaper and less fashion-sensitive types of garment. Import

penetration into countries like Britain has stabilised since the early 1980s, and the EEC has significantly increased its share of the British market at the expense of the developing countries. Italy has emerged as the world's largest net exporter of clothing and textiles despite wage levels four times higher than those of Hong Kong and twenty times those of countries such as Sri Lanka.

These far-reaching shifts in markets, technology and competitive strategies create new opportunities and new dangers for the Cyprus clothing industry as it has developed over the 1980s. The Libyan market which fueled the industry's expansion in the first half of the decade has proved dangerously unstable at the same time as it led Cyprus firms to specialise on product types and marketing methods that are uncompetitive elsewhere even in the Middle East. In the European markets which account for an increasing share of Cyprus clothing exports, demand for mass-produced garments has narrowed considerably, while prices and profit margins for these goods are depressed by the intensity of competition, both domestic and international. Cyprus is not in any case a low-cost producer by comparison to the Far East, nor have its larger firms pursuing mass-production strategies succeeded in achieving significant economies of scale. Specialisation on simply-styled garments with a low design content, finally, enhances the industry's vulnerability to competition in the home market from fashion-orientated manufacturers abroad when tariff barriers come down as a result of entry into the European Customs Union.

But these shifts in the international economy also create attractive possibilities for the development of the clothing industry in Cyprus. There has been a considerable expansion of demand for well-designed clothes produced by a skilled workforce with flexible equipment in countries close to European markets and inside EEC trade barriers. Changes in technology and work organisation make productivity improvement compatible with product diversity, while higher profit margins per unit for better-made, more fashionable garments can offset the wage levels required by Cyprus' high standard of living.

Two main strategies can be identified whereby Cyprus clothing manufacturers can take advantage of these opportunities. One strategy is for firms to build up their design capacities in the domestic market as the basis for a subsequent move into exports. In this respect, a home market like that of Cyprus which demands fashion and variety is a great asset, and firms can use it as a laboratory in which to develop a distinctive style and product image which can ultimately be projected into foreign markets as well. Close touch with local demand and the creation of an indigenous Cyprus style will likewise be vital to safeguarding the home market against invasion by European designer garments once tariff barriers have been lowered. Licensing agreements with well-known foreign brands, by contrast, may work in the opposite direction, and should be discouraged unless clear prospects of substantial sales outside the island can be established.

A second strategy is for Cyprus firms to become high quality suppliers for foreign retailers and manufacturers, building up long-term relationships on the basis of flexibility, reliability and quality rather than price alone. Through such relationships, Cyprus clothing firms can gradually acquire a feel for the requirements of European consumers while learning how to combine flexibility and efficiency and thereby reduce production costs. Ultimately, however, these two strategies must converge if the Cyprus clothing industry is to consolidate its position in international markets. Improved productive efficiency is vital in securing the price edge needed for unknown manufacturers to break into foreign markets, while original design capacity is crucial in expanding such footholds once acquired.

In-depth interviews with local firms suggest that a significant section of the Cyprus clothing industry has already gone some distance towards putting these strategies into practice. But as in other countries such as Italy, their success will require access to a range of common services which are beyond the means of even the most dynamic local firms to provide for themselves on an individual basis. The development of these common services forms the core of the detailed recommendations outlined at the end of this report.

THE INTERNATIONAL CLOTHING INDUSTRY IN TRANSITION

Any strategy for the clothing sector in Cyprus must take as its point of departure the transformation of the international clothing industry over the past decade. As in other sectors, this transformation can be understood as a shift from mass production to flexible specialization (Piore and Sabel, 1984; Sabel and Zeitlin, 1985): from the manufacture of standard products with specialized resources (narrowly-skilled workers and dedicated, single-purpose machines) to that of specialized products with general resources (broadly skilled labour and universal, multi-purpose machines). For clothing in particular this means that the balance of competitive advantage has shifted away from the high-volume production of low-cost garments for a homogeneous mass market towards the flexible production of a wider range of styles for increasingly differentiated groups of consumers.

1.1 The Reconfiguration of the Market

1.1.1 Industrial Structure and Mass Production

The clothing industry has never been a classic site for mass production. The volatility of fashion and the instability of limp cloth as a working material have always set greater limits to production economies of scale than in other industries. A relatively open and fragmented industrial structure has therefore persisted even in the United States, where the adaptation of mass-production methods to garment manufacture has progressed furthest (Chandler, 1977; Fraser, 1983). In Western Europe, with its smaller and more diverse

national markets, the average number of employees (in firms with more than 10 workers) in 1971 ranged from a low of 42 in Denmark to a high of 100 in the UK (Table 1 and Fornengo, 1978: ch. 2). Across the industry internationally, however, firms are typically larger and production runs longer in the more standardized areas of menswear and workwear than in more fashion-sensitive areas such as womenswear. But even for the most standardized types of garment such as men's suits and shirts, a recent study shows that the cost penalty resulting from production at one-third of the minimum efficient scale of operation is only 2-3% at the level of the firm and 4-10% at the level of the individual product (Mariotti, 1982).

Despite the fragmented structure of the industry, there were important forces pushing clothing manufacturers towards more standardized, longer-run garment manufacture during the postwar period. In Britain, for example, the key pressures in this direction came from the multiple and variety chains - above all Marks and Spencer - which dominated retail distribution. With the market divided into relatively stable segments by age, sex and price, the major retailers were largely able to set the pace and direction of fashion change, and pressed the manufacturers dependent on them to capture available production economies of scale by adopting garment engineering techniques developed in the United States. Within the core segments of the mass market, therefore, competition among the retail chains and their manufacturers revolved mainly around price and the physical quality of garment manufacture, with design relegated to a subsidiary role outside the high fashion sector (Wray, 1957; Rainnie, 1984).

1.1.2 The Crisis of the 1970s

In Britain as in the United States, the salience of price competition and the industry's concentration on the high volume manufacture of a slowly-changing range of garments with a low design content left domestic producer extremely vulnerable to the upheavals in the international economy during the 1970s. As Third World countries

such as Hong Kong, South Korea, Taiwan and the Phillipines acquired the relatively simple skills and transferable technology associated with the manufacture of standard garments in long runs, the low wages and non-union conditions of their workforce enabled them to undercut domestic production costs by a wide margin. Despite restrictive quotas imposed under international agreements, therefore, import penetration in the British market shot up dramatically to reach an overall ratio of 34.4% in 1981 (Rush and Soete, 1984).

The British clothing industry's commitment to mass production and price competition likewise left it unprepared for the onset of the world recession at the end of the 1970s. The depression of consumer demand at home and abroad left retailers competing for shares of a slowly growing market and touched off major price war among the high street retail chains. Unpredictable fluctuations in demand, low-cost import penetration and static retail prices all combined to squeeze domestic clothing manufacturers no longer able to achieve the sales volumes needed to cover the high overheads of long-run garment production. The result has been a rapid decline in employment from 320,000 in 1974 to 290,000 in 1978, 216,000 in 1981 and 194,000 in 1984, with closures concentrated among large and medium-sized firms in all the major clothing centres (Rainnie, 1984; Greater London Council 1984, 1986; Lancashire County Council, 1985).

1.1.3 The Fragmentation of the Mass Market

Since the beginning of the 1980s, however, the conditions of competition in the international clothing industry have shifted decisively away from those prevailing in previous decades. Changes in consumer tastes and the demographic structure of the population, the volatility of demand and the high capital costs of stocks and work-in-progress, and the industry's own efforts at product differentiation have together fragmented the mass market in the advanced countries and eroded the advantages of long-run garment

manufacture. While price remains important, particularly at the lower end of the market, the struggle for competitive advantage has come to centre increasingly on retailers' and manufacturers' efforts to target specific groups of consumers defined in new ways; to seduce customers with attractive, fashionable garments; and to respond rapidly to short-term trends in the sales of individual product lines.

There is widespread agreement among industry observers that consumer demand for clothing has become at once more fragmented and more discerning in recent years, with no single fashion or style dominant as in the past. Demographic and economic changes in the advanced countries have made 25-40 year old women rather than more easily influenced teenagers the most important group of clothing buyers, at the same time as the recession has fueled the trend towards purchasing fewer but more expensive and durable garments. The rise of casualwear and 'lifestyle' dressing has undermined established divisions within the market, as has the growing sensitivity to fashion of menswear, childrenswear and even workwear. Increased international competition has likewise added to the cacophony of styles within each national market. The result has been a reconfiguration of demand in which, as one study puts it, 'fashion is becoming more a question of individual taste than of trends set by designers'; and as recent studies confirm, a large section of consumers are prepared to pay a price premium for clothing 'catering to my taste' (Rosen, 1984: 36; Oddy, 1984a: 43; Textile Market Studies survey reported in Apparel International, June 1984: 22).

1.1.4 The New Retail Competition

The growing fragmentation and sophistication of the mass market has made it increasingly difficult to sell a single, rigidly-planned 'look' to broad categories of consumers, and high street retailers have therefore begun to target narrowly-defined segments of the market with loosely-structured garment ranges which allow the individual shopper to construct a more 'customized' wardrobe. The

outstanding success for this strategy in Britain has been the rapid growth of the Hepworth chain 'Next', whose 'coordinated' separates aimed at fashion-conscious women between 25 and 40 boosted sales from £20m in 1983 to 70m in 1984; and this strategy has been extended to new market segments with the creation of 'Next for Men' in 1984 and 'Next Interiors' in 1985 (Oddy 1984b; 'What's Next', Economist 15/9/84: 79; Polan, 1985).

Next's success has set off shock waves in rival boardrooms, sparking off a series of takeovers and imitative responses from retailers whose markets have been invaded. Richard Shops, which caters for the same age bracket as Next, has been taken over by Terence Conran's Habitat-Mothercare group and is making a determined effort to regain its customers through improved design and garment quality. The Burton group has launched a new chain 'Principles' explicitly aimed at translating high fashion into high street terms: 'Vogue designs at Next prices' according to one description, with looser coordination than the Hepworth chain. Under pressure of poor results in 1984, even Marks and Spencer was forced to follow suit with the establishment of a specialist coordination department and a belated effort to upgrade its design profile (Polan, 1984; Taylor, 1984; 'Market Fit', Apparel International, July 1984; Rosen, 1984; Beach, 1985).

While these developments are most pronounced in the upper-middle segments of the women's market, they are clearly visible throughout the clothing industry. C&A, for example, have been successfully pursuing a strategy of increased variety and fashionability across a number of market segments, moving away from commodity marketing towards garment ranges targetted by lifestyle such as sportswear, outdoorwear and young fashions. Woolworth's, now under new management, have likewise sought to upgrade their image with more fashionable, better-made clothes, especially in childrenswear; as

Have other mass-market dinosaurs such as British Home Stores, another recent Conran acquisition.

On an international scale, however, it is the Italian chain Benetton which has pioneered and perfected the new marketing strategies. Beginning in the domestic market and progressively extending its operations to Western Europe, the United States and Japan, Benetton has targetted its products at the most sophisticated and remunerative segment of the youth market. By offering a wide variety of styles and colours in its numerous franchised shops (each catering for a narrowly defined submarket and geographical location) and rapidly adjusting its output to the pattern of sales, Benetton enables individual consumers to participate in the construction of a product range tailored to the requirements of the local market. The result of this formula has been a spectacular growth of sales from IL 55m in 1978 to 623m in 1984 and 850m in 1985, 55% of which were obtained from exports (Correale and Gaeta, 1983; Rullani and Zanfei, 1984; Belussi, 1986; 'Success for Benetton Fashion', Apparel International, October 1986).

1.2 Retailers and Suppliers: Restructuring a Relationship

1.2.1 Design as a Two-Way Process

The shift of retailer strategies from price competition to fashion and variety has transformed relationships with suppliers as well as consumers. Whereas in the past garments were designed by retailers or manufacturers in relative isolation from one another, now the trend is for fabric selection and range development to become a two-way process based on consultation between buyers for retail chains and suppliers' in-house design teams. Thus according to an interview with its managing director, 'Next does not believe in simply contracting out its own in-house designs to a garment maker. It prefers a two-way process with design input coming from manufacturers as well as its own staff.' At Marks and Spencer, too, the main

design impetus is now expected to come from the manufacturer rather than the chain's in-house staff, since as one company spokesman observes, 'We can't change our styles fast enough if we have to plan everything in advance ourselves'; and M&S selectors now suggest modifications to ranges developed by suppliers and pick out fabrics jointly at international exhibitions. Even retailers whose relationship with suppliers has historically been looser such as Woolworth's, C&A and Richard Shops are moving in this direction, attending fabric fairs with manufacturers, extending informal commitments to cover cloth purchases, and participating in the development of garment ranges (Ody, 1984a, 1984b, 1984c; Apparel International, July 1984: 10).

1.2.2 Tailoring Supply to Demand

Just as retailers' new emphasis on fashion and variety demands increased design input from suppliers, so too does it demand enhanced flexibility to manufacture a wider range of styles and switch production between them in response to short-run trends in sales. While the selection of colours and fabrics take place well in advance, especially among retailers concerned with exclusivity and coordination, lead times for garment manufacture have become much shorter than in the past. Next, for example, finalizes only 70% of its range by the beginning of the preceding season, while Marks and Spencer is switching to three fashion seasons instead of two. Woolworth's used to receive its merchandise in a single massive shipment at the beginning of the season, but buyers now stagger orders over three deliveries and keep back a portion of their budget for last-minute impulse purchases; at the opposite end of the market, the fashionable Reiss menswear chain buys only 30% of its merchandise upfront and the rest during the course of the season. A number of chains will now book production time with manufacturers while reserving the right to allocate it among specific styles as the season progresses, and lead times of six to eight weeks from order to

delivery have become commonplace (Ody, 1984b; O'Dwyer, 1984; Economist, 15/9/84: 79; (Taylor, 1984).

Crucial to this process has been the development of Electronic Point of Sale (EPOS) systems which enable retailers to gather precise data on each style's sale performance and adjust orders with suppliers accordingly. The growth of Benetton in particular is closely tied to its pioneering use of EPOS systems. Each of its 3200 shops is linked into a data collection centre in its regional or national market which transmits detailed sales information to company headquarters (by satellite in the case of Japan and the US), facilitating rapid analysis of market trends. Production scheduling from its own factories and 200 associated subcontractors is thus tied as closely as possible to actual orders from the shops, and Benetton has developed a fully-automated warehousing system for the Italian market to cope with the resulting fragmentation of deliveries into small lots (Belussi, 1986; Rullani and Zanfei, 1984).

The proliferation of styles and their rapid permutation have reduced the average length of production runs as well as compressed lead times for garment manufacture. As the chairman of a leading M&S supplier ruefully comments, 'In the old days...Marks and Spencer was buying bulk just to fill the shelves. We would supply 1000 dozen in one style and that was it. Today they're buying merchandise - styles have to be tried and tested and the runs could be as little as 50 or 100 dozen, although much larger orders are still commonplace. It means certainly that we lose a lot of the economies of scale which we used to find with the long production runs of the old days' (Apparel International, July 1984: 11). Many clothing manufacturers, of course, are now obliged to cope with still shorter runs, since order quantities from the smaller, more fashion-conscious retail chains such as Next average between 1000 and 3000 garments per style.

But the decline of scale economies in direct production is more than counterbalanced by savings in the costs of inventories and work-in-progress, as well improved profit margins resulting from a closer

correlation between orders and sales. Thus a study by Kurt Salmon Associates (Frazier, 1986) demonstrates that 33% of the time from raw material production to final sale for a typical garment is spent in inventory rather than in process, and concludes that quicker response of production to sales can save up to 25% of the retail price of a garment through reductions in inventory costs (6.4%), forced markdowns (14.6%) and sales losses from 'stock outs' (4%).

These new demands on clothing manufacturers for design capacity and productive flexibility carry with them profound implications for relationships between retailers and suppliers. Most retail chains are now looking for long-term relationships with a smaller number of suppliers, whom they also expect to become more independent than in the past. The more successful manufacturers have diversified their customer base, and many retailers now prefer to be responsible for no more than a fixed proportion of their suppliers' business, normally below 50%. This process of diversification puts manufacturers in touch with a wider range of design currents and enhances their ability to develop new styles at the same time as it reduces the retailers' responsibility for unsuccessful garment lines. While many established suppliers have been dropped and some retailers in countries like Britain have taken advantage of high levels of competition to squeeze manufacturers' margins, the new pattern of production and distribution promises to create a more balanced relationship between the two parties in the longer term. As manufacturers broaden their order books they become less vulnerable to monopsonistic pressure on their profit margins, while retailers themselves become more dependent on those suppliers able to come up with saleable designs and adjust rapidly to changing market trends.

1.2.3 Non-Price Competition and International Trade

The growth of non-price competition and the new relationship emerging between retailers and suppliers has reduced the importance of clothing imports from low-wage developing countries. Lead times are too long, minimum production runs too large, quality control too

difficult, and the capital costs of stocks too high to make sourcing in the Far East worthwhile for most retailers except for the cheaper and less fashion-sensitive types of garment. Wages and prices have gone up significantly in the more established countries such as Hong Kong, which have themselves begun to move upmarket to escape low-wage competition elsewhere in the Third World and to overcome fixed-volume import quotas in the West (OECD, 1983: 85-9; Mower, 1986; Milman, 1986). Physical proximity is also important for collaboration between retailers and suppliers in range development and rapid adjustment of production to sales. Thus Marks and Spencer have always bought 90% of its garments in the UK (although this may be changing), and new fashion chains such as Next and Principles source more than 80% of their merchandise domestically (Ody, 1984a, 1984b, 1984c; Daily Telegraph 1/12/86: 20).

Within the UK market, as Table 2 shows, overall levels of import penetration have stabilized since the early 1980s, falling back slightly to 31.2% in 1985, though exchange rate fluctuations have influenced the precise chronology (Table 3). There has also been a pronounced shift in the composition of imports away from developing countries and towards Western Europe: as Table 4 and Figure 1 illustrate, the share of developing countries in UK imports fell from 45.7% in 1980 to 38.9% in 1985, while that of the EEC and Western Europe rose from 26.2% to 36.2%.

While some of this movement reflects growing production in lower-cost countries with privileged access to the EEC such as Portugal and Spain, a number of reports by a sector working group of the National Economic Development Council have shown that imports to Britain from other European countries are concentrated at the upper end of the market, competing on the basis of design and quality rather than price alone (National Economic Development Council, 1985, 1986; cf. also Euromonitor 1985a). Nor is this pattern confined to Britain: a detailed report on the market for clothing in Switzerland and Austria prepared for the Cyprus Ministry of Commerce and Industry likewise illustrates the robust share of imports from high-cost countries into

these rich and discriminating markets across many product categories (Makrotest, 1985).

Perhaps the most striking example of these trends has been the emergence of Italy as the world's largest net exporter of textile and clothing products, ahead of Hong Kong, South Korea and Taiwan, with a positive trade balance in 1982 of \$3.7 billion in clothing alone (Economist Intelligence Unit, 1983; Euromonitor, 1985b: 12; Correale and Gaeta, 1983). Alone among developed countries, Italy also increased its employment in clothing manufacturing between 1971 and 1981 from 416,000 to 443,000 (Fornengo, 1983). The international success of the Italian clothing industry is particularly remarkable since wage costs per direct employee (including social costs) are nearly twice those in Britain, four times those in Hong Kong and nearly twenty times those in countries such as Sri Lanka (Table 5).

The Italian industry, which specializes in high and medium-priced fashion garments, is extremely fragmented, with an average of 5.5 employees per firm, including those with less than 10 employees (Fornengo, 1983, 1978; Mariotti, 1982). Offsetting the formal fragmentation of productive units, however, is the concentration of firms in a series of 'industrial districts' which permits substantial economies of specialization and provision of common services (including fashion forecasting, market research and technological information), as well as access to pools of skilled labour (Brusco, 1982; Solinas, 1982; Piore and Sabel, 1983, 1984). According to a recent report by the OECD, these small Italian clothing firms, which have been active in adopting the best available technology and computerized management methods, have also proved more profitable than most of their larger counterparts. The result has been a far-reaching process of vertical disintegration whereby 'the large groups have not necessarily disappeared, but, when surviving, they now have a more flexible organization, and a number of small independent firms

are connected with the parent company only through financial (and sometimes marketing) linkages' (OECD, 1983: 25-8, 137-9).

1.3 Technology and Production: Marrying Flexibility and Efficiency

Changing market trends and retailer strategies have transformed the conditions for efficient garment manufacture over the past decade. The challenge facing clothing suppliers is no longer that of turning out long runs of individual garments at the lowest possible unit cost, but rather of designing and manufacturing the widest possible range of styles at the lowest cumulative cost. The central problem here has been to overcome the traditional trade-off in the industry between flexibility and productive efficiency, and there has been considerable progress in this direction through the use of computer-based technologies and revised methods of manufacture (Hoffmar and Rush, 1984; Rush and Soete, 1984; Trent Polytechnic, 1986).

1.3.1 Computer-Aided Design

On the technological side, the most important recent innovation in clothing manufacture has been the emergence of sophisticated computer-aided design (CAD) systems for the pre-assembly stages of pattern development, grading and lay planning, linked in many firms to computer-controlled cutting (discussed in section 1.3.2 below). There are a number of competing CAD systems now available, but most involve some combination of the following components: a digitizer, a mini-computer linked to one or more graphic display screens, and a high-speed marker/plotter. Using the digitizer, the shapes of existing pattern pieces are entered into the system (a UK company Cybrid Ltd. has recently brought out a photographic scanning table to perform this function), and house rules applied to them at a series of points to generate automatically a nest of graded patterns in a variety of sizes. Using a light pen, the operator can then manipulate the graded pattern pieces on the screen to work out the best possible lay, while the system calculates the fabric utilization

ratios for different combinations. The finished lay is then plotted out at high speed to yield a full-size marker for manual cloth cutting, while a magnetic tape can also be generated to guide a numerically-controlled cutter.

The most recent addition to the CAD facilities now available are pattern development systems, whereby the two-dimensional pattern blocks can be created on the screen and existing pattern pieces rapidly modified. Computers are not yet able to simulate the drape of three-dimensional fabrics, so that the scope for producing original designs directly on the screen remains severely limited. A number of companies have also brought out automatic marker-making programmes, which can be used for rapid costing exercises while remaining less effective than the operator assisted version.

Manual pattern grading and lay planning are highly skilled and time-consuming activities performed by well-paid, experienced craftspeople in most clothing firms. The main effect of CAD systems is to enhance existing skills and increase their productivity rather than to eliminate the need for skilled operators. This is clearest in the case of lay planning, where the operator makes the final decision on the arrangement of the pattern pieces, and experienced marker makers can beat an unassisted computer both for speed and fabric utilization. But even in the case of grading, where a larger proportion of the task has been automated, many industry experts believe that considerable operator judgment is still required in the formulation of new grade rules and their application to new styles.

Labour costs in grading and marker making form a tiny fraction of total manufacturing costs, and their reduction has not played a major part in decisions to purchase CAD equipment, though shortages of qualified personnel have sometimes been a factor. Far more important in firms' calculations have been improvements in fabric utilization and reductions in the time needed to grade and mark out new styles. Since fabric comprises 40-60% of garment costs, cloth savings from tighter lays were the main initial justification for the installation

of CAD systems in larger firms. More recently, however, clothing manufacturers have become aware of the possibilities offered by CAD systems for more rapid generation and modification of new styles. Grading and marker making times have been reduced by a factor of between two and six, and tasks which previously took days can be performed in a few hours. The full range of a firm's existing pattern blocks can be stored on the system for easy modification, decisions on which styles to cut can be delayed until sales information becomes available, and samples which may never go into production at all can be offered to buyers already graded, lay-planned and costed. The more rapid turnaround and increased flexibility available from CAD systems has thus proved crucial to suppliers in meeting the retailers' demands for an ever greater variety of styles produced to shorter lead times.

CAD systems are expensive, with prices ranging from £40,000 sterling to £200,000 and more, depending on their size and sophistication (see Appendix 1), and normally need to be utilized on a shift-work basis. But despite their cost, such systems are not characterized by significant economies of scale: indeed the shorter the production run, the larger are grading and marker making as a proportion of total costs, and the more frequent the style change the more crucial reductions in turnaround time become. Hence both equipment suppliers and users have become increasingly concerned to bring CAD facilities within the reach of smaller clothing manufacturers. As the suppliers start to saturate the demand for their products among larger firms, they have naturally begun to experiment with simpler, less expensive systems suitable for a wider market. Both the industry leader Gerber Garment Technology (which bought up CAMSCO in 1983) and Investronica, a Spanish-based company, have dropped their prices significantly and now offer highly sophisticated systems on a modular basis, as do Lectra Systemes, which has enjoyed considerable success with smaller European firms, and Microdynamics, a new American entrant to the market (Disher, 1983, 1985, 1987). So far, however, the quantity of information processing required for CAD in clothing remains beyond the capacities of existing micro-computers, limiting the scope of potential cost reductions.

An alternative method of giving smaller firms access to the full range of CAD facilities is through the establishment of a service bureau. Commercial CAD bureaux have been operating successfully in the United States, France, Italy, Japan and Scandinavia since the early 1970s, while a Leeds-based bureau has been servicing a range of different-sized clothing firms in the North of England since 1981. A number of large multi-plant clothing firms now maintain centralized facilities which operate like bureaux for the factories in their group, while the Baird Group has been leasing time to other firms on its Manchester-based CAD system. Beyond these strictly commercial operations, local authority-funded CAD bureaux have recently been established in London and Birmingham, and there are plans to set up similar facilities in Nottingham, Newcastle and possibly Glasgow in the very near future.

1.3.2 Computer-Controlled Cutting

The other major microelectronics-based innovation in clothing manufacture has been the spread of computer-controlled cutting systems to replace manually-guided methods. By far the most successful and widely-used of these systems is the Gerber cutter, in which a numerically-controlled servo-motor following a computerized pattern guides a reciprocating, self-sharpening knife across a cutting table on which many plies of cloth have been compressed by a vacuum mechanism. Linked to CAD systems, the Gerber cutter offers substantial gains in the speed and accuracy of the cutting process, resulting in improved fabric utilization and fewer defective parts in the assembly process. While 'knife intelligence' enables the machine to compensate partially for faults in the cloth, the wide range of fabrics used and their different cutting characteristics have led most firms to retrain existing skilled staff on the new equipment, though the number of cutters required has fallen substantially by comparison with manual methods (estimates of staffing reductions range from 25% to 60% depending on whether a shift system is introduced at the same time) Like CAD systems, Gerber cutters are expensive. Three systems are currently available, the S-91 at \$295,000, the S-93 at \$175,000 and the S-95 at \$145,000, though

second-hand equipment can be bought for as little as \$60,000 in some cases. The principal advantage of the more expensive systems is their ability to cut larger quantities of fabric in a single batch: thus the S-91 cuts up to 75 mm of compressed material, which works out to 220 ply of a light fabric such as polyester/cotton or c. 880-1000 garments per batch; the S-93 12 mm, 40 ply or c. 160-200 garments; and the S-95 10 mm, 36 ply or 144-180 garments. But the lighter construction and lower capacity of the smaller systems also enables them to operate more rapidly: thus the S-95 cuts at a rate of 17-18 metres per minute, as opposed to 14 for the S-93 and 6-7 for the S-91. There are also advantages associated with lower-ply cutting such as reduced time and space involved in material handling and storage.

The S-91 was the first system available, and most of the buyers have been large companies (23 of 39 Gerber cutters in the UK in 1984 belonged to Marks and Spencer suppliers), who have centralised their cutting facilities to feed a network of satellite sewing factories. The S-93 and S-91, by contrast, are aimed at medium and small-sized firms, and sales have been reported to companies with as few as 40 employees. The major obstacle for smaller firms in using this equipment arises from the need to keep it fully occupied in order to amortize the costs of the investment, and a number of commercial cutting bureaux are reported to be operating successfully in Italy and Scandinavia. For very low-ply cutting (1-5 ply), laser systems are available from a number of suppliers, but these are mainly used for marker making and their broader commercial application will depend on progress in continuous fabric spreading.

1.3.3 CAD/CAM: Knitwear

Whereas the links between computer-aided design and manufacture remain partial and incomplete in clothing, a much closer integration has emerged in the production of circular knitted fabric, flat body blanks and fully-fashioned knitwear. In knitwear, unlike other forms of clothing, garment design was always closely tailored to the capacities of specific machines, and the new CAD/CAM systems offer graphic design options which can convert shape, motif colour and stitch formations into mathematical terms which instruct the machine to knit the required piece almost automatically. These systems thus make possible the origination of designs on screen as well as the modification of existing patterns and the generation of new samples; and given the pressures from retailers for greater fashion content and quicker response to market trends, CAD/CAM has caught on rapidly in the knitwear sector, largely displacing the older technology in the purchase of new equipment. Though CAD/CAM in knitwear does not represent the same kind of quantum leap in capital costs as in garments, there is nonetheless scope for collective use of the equipment, particularly as a means of introducing firms to its benefits; and plans are currently afoot to establish bureau services in Nottingham and Newcastle, aimed at companies with mechanical or computer-controlled knitting machines but without CAD screens of their own. Since CAD/CAM systems manufactured by different companies are not necessarily compatible with one another, particular care must be exercised in the choice of equipment for a bureau, though software is available for translation of information between competing systems (Trent Polytechnic, 1986: 68-75; Newcastle Economic Development Committee, 1986).

1.3.4 The Sewing Machine and the Micro-Chip

Labour costs in garment assembly account for a large proportion of total manufacturing costs, yet there has been less technological innovation in the sewing room than in any other area of the production process. The main reason for this lies in the unstable

properties of limp fabric which necessitates extensive manual positioning by the sewing machine operator. Between the late nineteenth century and the 1970s, there were three main lines of innovation in sewing technology: increased stitching speeds and machine durability; the development of work aids such as needle positioners and underbed trimmers; and the emergence of dedicated machines for special tasks such as button holing and attachment. While each of these innovations brought significant productivity gains, most came at the expense of flexibility, limiting the possibilities for their diffusion in a volatile, fashion-sensitive industry like clothing to small parts assembly and more standardized products such as men's shirts and industrial workwear.

Much of the initial application of micro-electronics to sewing machinery has followed the course of previous technological innovation in the industry towards the development of special-purpose equipment for high-volume, repetitive operations. Thus dedicated microprocessors and numerical control units have been introduced for tasks such as belt-loop attachment and collar stitching, and pre-programmed convertible units for more variable tasks such as contour seaming, pocket setting and decorative stitching. While substantial productivity gains can be achieved, this equipment is expensive, costing anywhere from \$15,000 to \$35,000 (as opposed to \$500-1500 for an ordinary lockstitch machine) and its flexibility remains limited, though adjustment to style changes is easier than with the previous generation of dedicated machines, particularly for those with convertible programming units.

The major departure from this pattern of productivity gains achieved at the expense of flexibility has been the development of operator-programmable sewing machines. While these machines use a variety of methods to speed up and simplify the manipulation of the fabric including stitch-counters, edge-sensors and record/playback mechanisms (whereby the operator teaches the machine a sequence of operations it can then repeat), manual intervention in guiding the material remains crucial for the effective use of the equipment. Operator-programmable machines are general-purpose equipment which

can cope easily with style changes, cost much less than special-purpose ones (between \$2500 and 7500), and offer significant improvements in sewing accuracy and reductions in the length of the learning curve for new operations. So far, however, this equipment is in the early stages of its development, and has mainly been used for small parts assembly operations such as top-stitching collars and cuffs and pocket setting, though programmable controls for basic operations such as back-tacking are becoming common on the latest generation of ordinary sewing machines.

1.3.5 Management Information and Production Control

Clothing managers themselves believe that the most immediate and far-reaching effects of new technology will be the application of computers to management information and production control, traditional problems of the industry which have been multiplied by the pressures of shorter lead times and wider product ranges. Software packages have long been available for such traditional computing applications as accounting, invoicing and payrolls, and the spread of cheap micro-computers has now brought these within the means of even the smallest clothing firms. CAD systems can be used for decisions on product costing, cut order planning and production scheduling, while new software packages are being developed to assist firms with the preparation of work docket, stock control and fabric sourcing. In the sphere of production control, periodic reviews of factory performance are giving way to 'real time' systems which monitor work-in-progress and assist managers in production planning, line balancing and work measurement. These systems range in size and sophistication from individually-engineered work stations linked by automatic garment-moving rails to simple bar-code readers linked to a central computer suitable for smaller firms. As these systems of management information and production control become cheaper and more flexible, they should prove of special assistance to smaller clothing

firms constrained by limited managerial resources (Chuter, 1986; Financial Times 18/7/84).

1.3.6 Multi-Skilling and Productive Flexibility

Perhaps the most important key to increased flexibility of production lies not in new technology but in the skills and training of the workers themselves. Given the persistence of manual methods in garment assembly, a major source of scale economies on longer production runs has been the increased productivity of machinists as they move up the learning curve for each style. The tendency in larger firms has therefore been to subdivide the sewing process as finely as possible to allow each machinist to concentrate on a single operation and augment their productivity through the use of work aids and special machinery for complex tasks. But as production runs become shorter and style changes more frequent in the industry as a whole, even the larger firms have been forced to encourage their machinists to become proficient at a wider range of sewing operations to avoid costly bottlenecks and line imbalances. Broader initial training and continuous retraining, higher basic wages for more versatile operatives, and videotaped work aids for unfamiliar tasks are all being used by larger clothing companies in their efforts to shorten the learning curve and reduce the cost penalty associated with frequent style changes.

It is noteworthy in this context that a recent review of Japanese experiments with flexible automation in sewing found that the most promising departure, the Toyota Sewing System (pioneered by the car firm's garment subsidiary Aikin Seiki) was based on 'a combination of group working practices, manual skills, electronic sewing machines and careful line planning'. Most crucially, the Toyota system depends on the operators' ability to work several different general-purpose machines to produce garments in small lots, rather than attempting to remove the need for operator discretion through hard automation, as in other Japanese experiments such as the Mitsubishi Automatic Sewing System, which is only capable of handling two-

dimensional shapes in a narrow range of pre-determined patterns (Tyler, 1985; cf. 'How Sugden's Succeed with Work Group Systems', Apparel International, October 1986).

THE CLOTHING INDUSTRY IN CYPRUS: ANATOMY AND DIAGNOSIS

The shifts in markets, technology and competitive conditions described in the preceding section pose profound challenges for the clothing industry in Cyprus as in the rest of the international economy; and here, as elsewhere, a successful response will require new forms of intervention from the state as well as new strategies from the entrepreneurs. But before going on in Part III to outline a strategy for the clothing industry in Cyprus, it will be necessary to examine in some detail the strengths and weaknesses of its existing structure and development.

2.1 The Aggregate Picture**2.1.1 Clothing as a Leading Sector**

By any quantitative indicator, clothing must rank as a leading sector of Cyprus manufacturing industry. As Table 6 indicates, clothing (ISIC code 322) and textiles (321) together accounted in 1985 for 27.8% of employment, 15.5% of gross output, 18.2% of census value added, and 33.4% of domestic exports (36.1% in 1984) in manufacturing as a whole. Within this sector, as Table 7 shows, clothing accounted for the overwhelming proportion of enterprises (86.5%), employment (82.0%), gross output (80.5%), census value added (79.3%) and domestic exports (99.3%).

2.1.2 Industrial Structure and Performance

Table 8 sets out the size distribution of firms in the Cyprus textile and clothing industries by number of enterprises, employment, gross output and census value added. Two important points emerge from this analysis. First, the clothing industry in Cyprus is not particularly fragmented by international standards. Taking all firms together, the average number of employees is 7.6, compared with 5.5 for Italy in 1981; and when firms with less than 10 employees are removed for comparability with Table 1, the average number of employees in Cyprus is 56.4, larger than Denmark, Italy and Belgium in 1971. Firms with over 50 employees likewise account for a sizable share of employment, output and value added in Cyprus, and this share would be inflated considerably if we took account of the fact that a high proportion of the smaller enterprises are predominately engaged in subcontracting for their larger neighbours.

A second significant finding is the limited disparity in shares of employment, gross output and value added between firms in different size classes. In clothing, firms with more than 50 employees account for 45.2% of total employment, 50.3% of gross output and 48.4% of value added; while in the 1-9 class, the share of value added also exceeds that of employment by 0.3%. Even in textiles, where enterprises are larger (88 employees per firm in enterprises with more than 10 employees) and fixed capital investment more important, firms with more than 50 employees account for 45.2% of employment, but only 44% of gross output and 46.7% of value added. These close correlations between employment, output and value added in both sectors suggest the absence of a significant productivity gap between large and small firms and point up the inability of the former to achieve significant economies of scale.

As discussed earlier, the clothing industry can be disaggregated into a series of subsectors with distinctive levels of capital intensity, product standardization and sensitivity to fashion trends. Table 9A sets out Cyprus' pattern of subsectoral specialization in 1980 and

1984 by share of enterprises and employment, integrating knitwear, nightwear and underwear (ISIC 3213) with clothing proper (ISIC 322). Three important points can be drawn from the analysis of these figures. First is the relative stability of employment shares by subsector between 1980 and 1984: the main changes are the decline of knitwear from 17.5% of the total to 15.1% and the growth of childrenswear from 11.9% to 13.7. A second significant finding is the high concentration of activity in the most fashion-oriented subsectors of womenswear and childrenswear, which together account for 41.7% of enterprises and 46.8% of employment, alongside the absence of industrial workwear, a subsector characterized by high levels of standardization. A final point which emerges is the marked variation in the relationship between share of enterprises and share of employment across subsectors. Thus menswear accounts for 47.2% of all enterprises but only 26.5% of employment, presumably because of the inclusion of large numbers of small tailors under this rubric. Conversely, the share of employment is considerably greater than that of enterprises for knitwear (15.1% v. 7.8%), shirts (3.3% v. 11.2%) and childrenswear (5.9% v. 13.7%), indicating a greater than average concentration of larger firms in these subsectors.

Table 9B gives a more precise breakdown of output per employee by size of firm and subsectoral specialization drawing on data from a large-scale survey of the industry conducted by the Industrial Training Authority in 1985 (cf. section 2.2.1 below). This table confirms the finding of the census that productivity as measured by sales per employee shows no general tendency to increase with the size of firm in the Cyprus clothing industry: if anything, it appears to be higher in firms with 40-89 employees than in those with more than 89! More surprisingly, sales per employee are higher in womenswear and childrenswear than in more standardized subsectors such as menswear and shirts, indicating that the higher value products of the former more than compensate for any physical productivity advantage of the latter. And only in two subsectors, knitwear and childrenswear, are sales per employee higher in the largest than in the medium size class.

Taken together, these findings suggest that large firms in the Cyprus clothing industry are unable to achieve significant economies of scale even when they specialize on more standardized types of garments. Cyprus would therefore appear to have a comparative disadvantage in the mass production of clothing, and no prima facie justification can thus be derived for rationalization policies aimed at promoting the concentration of production in larger firms in this sector.

2.1.3 Patterns of Growth

Tables 10 and 11 set out the main contours of growth in the Cyprus clothing industry during the 1980s, using constant and current prices respectively. A number of points stand out immediately from an examination of these figures. First, there has been a sustained expansion of clothing output during the 1980s: 10.8% growth in real terms between 1980 and 1986 (Table 10) and 41.6% in nominal terms between 1982 and 1985 (Table 11). But this overall pattern is punctuated by sharp year-to-year fluctuations, with major surges in output in 1981, 1983 and above all 1984, and pronounced slumps in 1982 and 1985-6. As both tables make clear, these peaks and troughs in output are closely associated with the movement of exports, which grew in real terms by 21.1% in 1981, 10.2% in 1983 and 46.3% in 1984, only to fall back by 30.5% in 1982, 19.3% in 1985 and 19.9% in 1986 (projected figures). Between 1982 and 1985 the share of exports in total sales (measured in current prices) never fell below 47.3%, with a peak of 62.5% in 1984 (Table 10); and the export/sales ratio could be increased by the addition of sales to tourists in the home market, estimated by manufacturers at 5-10% of domestic sales, particularly in leisurewear. But despite the leading role of exports, a closer examination suggests that home demand has also made a significant contribution to the industry's growth. Thus local consumption of gross output has expanded by 36.3% in real terms since 1980, providing an important counterweight to fluctuations in exports; and the buoyancy of the home market has been particularly vital in

holding up output despite the decline in overseas sales during the past two years (Table 1).

2.1.4 Employment, Investment and Productivity

Table 10 also demonstrates the close association of employment and productivity with fluctuations in sales. As Table 12 shows, the expansion of the clothing industry during the 1980s gave rise to a major increase in capital investment: investment in fixed assets expanded by 311% between 1980 and 1984, growing from 2.8% to 4.6% of gross output during the same period. But this increase in investment did not result in any long-term growth of labour productivity as measured by real gross output per employee, which continued to be determined by the movement of sales reflecting the better prices and higher levels of capacity utilization obtainable in boom years.

2.1.5 Export Markets: The Shifting Balance

The sharp fluctuations in clothing exports during the 1980s have been closely associated with shifts in sales to specific national and regional markets. As Tables 13 and 14 demonstrate, the rapid growth of clothing exports in 1983 and particularly 1984 was based entirely on increased sales to the Arab countries, above all Libya which accounted for 40% of all exports in 1981, 23.8% in 1983, 54.2% in 1984, 38.3% in 1985, but only 4.6% in 1982 and 7.5% during the first nine months of 1986. Sales to other Arab markets have also been significant, with 34.2% of exports in 1982, 20.5% in 1983 and 11.9% in 1984, recovering to 15.5% in 1985 and 16.5% in 1986. Table 14 also points up a worrying decline of Cyprus clothing sales to the richer and more discriminating markets in the region such as Saudi Arabia and Kuwait (though performance is better in some of the smaller Gulf states such as Dubai and Qatar) and the growing importance in recent years of sales to poorer and less demanding markets such as Iraq, Yemen and Jordan. Some of the decline in Cyprus exports to the Arab world undoubtedly reflects the fall in oil

revenues over the past few years (cf. ch. 1 of this report), but the differential performance of sales to individual countries also suggests higher levels of competition in the richer markets, as reported by recent UK studies on Saudi Arabia (Clothing EDC, 1984, 1985a, 1985b).

While the Arab market was clearly central to the growth of the Cyprus clothing industry during the 1980s, the role of other export markets should not be neglected. Sales to Eastern Europe have remained important throughout the period, increasing by 95.9% in money terms between 1982 and 1985 and expanding their share of clothing exports from 8.4% to 10.%. Even more important have been exports to the EEC and other developed market economies. While sales to the EEC remained broadly stable in money terms between 1980 and 1985, they accounted for 50.2% of clothing exports in 1982, 43.5% in 1983, 25.5% in 1984 and 31.5% in 1985; and this figure can be augmented by the addition of exports to 'other countries' (mainly the USA, Sweden and Norway), which accounted for 2.6% of exports in 1982, 3.4% in 1983, 2.4% in 1984 and 4.4% in 1985. A particularly encouraging sign is the trend of sales to these markets during the first nine months of 1986, which are running considerably ahead of past levels in money terms, accounting for 67.7% of total exports and suggesting a significant shift in the orientation of Cyprus clothing exporters. Within these general categories, however, countervailing trends can be observed in individual markets, with declining sales to West Germany offset by growing exports to France, Britain, the Netherlands and the United States

2.2 Inside the Firms

2.2.1 The Firm Interviews

These general observations on the structure and development of the Cyprus clothing industry can be amplified considerably by drawing on in-depth interviews conducted in January 1987 with 21 firms (20 in

clothing and knitwear, plus one in dyeing and finishing). The subsectoral distribution of these firms is given in Table 15 and key information about them is summarized in Table 16. 3201 people are currently employed in these firms, or 29.9% of the total in clothing and knitwear as a whole (Table 10); if we add the 700 or so workers employed by their subcontractors, the coverage of the interviews rises to 36.5% of total employment. While the enterprises selected form a reasonable cross-section of the Cyprus clothing industry, a comparison with Tables 8 and 9 reveals a bias towards larger firms and an imperfect correspondence with the subsectoral structure of the industry as a whole. Thus menswear, for example, is underrepresented in its share of enterprises and overrepresented in its share of employment, while the reverse is true of womenswear and childrenswear (though the three general clothing firms produce mainly women's and children's garments). It will therefore be useful to supplement the findings of these interviews on certain points with information from two larger surveys conducted by the Industrial Training Authority in 1983-4 and 1985 respectively (ITA 1984, 1986). The first survey covered 70 firms with 5705 employees (54.4% of total employment); the second covered 97 firms (43.7% of all enterprises employing more than 10 people) with 6497 employees (77.2% of total employment).

2.2.2 Product and Marketing Strategies

The macro shifts in the market orientation of the Cyprus clothing industry observable in the aggregate trade statistics received ample confirmation at the firm level. A large proportion of the companies interviewed had been heavily involved in sales to Libya during the first half of the 1980s, and most of these had suffered badly from the subsequent collapse of this market. Sales to Libya were opened up by bilateral arrangements at the governmental level, and the available of finance for imports by the state purchasing agencies depended on the complex and cumbersome budgetary process of the Libyan People's Committees. The Libyan market was oriented towards very long runs (15,000-100,000 garments in a single style) of low quality clothing (using Far Eastern rather than European materials); and selling conditions were completely different from those in more

sophisticated markets (e.g. a full set of samples of each style in each material had to be produced rather than simply the basic styles plus swatches of alternative fabrics). The Libyans were prepared to pay high prices for these garments and substantial profits were realised in 1983-4. But the orders of Libyan purchasing agencies in 1985 were not backed by committed state finance, and firms interviewed had not yet been paid for amounts as large as C£700-900,000; and losses on these sales have been magnified by 9% interest charges on overdrafts and the intervening devaluation of the US dollar. The only firm interviewed which planned to continue dealing with Libya on a substantial scale was a large clothing manufacturer. Through contacts in the Libyan bureaucracy, this firm was able to ensure the company's orders were backed by confirmed letters of credit; but even in this case, large trading profits in 1986 were wiped out by unfavourable currency fluctuations.

The collapse of the Libyan market has led to a profound reorientation of marketing strategies among the firms interviewed. While many firms continue to direct 10-25% of their output to the Gulf states, Greece and Eastern Europe, most have turned their attention to the home market and Western Europe. Of 20 clothing firms interviewed, 15 sold 50% or more of their output abroad, but a number of firms also reported significant decreases in the proportion of exports. Despite its small size, the market for clothing in Cyprus is extremely demanding and fashion conscious, as can be seen from the fact that foreign imports currently account for just over 10% of domestic consumption despite tariffs of 75% and price differentials of 100-200% over domestic garments in local shops. A number of the more dynamic manufacturers in areas such as childrenswear, leisurewear and leather clothing have therefore made a conscious decision to build up a distinctive style and product image in the home market as the basis for a longer-term export strategy. Other firms, including five of those interviewed, have reacted to contracting export prospects and the threat of reduced tariffs in the home market by entering licensing agreements with well-known foreign brand names such as Pierre Cardin, Yves St.-Laurent, Levis and FUs, as well as with smaller European designer companies. These agreements typically give the Cyprus partner exclusive rights to sell the foreign company's

designs in the local, Greek, Middle Eastern and sometimes East European markets in return for a royalty of 5-10% on sales; sometimes a minimum quantity is also specified on which royalties must be paid whether or not the projected sales materialize. The extent of commercial and technical collaboration between licensor and licensee also varies considerably from case to case: thus some licensees are permitted to modify the parent company's designs to suit the requirements of the local market, while others are not; and one large European jeans producer went so far as to insist that their licensee hire a professional production manager and send him to Europe for training in the company's methods of work organization.

This increased focus on the home market has brought with it a closer integration between production and retailing. Six of the firms interviewed had their own shops in Cyprus (compared to 19 of 70 firms in the 1983-4 ITA survey); and a clothing manufacturer, G. Kallis Ltd. owns the largest retail organization in Cyprus with shops in each of the major cities selling its own products under the Jet label and imports from C&A under the Eurojet label. Two of the companies visited planned to install EPOS equipment in the near future to link production more closely to sales, and a number of manufacturers not directly involved in retailing monitored the sales of individual product lines through close contacts with major buyers and regular surveys of other customers. Several manufacturers had also used extensive advertising as a means of strengthening the image of their product in the home market against imported brand names: the sums involved ranged from £15,000 a year for a medium-sized childrenswear company to £100,000 for a large jeans manufacturer.

But even firms heavily committed to the home market have made considerable efforts to develop their exports to Western Europe. Under current EEC regulations, Cyprus is allowed a quota of duty-free clothing exports to the Community. As we shall see below (section 2.2.7), Cyprus is a low-cost producer of garments relative to most EEC countries (though not relative to the Far East), and since exports up to agreed ceilings are not subject to EEC rules of origin, it can gain additional cost advantages by making up cloth from the

Far East. Cyprus is also much closer to West European markets than the Far East and its management is more professional and labour force more skilled than other nearby producers of low-cost garments such as North Africa. There are thus strong incentives for West European countries to import clothing from Cyprus, at least for certain types of products.

Despite these underlying advantages, Cyprus clothing manufacturers face major obstacles in penetrating the markets for clothing in Western Europe, and Cyprus has never yet been able to use all of its EEC import quota. European nations differ considerably from one another in demand patterns and distribution structures, and specialist knowledge of individual markets is necessary to determine the correct line of approach (British Overseas Trade Board, 1983; Euromonitor, 1985b; and Cyprus Industrial Strategy, Footwear Report, Tables 5-8). It is difficult for unknown firms to gain access to the better retailers looking for long-term relationships with high quality suppliers, while the markets open to newcomers are less stable, less remunerative and dominated by intermediaries who exact a share of the proceeds. Prices in the lower to middle sections of the market are also depressed by competition from the Far East despite the impact of restrictive quotas, as well as from other low-cost suppliers within the EEC such as Portugal and Greece. Market research surveys of non-EEC countries such as Austria, Switzerland and Canada suggest that Cyprus goods are acceptable in quality but not quite cheap enough to overcome tariff barriers and consumer resistance to garments from a country without an established fashion image (Makrotest, 1985). Many of the firms interviewed spent considerable sums on foreign travel, participation in exhibitions and market research in efforts to make contact with buyers and improve their knowledge of individual markets, though only the largest firm visited maintained a permanent marketing organization abroad. But most of the firms were nonetheless obliged to export their products through wholesalers, commission agents and other middlemen, resulting in very low profit margins and a concentration of sales in the lower sections of the market: many companies in fact reported that they were subsidizing unprofitable exports from higher margins obtained in the domestic market.

Expatriate relatives and business associates also play an important part in gaining access to certain markets: thus an upmarket womenswear company which exported 100% of its output owed much of its success to the company's marketing agent, the owner's American brother-in-law. More typically, however, the expatriate connection ties Cypriot firms into poorly paid Cut, Make and Trim (CMT) work for London wholesalers seeking to cut costs and overcome growing shortages of skilled labour: one expatriate company had gone so far as to close its London factory entirely and ship the machinery to Cyprus where it was now employing over one hundred people (Cf. Zeitlin, 1985; Davenport, Totterdill and Zeitlin, 1986). A leading industry source estimated that 70% of the Cyprus clothing firms was currently working on British CMT orders, a possibly exaggerated but nonetheless significant figure. Nine of the twenty companies interviewed reported that they did some work on a CMT basis (compared to 24 of 70 companies in the 1983-4 ITA survey); customers included West Germany, Denmark and Sweden as well as the UK. In only two of these cases did CMT account for more than 50% of a company's annual turnover, and work of this type was largely regarded as a means of overcoming cash flow problems or filling gaps in orders for proper manufacturing.

A number of Cyprus clothing firms, by contrast, had managed to establish long-term supplier relationships with European retailing and manufacturing organizations. Thus one large, well-equipped company had enjoyed considerable success in manufacturing casual wear for three major European jeans companies. These customers supplied the designs and suggested the fabrics, which were purchased by the Cyprus subcontractor, made up into finished garment, and dispatched either to a central warehouse or direct to the individual national markets. A key feature of these relationships, which had been operating over three to nine years, was the Cyprus manufacturer's ability to handle small as well as large orders and to readjust production quantities for individual styles during the course of the season, a service for which additional payments were forthcoming. Orders from the jeans companies were not put out for competitive tendering, and the managing director of the firm ranked his customers' priorities in terms of flexibility, delivery and quality.

followed by price. Offers had been received from the jeans companies of orders for new lines such as jackets and trousers, and the Cyprus firm is making a major investment in a new factory for this purpose.

Another example of successful collaboration between Cyprus and Europe on a subcontracting basis was that of an upmarket womenswear firm manufacturing exclusive lines for French and British designer companies. The French company sent its design team to Cyprus several times a year to work out the final samples with local production management, and the visiting designer said that they regarded Cyprus as the 'top of the line' in quality terms for overseas manufacture. The manufacturer bought the cloth and received a mark up of 10% on costs, as well permission to sell the French company's designs on a licensed basis anywhere outside the French market. The Cyprus firm had a small design team of its own producing original styles for the regional market as well as assisting the visiting designers, and the managing director clearly saw subcontracting for foreign companies as a means of learning more about the requirements of European markets and gradually upgrading his in-house design capacity.

2.2.3 The Strategic Importance of Design

Many of the difficulties encountered by Cyprus manufacturers in developed country markets can be attributed to the limitations of local design capacities. Manufacturers unable to offer up-to-date designs of their own are excluded from certain segments of the market and pushed into competing on price, though as we have seen there are also opportunities to establish long-term relationships with Western retailers through flexibility, reliability and quality. Market research reports on Austria and Switzerland confirm that inadequate design content and out-of-date styling are important barriers to the sales of Cyprus garments at acceptable prices in both the lower and middle segments of these markets (Makrotest, 1985). Design is also crucial for those companies seeking to overcome established preferences for foreign goods in the upper segments of the domestic market, and it will clearly become increasingly important in the

future if entry into the European Customs Union reduces the price differential with imported garments.

For most Cyprus clothing firms, however, design means copying foreign styles from fashion magazines, photographs of shop windows or garments purchased abroad. Most European customers supply their own designs as samples or patterns, and the difference between manufacturing and CMT in such cases is largely that the subcontracting firm buys the fabric and receives a return on the working capital engaged as well as on the costs of making up the garments. Most medium and large-sized firms do have an in-house design department, but its staff spend the bulk of their time on adapting existing patterns to production requirements and grading rather than originating new styles. An extreme example was that of a large firm visited, which had only 0.6% of its workforce in the design department, though the management were planning to hire a freelance designer from the UK for a three-month period. Under these circumstances, it is hardly surprising that many companies' styles are six months to a year out-of-date, and this fact is reflected in the low prices obtained from their European customers.

A significant proportion of the firms interviewed, however, did see design as an important component of their marketing strategy, and spent considerable sums of money on hiring professional designers, purchasing design intelligence reports, and travelling abroad. An extreme case was that of the fashion garment firm exporting 100% to the United States, whose managing director reckoned that it spent C£80,000 a year on fashion forecasting reports, foreign travel and salaries for its ten person design staff, or 4% of its total turnover. But smaller firms focusing on the home market also spent considerable sums on design: thus a medium-sized childrenswear manufacturer had seven people in his design department out of 80 employees and spent £10-15,000 a year (or 2-3% of turnover) on foreign travel and design intelligence reports; an upmarket manufacturer of leather clothing spent similar sums on foreign travel for its designer; and even a manufacturer of casual shirts whose styles were largely copied spent DM2500 a year on design intelligence

reports.

A major problem for all these firms was the acute shortage of professional garment designers in Cyprus. One large knitwear manufacturer bought in a collection each year from a freelance designer based in Milan, while other companies were hoping to attract designers from abroad despite tight restrictions on foreign nationals working in Cyprus except on a short-term contract basis. A number of firms were seeking longer-term solutions by sending their daughters to London and Paris for specialized training in garment design, though they were not always well equipped to judge in advance which courses would be best suited to their needs.

Auxiliary skills such as grading and pattern cutting were likewise in short supply, and a number of the more design-orientated companies reported bottlenecks in grading during the seasonal rush to produce new samples. Several firms were aware of the potential benefits of CAD in faster turnaround times and improved consistency of grading, but none of them expected to be able to purchase this equipment from their own resources within the next few years.

2.2.4 Management Structure and Information Systems

All of the firms were private limited companies which could be described as family businesses, but there were considerable differences among them in the professionalism and effectiveness of their management structures and information systems. Management in some of the smaller firms visited consisted of little more than the owner, his wife and perhaps a son, and up-to-date information on the performance of the business was accordingly limited. At the other extreme, one large shirt manufacturer had a highly professional management structure based on independent cost centres and computerization of accounts, payrolls, invoices, stocks and production costing; at the time of the visit, a real-time production control system was also under consideration. But the size of firm in

itself was no guide to the effectiveness of management. Thus one large jean manufacturer had a top-heavy office staff which comprised nearly one-third of total employment, while overlapping chains of command and internal rivalries undermined decision-making procedures. A number of large firms used rudimentary accounting procedures and were unable to calculate key indicators of performance such as stock turnover or the amount of work-in-progress; few made systematic use of work study methods and costings for new products typically depended on rule of thumb and comparisons with past experience. Conversely, some medium-sized firms had highly progressive management systems: thus one childrenswear manufacturer had computerized his accounts, payrolls and invoices and developed his own software for order planning and stock control; at the time of the visit he was working on extending the system to manpower planning and production control as well.

Seven of the 21 firms interviewed used computers in their accounting department (compared to 22 of 97 firms in the 1985 ITA survey); and three of these also used computers for order planning, stock control, product costing and production monitoring. Seven of the remaining firms were planning to computerize their operations in the future (in some cases the process was already underway), and four of the firms which already had some computerization were planning to extend it to new areas of their business. The introduction of computerized systems of management information and production control should prove highly beneficial to Cyprus clothing manufacturers, especially those operating in more volatile market environments, but their effective utilization will require a shift in perspective from many companies unaccustomed to systematic monitoring of performance by other methods. Advice from outside consultants may therefore be necessary to assist such companies in developing an appropriate system of management information and in selecting the combination of hardware and software required for its implementation.

As in the case of designers, the shortage of professionally-trained personnel is a major constraint on Cyprus clothing manufacturers' ability to upgrade standards of management practice. Many of the

firms interviewed reported difficulties in finding experienced production managers, technicians and supervisors on the open market; those available were rarely familiar with up-to-date garment manufacturing methods since few Cypriots choose to study such subjects abroad. Restrictions on the employment of foreign personnel inhibited companies from seeking to buy in expertise through this route, though one firm visited did have a British production manager attached for official purposes to the payroll of a sister company in the UK. None of the firms interviewed had had any dealings with foreign management consultants, and there do not appear to be any consultancy services in Cyprus specialized in the problems of the garment industry.

2.2.5 Technology and Work Organization

The tasks confronting production management in the companies visited varied considerably following their product and marketing strategies. At one end of the spectrum was a medium-sized shirt manufacturer producing long runs of basic styles in cheap Far Eastern materials for customers such as the West German Army and the school uniforms departments of British chain stores. All orders were booked six months in advance, production was highly sectionalized, workers were trained for single operations, and special machinery was used extensively including a robotic button attacher. High levels of stocks and work-in-progress were necessary to keep the production lines moving, and labour turnover levels were the highest of any firms visited at 20-30% per year. At the other extreme was a childrenswear manufacturer of similar size producing small lots of medium-price designer garments using European materials for specialized boutiques in the home market, the Gulf states and Western Europe. The product range was wide and constantly changing, with new styles manufactured every week; production lines were flexible and easily rearranged; workers were trained in a variety of operations and several different garments of similar type could be assembled on the same line; underbed trimmers and computerized stitch controls were common on sewing machines; and special machines were placed in a separate department outside the main production area. It was this

company which had developed its own computerized system of order planning, deliveries and stock control to coordinate the complex flows of material through the factory; as a result, levels of inventory and work-in-progress had been cut by 20% over the previous year and further reductions of 15-20% were expected in the future.

Most of the companies visited stood somewhere between these polar cases of mass production and flexible specialization. Many of the larger companies manufacturing men's suits, shirts and trousers had highly sectionalized factories geared up for long runs of similar garments with minutely subdivided operations, low skilled workforces and extensive use of special machinery. But most of these firms were unable to fill their factories with orders of the requisite size, since the home market demanded variety and export customers obliged them to accept small orders alongside the large, while growing pressure for shorter lead times also wreaked havoc with their production planning. Many of these companies were awash with stock and work-in-progress needed to cover inadequate line balancing and keep production moving; absenteeism and labour turnover were frequently a problem; levels of capacity utilization were often low, and fixed asset/sales ratios high. A number of firms had therefore moved away from the mass production model in a variety of ways. Special production lines were often introduced for shorter orders with garments broken down into fewer operations and a more skilled workforce; a proportion of the workforce on the main lines were trained in a wider range of operations to cope with style changes and cover for absent colleagues; and one shirt manufacturer which prided itself on flexibility had reduced the time needed to rearrange production for a new style from two days to between two and three hours.

Similar problems were encountered by the large knitwear and underwear firms visited. Heavy capital requirements in the knitting departments gave these companies the highest levels of fixed assets per worker and asset/sales ratios outside dyeing and finishing (table 16), and much of the equipment was designed for production of long runs of standard underwear or classic jumpers. Imbalances between

departments and declining demand for standard products meant high stock/sales ratios and extremely low levels of capacity utilization in two of these firms (30% and 50% respectively on a three-shift basis). But the third knitwear company, which manufactured garments in smaller runs for the home and regional markets, had largely managed to avoid these problems through careful balancing of its production facilities, the introduction of computer-controlled equipment, and wider training for a proportion of its sewing machinists; while the manufacturer of classic knitwear had also invested in computer-controlled knitting machines to increase the company's ability to respond to fashionable demand for patterned jumpers in the European market.

The picture was quite different among womenswear and childrenswear manufacturers. There the problem was less one of increasing flexibility in factories organized for mass production than of increasing productivity and efficiency within factories already organized on flexible lines. Production in these factories was generally less sectionalized than in menswear and operations less finely subdivided. A higher proportion of the labour force in womenswear was broadly skilled, workers tended to be older and more experienced, and recruitment problems were particularly acute in this sector. Shortages of skilled labour together with instability of demand made outwork a common feature of production in womenswear, though some menswear firms also had recourse to subcontractors, and this was a constant source of quality problems for many companies. Some of the firms in this sector, particularly the smaller subcontractors, worked in cramped premises with obsolete machinery, but the majority of those visited were operating from modern factory buildings with up-to-date equipment such as underbed trimmers, programmable stitch counters and various types of special machinery. A number of companies visited were also attempting to improve the efficiency of their operations through careful management planning, quality control and in-house operative training; one large womenswear manufacturer had developed its own hanging system for moving garments through the factory with a minimum of work-in-progress.

As one would expect from the aggregate data reported in Table 12, most of the companies interviewed had invested heavily in plant and equipment over the past five years, and levels of fixed assets per worker in many firms compare favourably with those in Britain, as can be seen from Table 16. Investment in land and buildings typically accounted for 50% of fixed assets, and many of the companies visited had recently moved into new, purpose-built factories with modern facilities such as air conditioning, sanitation and canteens. All of the firms had some special machinery (compared to 53% in the 1985 ITA survey), often quite extensive; all had a significant proportion of underbed trimmers (compared to 73% in the ITA survey); six had some kind of computer-controlled equipment. Ten of the companies had automatic or semi-automatic laying up machines, but marker making remained manual and none were considering investments in computer-controlled cutting. Most of the managers interviewed emphasized the role of generous tax allowances for capital equipment purchase and depreciation in explaining their investment decisions, and many complained of difficulties in obtaining adequate information about the range and capacities of machinery available abroad.

2.2.6 Raw Materials, Lead Times and Finishing Processes

One of the major problems facing Cypriot manufacturers in responding to pressure from their customers for shorter lead times is the supply of raw materials. There is little fabric production on the island, and most of the manufacturers interviewed reported lead times of one to three months for European fabrics and four months or more for imports from the Far East. Fabrics can be obtained more quickly from merchant converters, but only at a price premium which may jeopardize the competitiveness of the finished garment. All three of the knitwear companies did make their own fabric; one also had a separate factory spinning acrylic yarn, and sold part of its output on the open market. Few of the companies needed more than two weeks to make up an average order once the material was in the factory, and difficulties in obtaining materials were a major factor in pushing up stock levels, particularly in capital-intensive firms concerned to maintain continuity of production. Large accumulations of raw

materials could be very risky in case of fashion changes, and two of the companies visited were in the process of writing down more than £500,000 of obsolete stock. Proposals had been discussed from time to time for new fabric weaving ventures, but even if these proved viable they could never provide a sufficient variety of output to satisfy the needs of the clothing manufacturers. Fabric supply is a bottleneck in the apparel pipeline even in countries which have their own textile industries, though manufacturers are becoming more aware of the need for quicker response to fashion trends (Cf. Nathan, 1986). Similar problems in Britain have led local authorities to discuss the possibility of establishing a collective fabric converting operation which would buy up grey cloth and have it finished to customers' requirements (Gillingwater, 1986); and a consortium of this type might prove successful in Cyprus as well. Within the firms themselves, much of the burden of stock requirements could be reduced through improved management planning and more flexible work organization, as well as better information on fabric sourcing.

An equally serious problem is the limited development of dyeing, bleaching and finishing processes in Cyprus itself. Expensive capital equipment is required for these processes, and few of the firms had any in-house capacity, though one knitwear company had its own washing and finishing unit and a large jeans producer was planning to invest in a special laundry for stonewashing denim. The major facility for these purposes on the island was a commission bleaching and dyeing company financed by the Cyprus Development Bank, about which opinions in the industry were sharply divided. This firm used the best German dyestuffs and a number of dyeing machines were computer-controlled to ensure process quality, but it also had a considerable proportion of outdated equipment which was rather less reliable and several customers expressed dissatisfaction with the quality of the service. Seasonal peaks of demand kept capacity utilization low (60% on a three-shift basis rather than the owner's target of 80-85%), and modest rates of profit meant that equipment could only be replaced over an extended time schedule. The firm also had a serious problem with water pollution, and pressure from public authorities to detoxify its waste products would push up its costs in

the future. A number of clothing companies were themselves considering new projects in this area. One large manufacturer was planning a major investment in a modern plant with a capacity of 1 million metres per year for dyeing imported raw silk; part of its output would be used in the company's own garment operations, while the rest would be sold on the domestic market and exported to Europe, where the proportion of local value added would enable it to overcome rules of origin barriers against Far Eastern products. Another womenswear firm was considering participation in a much larger joint venture with the Chinese government for the dyeing, finishing and printing of 15 million metres of fabric a year; the total investment required would be \$16 million, or \$30 million if a weaving plant was constructed as well. This project had apparently been under discussion for a number of years, and few sources in industry or government circles held much belief in its realization. Whatever the outcome of these initiatives, dyeing and finishing is clearly a function of strategic importance for the Cyprus clothing industry, and its development will need to be carefully monitored by the public authorities. As in the case of fabric supply, there may be scope for collaboration among the clothing firms themselves to upgrade the facilities available for dyeing and finishing and improve the utilization of existing equipment (Cf. Cotton and Allied Textiles EDC, 1983; Gillingwater, 1986).

A final problem for the clothing manufacturers in relation to lead times were delays in transport. Thus transport by sea and road to northern Greece added several days to deliveries by truck, while air freight cost £.20 per garment. Despite the inconvenience, however, these delays did not appear to be a major barrier to European exports, and many London wholesalers were prepared to pay air freight charges even on relatively inexpensive garments.

2.2.7 Wages, Productivity and Costs of Production

In all of the clothing firms visited sewing machine operators comprised the overwhelming majority of the workforce, and the making and finishing departments together accounted for 75.7% of total employment in the 1985 ITA survey. Gross wages for sewing machinists in the companies interviewed ranged from C£28 for new entrants to £45 for experienced workers; the average was around £37 per week. Average operative earnings in 1985 were £1861 per year, £35.78 per week or £.89 per hour, though this figure would be inflated by the inclusion of better paid male workers in other departments. Additional costs to the employer for social insurance and the Refugee Levy amounted to 32% above the gross wage bill for each worker (Cyprus Department of Statistics and Research, 1985).

Converting Cyprus pounds to sterling at roughly the January 1987 parity of £1.33 gives average hourly wages of £1.18 in 1985. For comparability with the data for other clothing producers given in Table 5, it is necessary to use 1983 wage rates, which were C£.77, £1.02 or £1.35 including social costs (Cyprus Department of Statistics and Research, 1983). On that basis, wage costs in Cyprus were well below those in developed European countries such as Switzerland (71.5%), West Germany (71.2%), Italy (69.7%), Britain (44.0%), Spain (36.9%) and Ireland (28.6%), but well above those in developing countries such as Hong Kong (26.2% above), the Ivory Coast (57.0%), Egypt (85.0%), Tunisia (87.2%), and Morocco (409%), not to mention Sri Lanka (562.5%). Wage costs in Cyprus were also below those of other Mediterranean clothing producers such as Greece (31.9% less) and Malta (71.8%), but well above those of Portugal (157.0%). As in all such comparisons, however, these results are extremely sensitive to currency fluctuations, differential inflation rates and variations in the quality of the original data.

But lower wage costs in Cyprus also need to be set alongside lower levels of productivity than those prevailing in more developed

countries. Table 16 gives crude productivity figures for the firms interviewed in terms of gross output per employee, and these can be compared with the average for firms with ten or more employees in Cyprus and with published figures for different types of company in Britain. In 1985, average output per worker in 15 firms for which data is available was C£8740 (or £11624 at a parity of £1.33), compared to the average for all clothing firms with more than 10 employees of C£8783 (£11681); in 1986, average output per head in 19 of the firms visited was C£9815 or £13054. As can be seen from Table 16, gross output per head in Cyprus in 1985 was just over 65% of that in intermediate-sized clothing and hosiery and knitwear firms in Britain, or 53.4% of that in large clothing groups; the 1986 figures for the firms interviewed were 73.5% of those for intermediate and 59.6% of those for large British firms respectively. Given the upward bias of the British figures, which omit the smaller companies, these results support the judgment of previous consultants that productivity in Cyprus clothing firms is 65-75% of European levels (ITA, 1984).

Cyprus' wage cost advantages over European clothing producers therefore need to be discounted by 25-35% to take account of lower productivity per head. But in the case of Britain, this still leaves Cyprus with an advantage of 28.6%-33.0% in unit labour costs, and similar calculations could be performed for other European countries where comparable productivity data available. Cyprus' position as a low-cost garment producer in European terms can also be confirmed by evidence from other sources. Thus one large knitwear manufacturer estimated that his export prices for classic woolen jumpers were 30-35% below those of leading European companies using comparable materials; and another manufacturer observed that import prices were 150-200% higher than those of his own goods in the shops or 75-125% when the tariff penalty is removed. Similar data collected by a UNIDO consultant in 1985 gave retail price differentials over European imports of 200% for knitted shirts and 300% for woven shirts, though import prices for mass-produced commodity textiles like terry towelling were more than 20% below those of domestic producers despite tariff protection (Murray, 1985). It would in any case be difficult to understand why subcontracting from European

firms is so widespread if costs of production in Cyprus were not substantially below domestic levels.

International comparisons of costs of production thus provide little support for the view that wage levels per se are a major problem for the Cyprus clothing industry. During the course of our interviews, while some employers placed most emphasis on labour costs and the de-indexation of wages from the cost of living, others took the view that a moderate increase in wages would not pose major difficulties for their businesses. The latter were far more concerned about productivity levels, and there is little doubt that improvement in this area is of much greater strategic importance for the longer-term development of the clothing industry in Cyprus.

As can be seen from Table 16, levels of fixed assets per worker in Cyprus firms are comparable and often above those in British garment firms, and differences in capital intensity cannot therefore explain the productivity gap. A large part of the explanation clearly rests with the weaknesses in management planning and the organization of production discussed in previous sections, but many manufacturers also emphasized the irrationalities of the existing wage structure and the absence of any clear link between earnings and output. The clothing industry in Cyprus is heavily unionized (80%) and basic wage rates are set through national agreements between the Clothing Manufacturers' Association and the two trade union confederations, PEO and SEK. Within this national wage system, however, the earnings of individual workers are primarily dependent on their level of seniority in the enterprise: there is no formal grading according to skill nor any incentive component in earnings. While many manufacturers attributed their failure to introduce incentive systems to opposition from the unions, a number of the more candid managers interviewed observed that the employers' association was also extremely ambivalent on this subject. Indeed, given the ad hoc nature of work measurement and product costing in many firms, it is hardly surprising that employers lack confidence in their ability to administer such wage systems efficiently. While the unions did

express strong reservations about incentive wages, the officers interviewed conceded that their organizations would be willing to consider a move in this direction given adequate safeguards for worker interests and an active role for their representatives in determining output targets and bonus rates.

The high manual content of sewing operations means that individual machinists exercise a considerable impact on productivity levels, and incentive wage systems are accordingly the norm in European garment factories. But incentive wages come in many variants from individual piece rates through measured day work to group bonuses, and the advantages and disadvantages of each system for management and workers depend greatly on the context in which they operate and the way they are administered. Where workers change jobs often there must be adequate compensation for reduced productivity at the beginning of the learning curve, and as discussed in section 1.3.6 above many Western clothing companies have moved towards systems based on high basic rates for multi-skilled workers and group bonuses for interdependent work teams to enhance their ability to respond to frequent style changes. The design of incentive systems therefore needs to be carefully tailored to each company's broader product and production strategies, and effective systems of product costing and management information are also vital for their implementation. Given the high levels of unionization in the industry and the significant changes in management practice and collective bargaining that would be required, it is equally crucial that the unions be closely involved in the development and administration of new wage systems. With these qualifications, the introduction of incentive wage systems would have a beneficial impact on productivity in the Cyprus clothing industry and permit the achievement of higher levels of real earnings for the workforce in the long run.

2.2.8 Training and the Labour Market

A crucial factor in productivity improvement is the training of the workers themselves, and the growing tendency towards more varied

output and more flexible work organization also requires broader skills on the part of the labour force. Of sixteen firms visited with whom training was discussed, ten had recently run in-company training courses sponsored by the ITA (which subsidizes the trainee's wages for five weeks subject to passage of a proficiency examination at the end); two trained new recruits on individual operations to a level which could not qualify for ITA support, and four did no training at all. The numbers involved in these courses ranged from five to thirty trainees per company on the ITA scheme, with an average of perhaps ten, and slightly larger numbers on the non-sponsored schemes.

Levels of training activity in the companies visited were thus considerably above those in the Cyprus clothing industry as a whole. The 1985 ITA survey found that 88.5% of all employees had received no formal training at all; of the remainder, 1% had served an apprenticeship; 4.4% had been to private vocational schools; 6.4% had followed courses at the ITA or the Cyprus Productivity Centre (CPC); and only 1% had received in-firm training on ITA-sponsored courses. Tables 17 and 18 give figures on numbers of courses and trainees between 1979 and 1986, together with a breakdown by type of course (basic vocational, middle management and top management).

A number of points stand out from an analysis of these figures. First, only 1732 people received any formal training at a basic vocational level over the whole period between 1979 and 1986; and only a small proportion of these were upgrading their skills rather than being trained from scratch. Second, the number of trainees at this level fell off from 455 in 1984 to 182 in 1985 but recovered slightly to 237 in 1986: as in Britain, clothing firms in Cyprus seem to have responded to falling demand by cutbacks in training, at least during an initial period. Thirdly, the majority of all formal training in the industry takes place at the middle and top management levels. Between 1979 and 1986 the number of people participating in courses to upgrade their skills was 1522 for middle management and 421 for top management respectively; in most cases this appears to have entailed attendance at generic courses in management and

supervision run by the CPC. Finally, only four people had been given public assistance to study abroad, all at the top management level (three in 1985 and one in 1986), a level of provision which can only reinforce the shortage of professional technicians and production managers in this sector.

Among the firms visited there was considerable criticism of government training provision, particularly at the technical and managerial level. Manufacturers appreciated the assistance of the ITA in setting up in-house training courses, but complained of a shortage of specialist instructors and a lack of up-to-date knowledge of foreign practice. More severe criticism was reserved for the CPC, whose specialist courses for machinists and designers were regarded as extremely basic, while their courses for managers and supervisors were taught by instructors without any specific knowledge of the clothing industry, and no courses on garment technology were available.

The ITA itself felt strongly that greater efforts were required in the field of training for the clothing industry. The agency was in the process of a comprehensive review of training standards, and it intended to extend the period of subsidized training to six to twelve weeks and widen the range of skills required to qualify for financial support. The ITA was also involved in negotiations with the Clothing Manufacturers' Association for the establishment of a skill centre to coordinate training for a group of member companies, and was prepared to subsidize individual firms in building up their capacities for manpower planning. For its own purposes the ITA prepared detailed forecasts of manpower and training requirements based on the high quality surveys used extensively in this report; and its knowledge of the clothing industry was certainly the most developed of any government agency on the island.

Closely related to the inadequacy of training provision were widespread complaints of labour shortages, particularly for experienced sewing machinists. There was considerable variation

between companies in this regard, depending on the quality of employment offered, the level of initial skill required and the extent of in-house training: ten of the sixteen companies reported shortages of labour, often quite extensive, while most of the others acknowledged the problem but felt confident about their ability to recruit new employees if necessary. Labour turnover in the industry is high, at 24% per year in the 1985 ITA survey, though here as well there were considerable variations among the firms visited. Skill shortages also had a clear regional dimension, being most acute in Nicosia, less in Larnaca and least in Limassol; while a number of companies had established small factories in the countryside in order to tap additional pools of female workers.

The labour supply difficulties of the garment industry in Cyprus, as elsewhere, are strongly conditioned by the high proportion of female operatives and the absence of adequate childcare facilities. 89.4% of all employees in the industry are women, and 61.2% of these are married; the age structure of workforce shows a sharp dip in the proportion of workers aged 25-29, the peak childbearing years. According to the 1985 ITA survey, 34.1% of workers leaving their jobs gave marriage as the reason; a further 17.9% referred to 'personal reasons', a considerable proportion of which presumably related to family responsibilities. With the growing demands for broad skills and training in the clothing industry, the failure of experienced machinists to return to work after the birth of their children represents a major loss of human capital, and there is a strong case for greater nursery provision in proximity to the garment factories.

2.2.9 Profitability and Finance

Table 16 gives net profit margins on sales in 1986 for 19 of 21 firms interviewed. Profit calculations were often rough and ready, but every effort was made to exclude contributions to overheads and to obtain firms' internal figures rather than those submitted for tax purposes. Profit rates ranged between 5% and 15% on sales, with a weighted average of 6.7%, while three either broke even or made a

loss . 1986. Return on capital were normally higher, and results cited for the more successful companies ranged between 15% and 25%, which compares favourably with British figures for intermediate-sized clothing manufacturers (0.8% in 1984-5), hosiery and knitwear manufacturers (17.2% in 1985-6), and even large clothing manufacturers (14.1% in 1984-5; ICC 1986a, 1986b, 1986c). Most companies reported sharply decreased profits by comparison to the boom years of 1983-4, but margins are still considerably higher than the 1985 figures for large and particularly intermediate-sized British clothing firms given in Table 16. As we noted earlier, a number of firms reported significantly higher profit margins in the home market, presumably because of tariff protection, but even companies producing largely for export had respectable returns on sales by international standards.

Working capital bulks large in the operations of clothing firms because of the cash flow problems created by seasonal peaks in sales and the need to finance forward payments for fabric and wages. Most of the firms visited therefore had large bank overdrafts, amounting in many cases to more than 50% of fixed assets, and nine had long-term loans ranging from C£40,000 to £550,000. Among the companies with long-term loans, six were from the commercial banks and three from the Cyprus Development Bank (CDB), though two of the companies interviewed had borrowed from the CDB at some point in the past. While the CDB's clients were generally appreciative of its strategic advice, most of the other firms interviewed felt that there were no advantages to borrowing from it rather than the commercial banks. Rates of interest were the same (9% for overdrafts and long-term loans alike, though many firms reported extra charges under various pretexts), the terms were similar (3-4 years for the commercial banks, 5-6 years for the CDB), and a number of companies feared that the CDB would want a say in the management of their business. The commercial banks were anxious to lend money to manufacturers in order to make use of special priority funds exempt from normal liquidity restrictions, and firms were under pressure to take out long-term loans from the bank which controlled their overdraft. There was little evidence among the companies interviewed of problems in obtaining finance, though criticisms were voiced of the heavy

dependence of bank lending on disposable assets, particularly real estate. But the only company among those interviewed which had been refused a long-term loan was a large knitwear manufacturer with a capacity utilization level of 30% and a stock/sales ratio of 60%, though firms which had large sums tied up in unpaid Libyan orders also had difficulty in raising further working capital. Indeed, given the high levels of fixed assets and low productivity in many companies, a good case could be made for greater selectivity in bank finance and increased targetting of tax concessions on capital investment.

Despite the constraints under which it was operating, the CDB did have a strategic perspective on the problems of the Cyprus clothing industry. The CDB had investments of C£1.1m in nine textile and clothing firms, or roughly 10% of its total industrial portfolio. As one might expect, these investments were concentrated in the larger and more capital-intensive sectors of the industry, although the CDB did have a stake in two medium-sized childrenswear firms. Both the lending and the consulting divisions of the bank saw the need for Cyprus to move away from mass-produced commodity textiles and garments towards higher-value products and more flexible production processes; and the feasibility studies and turnaround plans produced for industrial clients clearly reflected this perspective. The CDB would thus be well placed to play a more important role in the direction of investment within the clothing industry if it were able to offer finance on better terms than the commercial banks.

2.2.10 Government Services to Industry

Beyond the training activities of the ITA and the CPC, the major public body providing services to the clothing industry in Cyprus is the Ministry of Commerce and Industry (MCI). The Trade Department of the MCI was responsible for export promotion and organized the participation of Cyprus clothing firms in international exhibitions and trade fairs, as well as mounting special trade missions, particularly to the Middle East. Some of these were specialist

events for the clothing industry, but others, including the trade missions were open to all exporting sectors. Participants had to pay for their own overseas travel, but the MCI bore the costs of exhibition fees, construction and decoration of pavilions, and could supply interpreters and entertainment if required. No selectivity or quality control was exercised by the MCI, and the only requirement for participation was that firms be authentic manufacturers in their own right as opposed to agents, retailers, licencees or CMT subcontractors. The MCI also organized an annual exhibition of Cyprus clothing products held on the island, and paid the hotel expenses of visiting buyers, though not their travel costs. The annual budget for export promotion within the MCI was between C£200,000-250,000.

In addition to these direct forms of export promotion, the Research Department of the MCI produced reports in conjunction with foreign consultancy firms on the opportunities for Cyprus clothing sales in selected foreign markets, such as Austria and Switzerland, Norway and Sweden, Canada and the UK. Judging by the sample examined (Makrotest, 1985), the quality of these reports was excellent, but no comparable research on the market for clothing within Cyprus itself had been undertaken by the Ministry despite the expected customs union with the EEC.

Both export promotion and market research were performed by office with responsibilities for a number of sectors, and the only section of the Ministry specifically concerned with the clothing industry was the Technical Extension Service of the Department of Industry. Within the Extension Service there was one officer with special responsibility for assisting clothing and textile firms, and part of her time was taken up in preparing technical specifications standardisation, and advising on the purchase of machinery. This extension officer had been well trained as a textile technologist in Britain and was generally respected by the manufacturers, but other financial priorities had not allowed her to attend international machinery or fabric exhibitions during six years in the job. This is important if she is to maintain direct experience of the more recent

technical developments abroad. The industry was in any case far too large for a single extension officer, and visits to individual firms were therefore infrequent. The ITA sponsored twice-yearly seminars on future fashion trends by the Greek office of Promostyl, a leading French design intelligence company, and these were extremely popular and well attended by local manufacturers and designers. But financial support within the Ministry had not been forthcoming for efforts to bring foreign consultants to run courses on work study methods and other specialist aspects of garment management.

The need for more specialist knowledge within the Ministry, and for more resources for technological information, management advice and the extension service more generally, were all points made to us by industrialists. The importance of selectivity in export promotion was also underlined, and this we hope can be taken on board by the Export Promotion Organisation. In our view there certainly is a need for more resources. But at the same time much could be gained from a closer integration between export promotion, market research and technical assistance, as well as other functions of the Ministry which directly affect the sector. The re-organisation of the Ministry's services on a setoral basis would help bring this about, and serve to build the close government-industry inter-relationship which is a pre-requisite for successful restructuring.

2.2.11 The Implications of the Customs Union

Any assessment of the implications of the European Customs Union for the Cyprus clothing industry must contain a strong component of speculation. For there is little hard evidence available on such key questions as the price elasticity of demand for imported garments in Cyprus or the long-term potential for Cypriot exports to the EEC; while the specific prospects of the clothing industry may also be affected by the broader impact of the Customs Union on price and income levels in the economy as a whole. With these caveats in mind, however, some tentative conclusions may be drawn from the preceding discussion.

Despite the high level of existing tariffs, unit labour costs in Cyprus are well below those in EEC countries, with the exception of Portugal; and this cost advantage is confirmed by the substantial volume of work subcontracted to Cypriot clothing firms by European retailers and manufacturers. Provided that existing quota restrictions on low-cost imports from the Far East are maintained, the Customs Union would thus appear to pose little danger to the lower segments of the domestic market, except perhaps for more standardized garments such as jeans where European producers may enjoy continuing economies of scale. The real threat may be expected in the upper segments of the market from European manufacturers and retailers competing on the basis of flexibility, design and brand image. Even with the existing tariff levels, as table 11 shows, imports accounted for 10.4% of domestic clothing consumption in 1985 and slightly higher levels have been reached in previous years. Since the Cyprus Household Income and Expenditure Survey (1984/5) does not collect information on patterns of demand for imports, it is difficult to estimate with any precision how much imports of European fashion garments might increase if prices were reduced by the amount of the present tariff. Much will clearly depend on the efforts of domestic producers to build up consumer loyalty through the development of indigenous design and marketing capacities; and much will depend as well on whether European manufacturers choose to renew their current licensing agreements or to export their goods to Cyprus directly. A reasonable guess would be that imports might increase their share of the domestic market from 10% to 15-20%; and import penetration to Cyprus is unlikely to reach British levels of 30-35% given its lower costs and less developed system of retailing. Since domestic sales account for less than 50% of total output, a moderate increase in import penetration could be absorbed without disastrous consequences, particularly if exports expanded to compensate.

A second effect of tariff reductions might be to reduce the rate of profit in the domestic market. Many of the firms interviewed confirmed that price and profit levels in Cyprus were substantially higher than those obtainable in export markets, and several reported that domestic sales were subsidizing export orders, particularly to Western Europe. Insofar as such differentials exist, entry into the

Customs Union will weaken the financial position of Cyprus clothing firms and reduce their ability to accept unprofitable orders as a means of breaking into export markets. But data from the firm interviews do not show any clear division in overall profit levels between companies engaged in exports and those concentrating on the domestic market. Many firms do succeed in achieving remunerative prices on export sales, and the crucial determinant of profit levels does not appear to be geographic specialization but rather the quality of company management and the effectiveness of its production and marketing strategies. There is thus no reason to believe that entry into the Customs Union would have a catastrophic effect on the export capacities of the Cyprus clothing industry; indeed, the reduction of price differentials in the domestic market should spur Cyprus firms to intensify their exporting efforts.

Entry into the European Customs Union will give the Cyprus clothing industry duty-free access for its products to the markets of the EEC. But Cyprus has never yet succeeded in reaching its existing ceilings for clothing which could be exported to the EEC without having to meet all the visual rules of origin requirements. The industry could therefore expect little immediate benefit from the Customs Union, apart from products such as shirts some of which currently face CCT as 3rd country imports under EEC rules of origin. In the longer term, however, more substantial benefits might be expected from the Customs Union. Many of the firms interviewed had made considerable investments of time and money in building up export connections to the EEC, and these investments are partially reflected in the preliminary trade figures for 1986 (table 13). Insofar as these firms are successful in upgrading the quality of their products and reducing their costs, Cyprus clothing exports to Europe might be expected to increase considerably in the future. Membership of the Customs Union might also help to overcome the low-wage image which has proved a barrier to imports of higher-priced garments from Cyprus, while existing quota arrangements may prove vulnerable to the growing tendencies towards protectionism in the international economy.

The impact of the Customs Union is thus unlikely to be disastrous for the Cyprus clothing industry but any potential benefits will depend on the abilities of domestic producers to improve their competitiveness in European markets. It would clearly be prudent for Cyprus to negotiate an extended period of transition for the reduction of tariff barriers against European products, while continuing to exclude lower-cost imports of made-up garments from countries outside the EEC. But given the heavy commitment of the Cyprus clothing industry to increasingly competitive export markets, it will be far more crucial for the public authorities to establish a policy framework which can assist manufacturers in developing appropriate production and marketing strategies; and it is to this task we turn in the concluding section.

A STRATEGY FOR THE CYPRUS CLOTHING INDUSTRY

3.1 Opportunities and Dangers

The far-reaching shifts in markets, technology and competitive strategies described in the first section of this report create new opportunities and new dangers for the clothing industry in Cyprus as it has developed over the 1980s. The dangers are perhaps most evident and are often uppermost in the minds of many manufacturers. Throughout the international economy, markets have contracted and become less remunerative for cheap, simply styled garments produced in long runs by unskilled workers in highly sectionalized factories. The Libyan market which fueled the industry expansion in the first half of the decade has proved dangerously unstable at the same time as it led Cyprus firms to specialize on product types and marketing methods that are uncompetitive elsewhere. By contrast, fashions in higher income Arab states like Saudi Arabia and the Gulf have moved closer to European patterns, and Cyprus clothing manufacturers have been losing out in these more demanding markets. Within Europe itself, demand for mass-produced garments has narrowed considerably, while prices and profit margins for these goods are depressed by the intensity of competition, both domestic and international. Cyprus is not in any case a low-cost producer by comparison to the Far East and its competitiveness in this segment of the European market depends on the continuation of import quota restrictions from those countries. Entry into the European Customs Union will also subject Cyprus imports to EEC rules of origin and deprive manufacturers of cost advantages deriving from the making-up of cheap Far Eastern textiles. Specialization on simply-styled garments with low design content, finally, enhances firms' vulnerability to competition in the home market from fashion-orientated manufacturers abroad when tariff barriers come down as a result of entry into the European Customs Union.

But these shifts in the international economy also create attractive possibilities for the development of the clothing industry in Cyprus. There has been a considerable expansion of demand for well-designed clothes produced by a skilled workforce with flexible equipment in countries close to European markets and inside EEC trade barriers. Changes in technology and work organization make productivity improvement compatible with product diversity, while higher profit margins per unit for better-made, more fashionable garments can offset the wage levels required by Cyprus' high standard of living.

Two main strategies can be identified whereby Cyprus clothing manufacturers can take advantage of these opportunities. One strategy is for firms to build up their design capacities in the domestic market as the basis for a subsequent move into exports. In this respect, a home market like that of Cyprus which demands fashion and variety is a great asset, and firms can use it as a laboratory in which to develop a distinctive style and product image which can ultimately be projected into foreign markets as well. This is the path which much of the Italian clothing industry has followed, and Spanish garment producers now appear poised to make a powerful impact on international fashion markets using similar methods. Close touch with local demand and the creation of an indigenous Cyprus style will likewise be vital to safeguarding the home market against invasion by European designer garments once tariff barriers have been lowered. Licensing agreements with well-known foreign brands, by contrast, may work in the opposite direction, and should be discouraged unless clear prospects of substantial sales outside the island can be established.

A second strategy is for Cyprus firms to become high quality suppliers for foreign retailers and manufacturers, building up long-term relationships on the basis of flexibility, reliability and quality rather than price alone. Through such relationships, Cyprus clothing firms can gradually acquire a feel for the requirements of European consumers while learning how to combine flexibility and efficiency and thereby reduce production costs. Ultimately, however, these two strategies must converge if the Cyprus clothing industry is

to consolidate its position in international markets. Improved productive efficiency is vital in securing the price edge needed for unknown manufacturers to break into foreign markets, while original design capacity is crucial in expanding such footholds once acquired.

As we have seen, a significant section of the Cyprus clothing industry has already gone some distance towards putting these strategies into practice. But as in other countries such as Italy, their success will require the development of a range of common services which are beyond the means of even the most dynamic local firms to provide for themselves on an individual basis.

3.2 Fashion Forecasting and Market Research

For Cyprus firms to break into more remunerative niches in Western export markets, they need detailed guidance on fashion trends (styles, shapes, colours), both current and prospective (12-18 months ahead), together with good quality research on the characteristics of demand in different markets and their potential accessibility to Cyprus manufacturers. As we have seen, the ITA already organizes twice-yearly seminars by a French design intelligence company, which are well attended by local clothing companies, and the Ministry also hires international consultancy firms to undertake one-off surveys of particular markets. A number of the more progressive exporters themselves purchase commercial design forecasts at C£500 a shot and spend considerable sums on research visits to European markets.

Significant economies of scale obtain in these areas, and a sectoral organization could perform these functions in a more continuous and systematic way, following the example of the Centro Informazione Tessile Emilia-Romagna (CITER), a joint public-private organization located in Carpi, the centre of the Italian knitwear industry. The CITER, which grew out of management training courses for local entrepreneurs sponsored by the European Social Fund, has a budget of £250,000, 75% drawn from its 500 member firms (most of them with less

than 50 employees) who pay a subscription of £400/yr. Its eight-person staff provides a comprehensive and highly professional range of information services in the areas of design intelligence, market research and fabric sourcing, as well as technology and management. On a more modest scale, Newcastle City Council is proposing to establish a Fashion Centre for the local clothing industry in conjunction with the local Polytechnic, and estimates the cost of creating a fashion forecasting facility which would purchase the full range of international design intelligence reports at £20,000 per year (Newcastle Economic Development Committee, 1986). There is strong support for the collective provision of this type of service among Cyprus clothing manufacturers, particularly those who are already spending their own money to achieve less satisfactory results. If such a service were established in Cyprus, it might also set up a register of free-lance designers and establish contacts with designers abroad willing to work with Cyprus firms, as well as compiling a fabric library and maintaining up-to-date information on fabric sourcing.

3.3 Joint Export Marketing

Alongside design intelligence and market research, there is a clear need for some kind of joint sales organization. As we have seen, many Cypriot exporters use commission agents to make contact with Western buyers, and often pay a considerable premium for their services; a joint sales organization might enable them to avoid these middlemen as well as providing vital technical and logistical support for exports. The new Export Promotion Council should provide a good general framework and some potential finance for collective initiatives in marketing, but the detailed knowledge of local capacities required for its success can only come from within the sector itself. Many industrialists expressed strong support for sector-specific marketing initiatives, and one larger ladieswear manufacturer reported that he was actively canvassing for partners to establish a joint sales organization at a cost of C£100,000 for each market. A general concern among the industrialists is the need for any such organization to impose stiff quality standards on

participating firms in order to overcome Cyprus' image as a low-cost producer, in contrast to current practice in the export promotion activities of the MCI.

3.4 Computer-Aided Design

As in European clothing districts, there would be considerable advantages to the establishment of a CAD bureau in Cyprus. As we have seen, many of the companies visited were well aware of the benefits of CAD in terms of savings in materials costs, faster turnaround times and more accurate costings for the generation of new styles; but all considered it to be beyond their financial means for the foreseeable future. Even if CAD systems fell considerably in price, a bureau could play a valuable role in training larger companies in the use of the equipment, as well as making its services available to their smaller counterparts who would be unlikely to purchase it themselves. An additional benefit for the smaller companies would be improved product quality and consistency because of the possibility of standardizing sizes across a range of different models by building on a basic set of pattern blocks stored in the system. The cost of the equipment and software for a CAD bureau would be £120-150,000 (plus perhaps £50,000 for a building), based on the recent experience of the West Midlands Clothing Resource Centre in Birmingham and on proposals for the Newcastle Fashion Centre (Newcastle Economic Development Committee, 1986). CAD/CAM equipment is already in use within the knitwear sector, which is dominated by larger firms, and it does not seem necessary to provide these facilities within a CAD bureau. Computer-controlled cutting is probably still too expensive and difficult to coordinate for operation on a bureau basis in Cyprus, but the situation should be closely monitored for future consideration.

3.5 Technological Information and Management Consultancy

As we have seen, there are often major problems in production planning and factory organization even in the better firms. Many companies do not understand well how to reconcile the demands of flexibility and productivity in relation to different market strategies; product costing is often amateurish and levels of stocks and work-in-progress excessive. While most of the larger manufacturers have some knowledge of current developments in machinery, the same cannot be said of their smaller counterparts, and many large firms too have invested in expensive dedicated equipment inappropriate for their requirements. There is thus a need for the collective provision of information on technology and management which goes beyond the Technical Extension Service of the MCI in both quantitative and qualitative terms. In addition to providing up-to-date information on technological developments abroad and advising on machinery purchase and factory organization, it would be desirable for a service of this type to build up a register of approved consultants willing to work with Cyprus firms.

A five-year programme of technical assistance financed by the United Nations Development Programme would make it possible to bring foreign consultants to Cyprus to advise local firms on such key issues as product costing, inventory control and the design of management information systems. Individual firms might be allowed to draw on their services at subsidized rates, while visiting consultants could also help in establishing a more permanent technological information bureau by running public seminars and training its staff.

A specific problem of management organization which affects the industry as a whole is that of payment systems. As we have seen, the potential benefits in increased productivity and higher wages which could be realized through the introduction of incentive systems are currently blocked by the mutual distrust and lack of technical expertise on the part of management and unions alike. The government should therefore encourage both parties to open negotiations on the

introduction of incentive systems, and provide public finance for advice and training in their design and operation to ensure that neither is disadvantaged. A progressive management consultancy such as Kurt Salmon Associates might be approached for assistance in designing payment systems compatible with the growing emphasis on flexibility and multi-skilling in Cyprus firms, while the International Labour Organization might be able to provide assistance in training union representatives in negotiating wages under incentive systems.

3.6 Fabric Supplies and Finishing Processes

Fabric supplies and finishing processes pose particular problems for Cyprus clothing firms in their efforts to meet the shorter lead times and higher quality standards increasingly required by export markets. A partial solution to delays in fabric supply might come from the establishment of a collective converting operation by a consortium of clothing firms which would buy up grey cloth and have it finished to members' requirements. Proposals of this type have been discussed by a group of local authorities in Britain, and they should be contacted to investigate the feasibility of such a project in Cyprus. Collective efforts by clothing producers might also prove useful in resolving the problems of local capacity for bleaching, dyeing and finishing. As we have seen, the main facility for these purposes on the island is a private commission dyehouse whose investments in new equipment are constrained by low levels of capacity utilization and long payback periods at existing rates of profit. It might be possible for a consortium of clothing manufacturers to provide additional capital for new equipment by purchasing a stake in the enterprise (which is already supported by the CDB); and closer liaison between the dyehouse and its customers over production scheduling might also improve existing levels of capacity utilization. Similar considerations should also be borne in mind by the banks and the public authorities in evaluating new proposals from individual firms

for the creation of additional dyeing and finishing facilities on the island.

3.7 Training and the Labour Market

As we have seen, there is a pronounced shortage of skilled labour at a number of levels within the Cyprus clothing industry. Professionally-trained production managers, technicians, supervisors and designers are generally scarce, and firms are often dissatisfied with the level of skills available locally. There is a clear need for increased provision of sector-specific training in these areas beyond what is currently offered by the CPC, and these areas should be given priority in the allocation of public subsidies for study abroad. It would also be desirable to relax current restrictions on the employment of foreign personnel in these positions, though efforts should be made to ensure that some transfer of knowledge takes place in exchange, perhaps through the teaching of relevant courses.

Equally important, however, are skill shortages at the operative level, particularly among sewing machinists. The ITA should be encouraged in its plans to upgrade training standards in the industry, as well as to provide additional specialist instructors to assist in the establishment of in-company schemes. The establishment of joint skill centres for groups of firms combining on and off-the-job training would be particularly desirable given rising skill requirements in the industry as well as endemic problems of competition for labour among employers. The establishment of subsidized child care provision for women workers would also assist in the retention of skilled labour, while the concentration of clothing factories on industrial estates means that these facilities could be shared among a number of firms.

3.8 Finance

While the interviews suggested that access to long-term finance was not a key problem for most firms, there did appear to be considerable misallocation of investment as a result of government policies on capital allowances, interest rates and bank lending. As in other sectors, non-selective capital allowances have encouraged the purchase of inappropriate equipment in many firms, while fixed interest rates for all types of borrowing and the commercial banks' exemption from liquidity requirements for industrial loans have promoted investments based more on security of assets than on serious project assessment. Capital allowances need to be targetted much more carefully towards specific categories of investment expected to bring particular benefits within each industry, as for example, in the case of computerized management information systems in clothing or CAD/CAM in knitwear. The Cyprus Development Bank should also be permitted to offer loans on more advantageous terms than the commercial banks to strengthen its role in the strategic direction of investment within the sector.

3.9 Sectoral Institutions and Collective Services

As international comparisons demonstrate, the provision of collective services can be organized in a variety of ways. Sometimes a service can be provided by an independent company, as in the case of a commission dyehouse or commercial CAD bureau; other times by consortia of firms or employers' associations, as in the case of marketing and credit cooperatives in Italy. Sometimes it will be a public body which takes the lead, as in the case of local authority-funded Fashion Centres in Britain; other times instead a joint venture between the public and the private sectors, as in the case of the CITER. No pre-determined formula can therefore be laid down for Cyprus, but two general observations are in order. First, the development of these services will require new initiatives from manufacturers and government alike, as well as cooperation from the trade unions, particularly in the areas of training and manpower

utilization. Second, there must be a strong sector-specific component in their provision, since each of the services identified requires intimate knowledge of the problems and capacities of the industry itself.

For many of these services, the Clothing Manufacturers' Association appears the most likely candidate to serve as the nucleus for their provision. A number of leading industrialists are strongly committed to this strategy, and the Annual General Meeting of the Association has now voted to increase its subscriptions by 10% to finance the development of such services. Fashion forecasting and technological information are the obvious places to start, and these could be linked with joint marketing under the auspices of the new Export Promotion Organisation to form a sectoral resource centre. But the Association's resources will not be sufficient by themselves, and matching funds should therefore be provided by the government at least for an initial period of perhaps five years. In the case of the CAD bureau, the state might purchase the capital equipment and the employers meet the running costs through subscriptions and commercial charges for its services. The resource centre will clearly require a specialist staff with its own administration, and the MCI should be represented on its management board alongside the Manufacturers' Association in keeping with the public-private basis of its funding. A sectoral agency of this type would be well-placed to collaborate with the ITA and CPC in the development of joint training schemes, although here the trade unions would also need to be represented; and it would also be in a good position to advise the CDB on priorities for strategic finance in the industry. The reorganization of the MCI on sectoral lines, finally, would facilitate that collaboration between industrialists and the state which will be vital for the success of this strategy.

CLOTHING

SUMMARY OF RECOMMENDATIONS

1. A fashion forecasting facility should be established for the Cyprus clothing industry. This facility would purchase the full range of international design intelligence reports and elaborate them for local firms through seminars and presentations. Its staff should also set up a register of free-lance designers and establish contact with designers abroad willing to work with Cyprus firms, as well as compiling a fabric library and maintaining up-to-date information on fabric sourcing.

2. A sector-specific export marketing organization should be established for the clothing industry. In conjunction with the fashion forecasting facility and the new Export Promotion Council, it would undertake research on the characteristics of demand in foreign markets and their potential accessibility to Cyprus manufacturers. The export marketing organization should undertake promotion campaigns for Cyprus garments in targetted markets, as well as providing technical and logistic support for individual companies. A key function of this body should be to impose stiff quality standards on the firms which use its services in order to overcome Cyprus' image as a down-market producer.

3. A computer-aided design bureau should be established for the clothing industry. This bureau should consist of facilities for pattern modification, grading, lay planning and marker making, which would be made available to firms on a commercial basis. At a future stage, the possibility of adding a computer-controlled cutting service should be considered.

4. A technological information service should be established for the clothing industry. This service should compile up-to-date information on technological developments abroad and advise firms on machinery purchase and factory layout. It should also build up a register of approved management consultants willing to work with Cyprus firms. With the support of a five-year programme of technical assistance financed by the United Nations Development Programme, a series of foreign consultants should be brought to Cyprus to advise local firms on management organization and procedures; these consultants should undertake specific projects for individual companies at subsidized rates, while also running public seminars and training the staff of the information service. In addition, foreign consultants should be approached for assistance in designing new payment systems for Cyprus firms, and union representatives should be trained in the negotiation of wage rates under such incentive systems.

5. A feasibility study should be conducted on the possibility of establishing a collective fabric converting operation which would purchase grey cloth and have it finished to local firms' requirements. An investigation should also be conducted into the possibility of creating a consortium of clothing firms to provide additional investment for dyeing and finishing processes on the island, whether in new or existing installations.

6. The provision of sector-specific training for managers, technicians, supervisors and designers should be improved, and these fields should be given priority in the allocation of public subsidies for study abroad. Restrictions on the employment of foreign personnel in these positions should also be relaxed. Joint skill centres for clothing operatives should be established by the Industrial Training Authority together with groups of firms combining off-the-job training with in-company placements. The ITA should also be encouraged in its plans to upgrade training standards for the industry and to provide additional specialist instructors for in-company programmes. Subsidized child care centres should be established

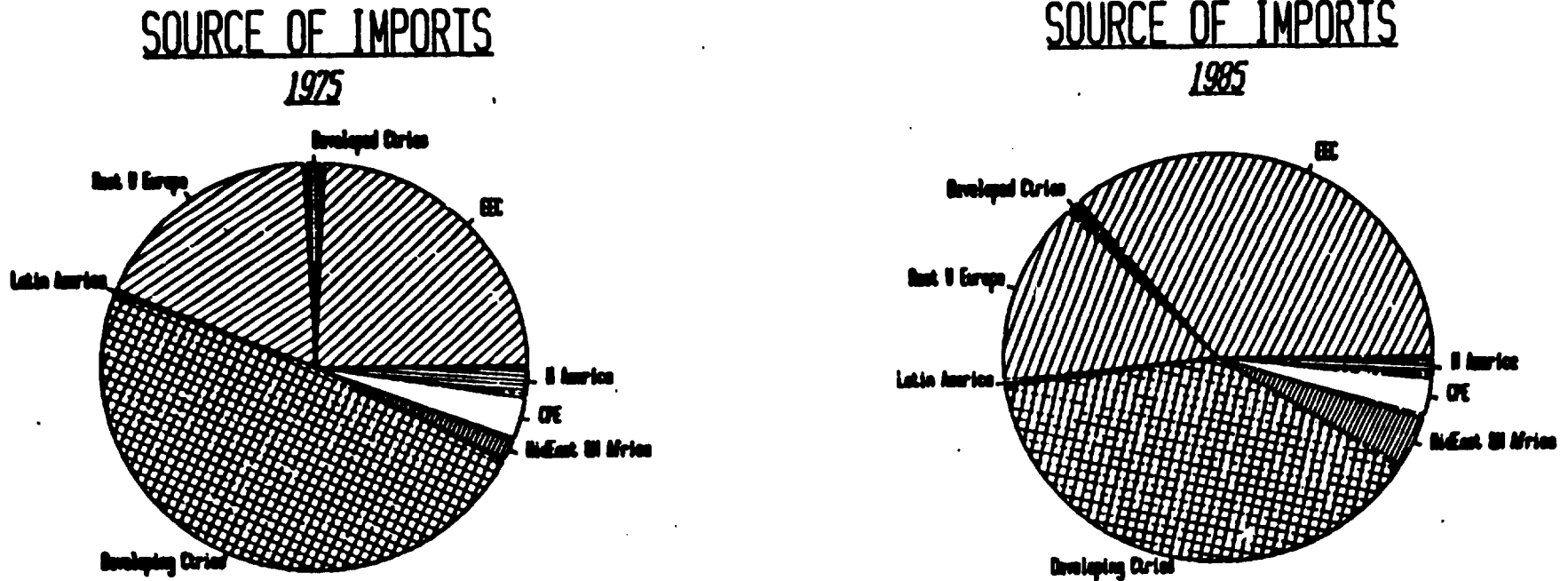
on the industrial estates to assist in the retention of skilled women operatives.

7. The existing system of capital allowances should be reviewed in order to target incentives for investment towards specific categories of investment expected to bring particular benefits to the industry, such as computerized management information systems or CAD/CAM equipment. The Cyprus Development Bank should also be permitted to offer loans on more advantageous terms than the commercial banks to strengthen its role in the strategic direction of investment within the sector.

8. A sectoral resource centre with a specialist staff should be established to administer the fashion forecasting facility, the export marketing organization, the CAD bureau and the technological information service. Funding for these services should be provided jointly by the Clothing Manufacturers' Association and the public authorities (the Ministry of Commerce and Industry and the Export Promotion Council), except in the case of the CAD bureau where the state should purchase the capital equipment and the industrialists provide the running costs. Each of these organizations should also be represented on the management board of the resource centre. To facilitate collaboration with the resource centre, the services currently provided by the Ministry of Commerce and Industry should themselves be reorganized on sectoral lines.

Figure 1

Changing Sources of Imports of Clothing into the UK



Source: Hollings Apparel Industry Review (Manchester Polytechnic) Spring 1986

Table 1

The Structure of the European Clothing Industry

Size Class (number of employees)	WEST GERMANY		BELGIUM		FRANCE		ITALY		HOLLAND		UK		DENMARK	
	FIRMS	EMPLS.	FIRMS	EMPLS.	FIRMS	EMPLS.	FIRMS	EMPLS.	FIRMS	EMPLS.	FIRMS	EMPLS.	FIRMS	EMPLS.
10 - 19	21.4	4.2	74.8	35.3	30.7	5.2	47.0	12.3	44.7	12.0	60.9	16.5	32.7	36.8
20 - 49	36.7	16.0			33.3	12.9	30.8	17.8			40.2			
50 - 99	21.6	20.7	14.0	19.9	17.2	14.7	11.7	15.4	18.7	14.5	16.9	16.9	16.9	16.9
100 - 199	13.2	24.9	7.4	20.0	10.1	17.2	10.5	54.5	55.3	88.0	10.9	15.9	7.5	63.2
200+	7.1	34.2	3.8	24.8	8.7	50.0					9.5	53.1	2.7	
TOTAL	100	100	100	100	100	100	100	100	100	100	100	100	100	100
AVERAGE NUMBER OF EMPLOYEES PER FIRM FIRMS WITH TEN OR MORE EMPLOYEES)	90		49		82		52		65		100		42	

SOURCE: G Pent Fornengo, L'industria Italiana dell 'Abbigliamento (Bologna: 1978)

Table 2

UK Imports and Exports of Made-up Clothing

(Figures in £millions)

	1981	1982	1983	1984	1985
Sales	2911.0	2987.2	3253.3	3700.7	4134.7
Exports	558.7	540.2	560.8	643.9	762.5
Imports	997.1	1051.0	1121.2	1415.5	1532.0
Home Market Import	3349.4	3498.0	3813.7	4472.3	4904.2
Penetration(%)	29.8	30.0	29.4	31.7	31.2
Exports/ Sales (%)	19.2	18.1	17.2	17.4	18.4

Source: U.K. Department of Trade and Industry, Bulletin of Textile and Clothing Statistics (1985).

Table 3

UK Trade Balance in Clothing (SITC Division 84)

Figures in £000s)

Year	Imports	Exports	Balance
1978	920746	670004	-250742
1979	1194446	751088	-443358
1980	1231122	807558	-423564
1981	N/A	N/A	N/A
1982	1500755	840351	-660404
1983	1601480	865394	-660404
1984	2013149	996392	-1016757
1985	2094680	1171923	-922757

Source: Overseas Trade Statistics of the U.K. (December 1985).

Note: 1981 figures affected by Civil Service strike.

Table 4

Sources of U.K. Clothing Imports by Main Trading Area
(SITC Division 84) (£000) and % of Total

Imports from	1981	1982	1983	1984	1985
EEC	322989(26.2)	449519(30.0)	516998(32.3)	655547(32.6)	759230(36.2)
Rest of W. Europe	178495(14.5)	194826(13.0)	233694(14.6)	289784(14.4)	305304(14.6)
Other DCs	16512 (1.3)	16443 (1.1)	20645 (1.3)	26085 (1.3)	20118 (1.0)
Latin America	5527 (0.4)	5202 (0.3)	5389 (0.3)	8686 (0.4)	7483 (0.4)
Middle East & N. Africa	51636 (4.2)	67717 (4.5)	78219 (4.9)	85343 (4.2)	89660 (4.3)
Other LDCs	562773(45.7)	68429(45.6)	663282(41.3)	861556(42.8)	814793(38.9)
CPEs	34202 (2.8)	40756 (2.7)	46548 (2.9)	53999 (2.7)	67768 (3.2)
North America	59028 (4.8)	42043 (2.8)	36707 (2.4)	32149 (1.6)	30324 (1.4)

Note: Greece has been included in the EEC since 1981. Spain and Portugal are still included in the figures for the Rest of W. Europe, along with Gibraltar, Malta and Turkey. DCs = Developed Countries; LDCs = Less Developed Countries; CPEs = Centrally Planned Economies.

Source: Overseas Trade Statistics of the U.K. (December 1985).

Table 5

International Variations in Wage Costs per Direct Employee

Country	Hourly Wages incl. Piecework Incentive		Social Costs in %	Wage Costs Total per Hour	
	£	DM		£	DM
West Germany	2.75	11,00	70	4.68	18,70
Egypt	0.48	1,92	52	0.73	2,92
England	1.90	7,60	27	2.41	9,25
Greece	1.21	4,85	85	2.24	8,97
Hong Kong	0.83	3,30	29	1.07	4,26
Haiti	0.30	1,19	32	0.39	1,57
Ireland	1.49	5,95	27	1.89	7,56
Italy	2.18	8,70	105	4.46	17,84
Ivory Coast	0.48	1,90	80	0.86	3,42
Malta	1.50	6,00	25	1.88	7,50
Morocco	0.30	1,20	10	0.33	1,32
Portugal	0.68	2,70	25	0.84	3,37
Spain	1.50	6,02	42	2.14	8,55
Sri Lanka	0.19	0,76	25.8	0.24	8,55
Switzerland	3.38	13,53	40	4.74	18,94
Tunisia	0.40	1,58	19.5	0.47	1,89
USA	2.82	11,26	33	3.75	14,98

Source: Research by Kurt Salmon Associates reported in Apparel International (February 1984).

Table 6

Share of Textiles and Clothing in Cyprus Manufacturing Activity 1985

Employment	27.8%
Gross Output	15.5%
Census Value Added	18.2%
Exports	33.4%

Source: Cyprus Department of Statistics and Research, Industrial Statistics 1985 Report.

Table 7

Clothing Activity as a Proportion of Textiles and Clothing, 1985

% of Enterprises	86.5
% of Employment	82.0
% of Output	80.5
% of Census Value Added	79.3
% of Domestic Exports*	99.3

* Trade figures include knitwear as part of clothing.

Source: Cyprus Department of Statistics and Research, Industrial Statistics 1985 Report.

Table 8

The Structure of the Cyprus Textiles and Clothing Industry, 1985

	Total		0-9		10-49		50-99		100+	
	No.	%	No.	%	No.	%	No.	%	No.	%
<u>Enterprises</u>										
Textiles	203	100	183	90.2	40	19.7	5	2.4	5	2.4
Clothing	1306	100	1112	85.1	164	12.6	32	2.5	10	0.8
<u>Employment</u>										
Textiles	2180	100	421	18.3	773	35.5	310	14.2	676	31.0
Clothing	9910	100	1795	18.1	3530	35.6	2212	22.3	2373	22.9
<u>Gross Output</u> <u>(000s)</u>										
Textiles	20623	100	4378	21.2	7185	34.8	3003	14.6	6057	29.4
Clothing	85274	100	14076	16.5	28300	33.2	20951	24.6	21947	25.7
<u>Value Added</u> <u>(000s)</u>										
Textiles	9585	100	1853	19.3	3258	34.0	1382	14.4	3092	32.3
Clothing	36611	100	6728	18.4	12140	33.2	8721	23.8	9022	24.6

Source: Cyprus Department of Statistics and Research, Industrial Statistics 1985 Report.

Table 9

Subsectoral Structure of the Cyprus Clothing Industry, 1980-84

A. Share of Firms(F) and Employment(E) by Product Group (%)

Product	1980		1981		1982		1983		1984	
	F	E	F	E	F	E	F	E	F	E
Knitwear, Nightwear & Underwear	8.5	17.1	7.6	17.4	7.5	16.6	7.9	16.1	7.8	15.1
Menswear	48.4	25.9	47.8	24.8	47.2	24.9	47.3	26.9	47.2	26.5
Womenswear	34.7	33.8	34.9	31.9	35.6	31.7	35.9	33.5	35.8	33.1
Shirts	3.7	11.3	3.5	12.1	3.6	13.1	3.3	11.7	3.3	11.6
Childrenswear	4.7	11.9	6.2	13.8	6.1	13.7	5.6	11.8	5.9	13.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Cyprus Industrial Training Authority, Manpower Survey for the Clothing Industry (1986).

B. Output Per Employee by Size of Firm and Subsector, 1985

Knitwear, Nightwear & Underwear	7,215	8,838	11,089	9,812
Menswear	6,124	9,771	8,971	8,995
Womenswear	11,563	13,089	10,648	11,779
Shirts	11,111	6,463	6,516	6,878
Childrenswear	8,482	9,856	12,051	10,471
Total	8,862	10,302	9,732	9,809

Source: Cyprus Industrial Training Authority, Manpower Survey for the Clothing Industry (1986).

Table 10

The Development of the Cyprus Clothing Industry, 1980-84

	1980	1981	1982	1983	1984	1985	1986*
Gross Output (C£m)**	53.0	57.7	51.9	55.0	64.5	60.3	58.7
Exports (C£m)**	27.9	33.8	23.5	25.9	37.9	30.6	24.5
Local Consumption of Gross Output (C£m)**	25.1	23.9	28.4	26.6	29.7	34.2	6.9
Employment	9,752	10,410	10,257	10,527	11,409	11,018	10,700
Gross Output Per Employee (C£)**	5.435	5.543	5.060	5.225	5.653	5.473	5.486

* = projected figures; ** = constant 1980 prices.

Source: Cyprus Industrial Training Authority, Manpower Survey for the Clothing Industry (1986).

Table 11

Output, Exports and Imports 1982-86 (Current Prices,
SITC Division 84 - Articles of Apparel and Clothing Accessories

	1982	1983	1984	1985	1986*
1. Gross Output (000s)	67,000	77,269	98,693	94,883	N/A
2. Domestic Exports (000s)	31,664	38,332	61,864	49,686	28,348
3. Imports for Home Consumption (000s)	4,106	5,314	4,971	5,231	3,382
4. Domestic Consumption (1 - 2 + 3, 000s)	39,442	44,251	41,800	50,428	N/A
5. Export/Sales (% 2/1)	47.3	49.6	62.5	52.4	N/A
6. Import Penetration (% 3/4)	10.4	12.0	11.9	10.4	N/A

* = first nine months only

Source: Cyprus Statistics and Research Department, Statistics of Imports and Exports 1982-6; Industrial Statistics of Cyprus 1982-5.

Table 12

Investment in Cyprus Clothing Industry, 1980-84

Investment (C£000s)	1980	1981	1982	1983	1984
Land	5	99	108	106	231
Buildings	406	651	543	1077	2237
Machinery	766	1167	1313	1405	2237
Vehicles	171	169	393	356	375
Furnishings and Fittings	112	118	163	317	277
Other	12	66	10	24	52
Total	1472	2270	2530	3285	4577
Rate of Growth		54.2%	11.5%	29.8%	38.7%
Investment as a % of Gross Output 2.8		3.5	3.8	4.3	4.6

Source: Cyprus Industrial Training Authority, Manpower Survey for the Clothing Industry (1986).

Table 13

Cyprus Clothing Exports by Country Group, 1982-86

Area	1982		1983		1984		1985		1986*	
	(C£000)	%	(000)	%	(000)	%	(000)	%	(000)	%
EEC	15898	50.2	16679	43.5	15751	25.5	15628	31.5	14130	58.2
Arab Countries	12474	38.8	17017	44.3	40722	66.1	26700	53.7	5817	24.0
Libya	1447	4.6	9138	23.8	33553	54.2	19018	38.3	1823	7.5
Other Arab	10827	34.2	7879	20.5	7369	11.9	7682	15.5	3984	16.5
Eastern Europe	2650	8.4	3390	8.8	3717	8.0	5165	10.4	2315	9.5
Others	842	2.6	1296	3.4	1474	2.4	2193	4.4	2005	8.3
Total	31664	100	38382	100	61864	100	49686	100	24267	100

* = first nine months.

Source: Cyprus Ministry of Commerce and Industry.

Table 14

Cyprus Exports of Clothing, Knitwear and Other Made-up
Textiles by Country of Destination, 1982-1986

(Figures in C£000s)

Destination	1982	1983	1984	1985	1986*
Libya	1447	9138	33553	19018	1823
UK	7163	7815	7883	9686	8685
USSR	761	1039	1176	2086	922
USA	394	703	820	1818	1355
Yemen Arab Republic	252	812	901	1742	1037
West Germany	5735	4239	3173	1694	1695
Belgium	871	1651	1690	1295	842
Egypt	224	614	1002	1239	401
France	622	962	1208	1218	1580
Czechoslovakia	266	686	473	1215	404
East Germany	-	3	1146	1115	306
Saudi Arabia	2493	1983	1483	769	422
Bulgaria	1623	1632	905	709	659
Kuwait	1012	1053	953	680	428
Dubai	756	709	699	674	302
Denmark	592	505	426	635	220
Netherlands	649	660	810	628	900
Qatar	554	385	415	590	223
Iraq	3172	4	49	590	525
Bahrain	724	803	618	440	153
Abu-Dhabi	525	312	322	298	141
Ireland	191	573	412	249	128
Jordan	489	392	169	205	71
Greece	69	266	94	202	169
Lebanon	326	322	361	181	155
Norway	19	36	42	175	87
Sweden	279	471	290	100	424
Other Countries	456	484	791	435	310
Total	31,664	38,382	61,864	49,686	24,267

* = first nine months only.

Source: Cyprus Ministry of Commerce and Industry.

Table 15

Subsectoral Distribution of Firms Interviewed

Subsector	Firms	Employees	% of Employees
Knitwear	3	456	14.5
Menswear	3	1390	44.3
Shirts	3	375	11.9
Womenswear	5	540	17.2
Childrenswear	2	130	4.1
Mixed	3	200	6.4
Leather Clothing	1	66	2.1
Dyeing, Bleaching and Finishing	1	44	1.4
Total	21	3201	100.0

Average number of employees per firm: 152.4

Source: Interviews.

Table 16

Analysis of Firm Data

Firm	Employees		Output/ Worker (£000)		Stocks/ Sales		Fixed Assets/ Wkr. (£000)	Fixed Assets/ Sales	Profits/ Sales
	1985	1986	1985	1986	1985	1986	1986	1986	1986
A	93	80	7559	7500	26.9	26.7	2500	33.0	5-6
B	144	150	8687	10000	33.7	16.7	N/A	200.0	20
C	128	156	7818	6410	60.7	60.0	7051	110.0	10
D	30	50	14752	10460	11.2	N/A	1600	15.3	12
E	258	170	9284	14700	7.9	2.0	7647	52.0	10
F	41	40	10976	3875	7.6	35.5	3625	93.5	(13.8)
G	N/A	240	N/A	12500	N/A	23.3	2917	23.3	0
H	58	70	10504	12857	26.6	17.7	4714	36.7	10+
I	146	150	11048	8000	29.7	83.3	3667	108.0	(4-5)
J	213	215	8815	11627	23.4	24.5	2325	20.0	6-8
K	20	30	6881	3333	41.8	47.0	700	21.0	13
L	191	200	8867	10000	17.0	15.5	1200	12.0	5-6
M	N/A	100	N/A	10000	N/A	N/A	5000	50.0	10
N	N/A	70	N/A	15714	N/A	14.4	2957	18.8	15
O	179	150	12533	20000	22.7	N/A	1133	56.7	15
P	N/A	90	N/A	10889	N/A	N/A	4444	40.8	7-10
Q	67	66	12852	13181	26.5	N/A	2955	22.4	5-6
R	N/A	N/A	6456	6000	20.1	15.8	2300	28.0	10
S	40	44	14282	14204	26.5	20.0	N/A	136.0	6-7
Average	-	152	8740 (11624)*	9815 (13054)*	23.1	25.6	3583 (4765)*	38.8	6.7
<hr/>									
Cyprus Clothing Average	41.8	-	8783 (11681)*	-	-	-	-	-	-
<hr/>									
UK Clothing (major)	-	-	21897*	-	21.7	-	3245*	62.5	4.3
UK Clothing (intermediate)	-	-	17772*	-	18.9	-	2214*	9.8	1.6
UK Hosiery & Knitwear	-	-	17757*	-	20.4	-	2757*	15.6	4.2

* = figures converted into sterling at CE1 = £1.33.

Sources: Cyprus: Interviews and Census Data; UK: ICC Business Ratio Reports (1986).

Table 17

Number of Courses/Trainees per Scheme for the Clothing Industry
for the years 1979-1986

Training Scheme	Number of Courses/Number of Trainees								Total
	1979	1980	1981	1982	1983	1984	1985	1986	
1. AB-INITIO Training Scheme	5/47	11/93	18/159	20/173	25/204	76/386	38/130	23/153	216/1345
1.1. Group Training Courses	5/47	11/93	16/142	9/114	10/123	10/125	4/50	-	65/694
1.2. In-company Courses	-	-	2/17	11/59	15/81	66/261	34/80	23/153	151/651
2. Up-grading Training Scheme	-	-	-	11/191	16/285	32/394	37/692	41/516	137/2078
2.1. Group Training Courses	-	-	-	-	2/32	5/92	6/274	10/159	23/557
2.2. In-company Courses	-	-	-	-	4/13	10/39	7/28	9/64	30/144
2.3. Government Institutions Courses	-	-	-	11/191	9/215	15/209	23/360	20/257	78/1232
2.4. Courses of other Institutions/Organisations	-	-	-	-	1/25	2/54	1/30	2/36	6/145
3. Apprenticeship Scheme	-/6	-/20	-/35	-/24	-/16	-/52	-/50	-/45	1/248
4. Training Abroad Scheme	-	-	-	-	-	-	3/3	1/1	4/4
TOTAL	5/53	11/113	18/194	31/388	41/505	108/832	78/875	65/715	<u>358/3675</u>

Source: Industrial Training Authority of Cyprus.

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Table 10

Number of Courses/Trainees per Scheme for the Clothing Industry
Classified Levels - Basic (Vocational)-Middle
Management-Top Management for the years 1979-1986

Training Scheme	1979			1980			1981			1982			1983			1984			1985			1979-1986					
	LEVEL			LEVEL			LEVEL			LEVEL			LEVEL			LEVEL			LEVEL			LEVEL					
	Basic (Vocational)	Middle Management	Top Management	Basic (Vocational)	Middle Management	Top Management	Basic (Vocational)	Middle Management	Top Management	Basic (Vocational)	Middle Management	Top Management	Basic (Vocational)	Middle Management	Top Management	Basic (Vocational)	Middle Management	Top Management	Basic (Vocational)	Middle Management	Top Management	Basic (Vocational)	Middle Management	Top Management			
1. All-INDUS Training Scheme	5/47	-	-	11/93	-	-	16/199	-	-	26/171	-	-	25/206	-	-	76/205	-	-	26/136	-	-	22/153	-	-	216/1345	-	-
1.1 Group Training Courses	5/47	-	-	11/93	-	-	16/142	-	-	9/114	-	-	10/133	-	-	10/126	-	-	4/36	-	-	-	-	-	-	-	-
1.2 In-company Courses	-	-	-	-	-	-	2/17	-	-	11/29	-	-	15/91	-	-	66/261	-	-	26/99	-	-	22/153	-	-	-	-	-
2. Up-grading Training Scheme	-	-	-	-	-	-	-	-	-	2/22	9/160	-	4/29	10/199	2/27	7/17	15/189	10/180	2/2	24/600	1/20	2/20	27/206	11/173	10/129	95/1522	26/617
2.1 Group Training Courses	-	-	-	-	-	-	-	-	-	-	-	-	2/22	-	-	1/8	4/94	-	6/274	-	-	2/20	7/120	-	-	-	-
2.2 In-company Courses	-	-	-	-	-	-	-	-	-	-	-	-	1/4	2/7	1/2	7/17	2/9	1/13	2/2	2/26	-	2/20	4/23	2/3	-	-	-
2.3 Government Institute Courses	-	-	-	-	-	-	-	-	-	2/22	9/160	-	2/26	6/160	-	-	12/172	2/27	-	22/260	-	-	26/227	-	-	-	-
2.4 Courses of other Institutions/Organisations	-	-	-	-	-	-	-	-	-	-	-	-	-	1/26	-	-	2/24	-	-	1/20	-	-	2/26	-	-	-	-
3. Apprenticeship Scheme	-/6	-	-	-/20	-	-	-/20	-	-	-/24	-	-	-/16	-	-	-/32	-	-	-/20	-	-	-/45	-	-	1/260	-	-
4. Training Abroad Scheme	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2/3	-	-	1/1	-	-	6/6
TOTAL	1/53	-	-	11/113	-	-	16/194	-	-	22/219	9/160	-	29/279	16/199	2/27	82/655	15/189	10/180	60/182	24/600	4/23	26/227	27/206	12/173	235/1722	95/1522	26/621

Source: Industrial Training Authority

APPENDIX I

CAD/CAM CLOTHING SYSTEMS NOW AVAILABLE IN GREAT BRITAIN - EQUIPMENT

EQUIPMENT	GERBER USA	INVESTRONICA SPAIN	LECTRA FRANCE	MICRODYNAMICS USA	CYBRID GREAT BRITAIN
SYSTEM TYPE	mini Hewlett Packard (micro interface to system only)	mini Hewlett Packard micro IBM Compat	Mini - Microlec computer	Micro IBM PC/AT	Cost Plan Company - micro PDS/Grad/M Making Micro -Whitechape /NGI
MODERN LINKS	yes	yes	yes	yes IBM Network	yes
DATA STORAGE	Hard Disk Tape	Hard Disk Tape Floppy Disk	Floppy Disk Hard Disk Data Bank	Floppy Disk Hard Disk	Cost Plan Floppy Disk PDS/Grad/M Making Hard Disk
RAM MEMORY STORAGE - ADD. TO FLOPPY	24 - 55 Mb	1.5 Mb 1.5 Mb 24 - 132 Mb 20 - 30 Mb	512K 10 Mb + 40 Mb (data bank)	512K 20 Mb (interface to data bank storage)	PDS/Grad/M Making 1 Mb 20 Mb
MODULAR	yes	Basic system other functions & micro-systems will integrate into system.	yes Autonomous work stations can work independantly or simultaneously.	yes Autonomous work stations can work independantly or simultaneously.	yes
EXPANSIBLE	yes Basic grading system upgrades into the larger systems.	yes Large capacity Easy data communication between stations.	yes - Lipgrades 301-single screen 303-two screen 305-many operation	yes Unlimited expansion work stations data storage.	yes
INPUT	digitiser	digitiser	digitiser	digitiser	Scanner claims to reduce input time by 60%.
COLOUR OPTION	yes (plus \$10,000)	yes (£7,000 less)	yes (plus £10,000)	integral to system	no
BUREAU SERVICES AVAILABLE	yes Private & Local Authority funded bureaus- Leeds, Birmingham, Scotland	yes Private & Local Authority funded bureaus- Ireland, London, Nottingham	yes Bureau run by the company in Shipley Yorks.	no	no
PRICE AT ENTRY (SYSTEMS ARE NOT DIRECTLY COMPARABLE)	Pattern adaptation pattern grading marker making \$87,000	Pattern adaptation grading & marker making main system £70,000, micro system £45,000 Mk station £24,000	301 system sketch (monochrome) patt adaptation grading marker making (automatic & interactive) single operator £38,500	Pattern grading marker making & plotting \$78,000 Pattern adaptation \$116,000	Scanner £20,000 Grading & M making £34,000 Plotter £13,000
NO OF PROG SYSTEMS SOLD MAY 86 UK E. MIDLANDS STUDY AREA	121 18	10 0	31	1 0	28 2
THE COMPANY'S STRONG SELLING POINTS	Credibility of a large company. Excellent track record. Production expertise. Speed	Ease of operation designed by a clothing company. Wide range of functions. Speed. Pattern adaptation excellent. Large data storage capacity. Micro option.	Flexible system. Independent modules. Good track record. Experience of use in small-medium size co.s Bureau support. Price	Ink-jet fast plotting. Flexible modular system. Interface into existing CAD systems. Latest software technology - will progress with IBM Easy to use. Low service cost Easy communication worldwide.	Ease of operation. Speed of input. New form of technology. Price. British product Interactive for small-med co.s with specialised production.

Source: Trent Polytechnic, How Knowledge of New Technology can be made Available to the Clothing Industry (Nottingham, 1986)

APPENDIX I continued
CAD/CAM CLOTHING SYSTEMS NOW AVAILABLE IN GREAT BRITAIN - FUNCTIONS

FUNCTIONS	GERBER USA	INVESTRONICA SPAIN	LECTRA FRANCE	MICRODYNAMICS USA	CYBRID GREAT BRITAIN
GRAPHICS SKETCH DESIGN	yes Stand alone system palette. 16 million colours \$23,000	yes Stand alone system palette. 16 million colours \$25,000	separate program works on existing hardware. No extra cost in monochrome Colour + £10,000 palette.	yes stand alone system palette. 16 million colours matches colours to Munsell textile colour system \$49,000	in review
PATTERN ADAPTATION	yes used by a small no of cos for pattern modification.	yes very effective proved in company operation.	principally an effective pattern modification system only single pattern pieces available at a time	yes program options now competitive with other major systems	in development expected Sept 86
PATTERN GRADING	yes very effective on standard prod. interactive or grade rule library	yes effective and adaptable. interactive or grade rule library	yes effective and adaptable . interactive or grade rule library	yes good reputation USA track record to be establd UK. production system intro UK Spring 86	in development expected Sept 86 interactive grading
MARKER MAKING	yes costing and prod	yes costing and prod	yes costing and prod	yes costing and prod	costing available prod system in development expected Sept 86 as above
"AUTOMATIC"	yes	yes major system no micro system	yes-all systems	in dev late 86	as above
PLOTTING (marker width)	paper markers flat bed pen 1.6 width	paper markers dram-ink jet 1.82m wide flat bed pen 2.2m	paper markers flat bed pen 1.8m width will plot on card for manually cut patterns.	paper markers flat bed ink jet	costing available prod systems in Sept 86 paper markers.flat bed pen 2.1m width.
CUTTING - CARD AND PLASTIC PATTERNS	yes plastic and card patterns	yes plastic and card patterns	yes special laser cutter required. cuts card and fibre board £17500	card patterns	in review
CLOTH CUTTING HIGH LOW-MED SINGLE	yes knife knife	yes interface to other cutters knife knife plasma jet	yes interface to Gerber & Bulmer cutters knife laser	interface to Gerber systems	in review low cost cutting system.
CUT PLANNING	yes	yes integral to the system.	in development expected Nov 86	no	in review
OTHER FEATURES	fabric saving made to measure Gerbermove handling system stand alone system	check matching system. made to measure Investmove handling system stand alone system	made to measure in development expected Nov 86	made to measure standard	

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≡ CYPRUS ≡ INDUSTRIAL STRATEGY

Report of the UNDP/UNIDO Mission

SUPPLEMENTARY REPORT

FOOTWEAR

3

16741
(4 of 8)

Prepared for the United Nations Industrial Development
■ Organisation on behalf of the Government of Cyprus ■

Institute of Development Studies

December 1987

THE FOOTWEAR INDUSTRY

Jane Humphries

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FOOTWEAR

SUMMARY

Shoe manufacturing was largely an indigenous activity before the 1950's. Since then world trade in shoes has increased as developing countries have built up their industries and penetrated developed country markets. German production has dropped from 151m pairs in 1972 to 92m in 1984, Britain from 184m to 127m, and French from 240m to 159m. In contrast, Italian shoe production has risen to 496m pairs, 393m of which were exported. British retailers, in particular, have played a key role in importing cheaper and often more stylish shoes, so that by 1984 six pairs of shoes out of every ten sold were made abroad. In America import penetration has gone further with 70 per cent of shoes sold being foreign made. In footwear it is the era of global competition.

The theory of comparative advantage depicts the footwear industry as appropriate for developing countries because of relatively low skill and capital requirements. However among successful exporters, countries which are better off export more leather and footwear than countries with a lower per capita income. Italy and Austria stand out as strong counter-examples to any generalization that these industries are now typical of developing countries. EEC countries import shoes on a large scale but from other EEC countries as well as from non-EEC countries. As explanations of export performance nearness to markets, responsiveness to fashion, product quality and labour skills may be more important than relative wage costs.

Footwear manufacturers traditionally faced two interrelated technical problems: first how to integrate the small batch methods most suited to clicking and closing with the mass production appropriate to

making; and, second, how to combine a variety of models into a coherent production plan which minimised idle factory time. Strategies ranged from producing high quality shoes in limited volumes for sale at the top end of the market to mass producing standardised footwear. Technological developments favoured automation, though it was not easily combined with the maintenance of quality, and often required long runs of standardised products to be profitable.

Producers in advanced industrial countries who pursued the mass production strategy were increasingly threatened by imports from low wage countries. The latest in automated technology did not help them fend off such competition because it was also available to the low wage competitors in the form of turnkey factories established by international firms and operable by relatively unskilled labour. The collapse of the American industry illustrates the impossibility of remaining competitive in a high wage economy by continuing to mass produce standardised shoes. To survive, European shoe manufacturers have learned to capitalise on their advantages: design capability, skilled workers, and proximity to their markets.

Independent changes in consumers' preferences have led to an increase in the demand for customised, high quality, and design intensive shoes in contrast to mass produced basic models. At the same time the most recent developments in technology unlike those ten years ago, do not require long runs of standardised products to be economical, but are amenable to an efficient production of small batches.

So a strategy to resist low cost foreign competition has emerged. It involves footwear producers in a more continuous response to changes in style and the production of a larger variety of non-standard shoes, while holding the line on costs and maintaining quality.

European footwear industries continue to exhibit distinct national patterns in both firm strategy and industrial structure. The fragmented Italian industry has achieved international success on strong design and the intensive use of modern equipment in specialised firms which are linked by market and non-market ties to facilitate a flexible response to changes in demand. On the other hand, after a tremendous battering, the British industry seems to be fighting back on the basis of building increased flexibility into its vertically integrated firms by investing in new equipment particularly management information systems.

What future is there for countries on the periphery of Europe in footwear production? Low wage economies might hope to gain from the relocation of closing if the wage differential is big enough to offset transportation costs and the styles sufficiently classic to survive disassociation from the European market. Closing provides employment for semi-skilled women workers but is a low value added activity. Perhaps once closing is established other phases of shoe production may also be relocated but to the extent that this widens supply lines it tends to involve precisely those standardised items in which other even lower cost producers can be competitive.

The subcontracting of shoe production leaves the indigenous producer dependent on the parent firm and exposes them to the vagaries of head office decisions. In particular, made to order production can always be subcontracted where labour is even cheaper. Workers may be less skilled elsewhere but this can be offset by increased automation. Alternatively producers in the periphery can seek independence by mass producing standard shoes themselves using up-to-date equipment and seeking to be competitive in the low end of the European market or in the COMECON countries.

Finally producers in the periphery can try to follow the Europeans themselves into segments of their own or third country markets that are relatively protected from low-wage competition, though this will involve them in developing their products and processes to compete in

terms of design, delivery dates, market response and quality. These moves may not be easy for a country at some distance from the markets which it seeks to serve and with different manufacturing traditions.

Cypriot footwear manufacturers cannot currently compete with European producers. Price is perhaps the dimension of competitiveness where the sector performs best though not sufficiently well to attract customers given the quality, design and delivery dates characteristic of the sector. As things stand the industry will be in real difficulties when the domestic market, to which many producers have turned, is exposed to the more efficient and design intensive European producers. The strategy for the sector proposed here is based on known developments in footwear markets and footwear technology and appears in the context of the structure and development of the industry in Cyprus. The aim is to improve the competitiveness of the industry in terms of quality, design and speed of response while simultaneously holding the line on costs.

The linch-pin of the proposed industrial strategy is the establishment of associations of flexibly specialised firms which, in concert with the government, can exploit economies of scale in marketing, technology and administration which would be beyond the reach of the individual firms. Marketing strategies require refinement. Niches suited to Cypriot products, or potential products, must be identified and targeted. Cyprus must exploit both her unique position as a bridge between Europe and the Middle East and the extension of the domestic market occasioned by the 900,000 tourists who visit each year. The development of sector level training, research, and marketing activities implies an expanded role for sector infrastructural services such as the Leather and Footwear Testing Unit at the High Technical Institute. Skills must be upgraded at all levels within the industry. Economies can be secured by the joint provision of some facilities by neighbouring footwear and clothing factories, a manoeuvre assisted by the concentration of factories on industrial estates.

THE FOOTWEAR INDUSTRY WORLDWIDE

a) Broad Overview

Shoe manufacturing was largely an indigenous activity before the 1950's . There were few exports or imports. Since then world trade in shoes has increased as developing countries have built up their industries. With their home markets no longer expanding imports have taken a rapidly increasing share of developed country markets: Italy alone has managed to export sufficiently to compensate and become the most important producer of leather shoes in the world. German production has dropped from 151m pairs in 1972 to 92m in 1984, British from 184m to 127m, and French from 240m to 159m. In contrast, Italian shoe production has risen to 496m pairs, 393m of which were exported (see table 1.). In Britain, in particular, powerful retailers have played a key role in importing cheaper and often more stylish shoes, so that every branch of the High Street outlets has more foreign made shoes on their shelves than home produced ones. In 1984 six pairs of shoes out of every ten sold in Britain were made abroad. In America import penetration has gone further with 70 per cent of shoes sold being foreign made. Taiwan sent 302m pairs of shoes to America last year, South Korea 118m pairs and Brazil 110m pairs. In footwear it is the era of global competition.

Helped by its relatively low wage rates the Far East has made particular inroads in the market for non-leather shoes (see tables 2 and 3). But in 1984 the Brazilians overtook the Italians in the American leather shoe market and challenged European dominance in this sector. Helped by heavy investment from both the US and Japan and with Mitsubishi particularly prominent, the Brazilian success has involved a marriage of advanced machinery, skilled workers and

farsighted management, as well as a readily available local supply of good quality leather.

In theory the leather and footwear industry is considered appropriate for developing countries because of relatively low skill and capital requirements (UNIDO, 1981). Per capita income levels of countries which export leather and footwear are on average lower than those of countries which import them and the difference widened in the period 1952-1973 (Michaely, 1984). However among successful exporters, countries which are better off export more leather and footwear than countries with a lower per capita income. Italy and Austria stand out as strong counterexamples to any generalization that these industries are now typical of developing countries. EEC countries import shoes on a large scale but from other EEC countries as well as from non EEC countries (see tables 4A and B). As explanations of diverse export performance nearness to markets, an ability to respond to changing fashions, high quality products, and a greater than average supply of relevant skills, may be more important than relative wage costs.

Signs that the European industry can recover if it can respond creatively and flexibly, confirm the view that relative wage costs are only one, and perhaps not the most important, factor influencing performance. The success stories of the industry suggest that technology holds the key. But technological change means much more than the automation of production or the substitution of robots for workers. It includes rationalisation of work and improvements in management involving more efficient use of resources and skills, improvements in marketing and better financial control. Changes in each of these areas have a direct or indirect impact on employment, productivity, working conditions and work content.

As we shall see successful use of the new technology in footwear manufacture has often involved its selective adoption. Moreover the new technology need not be married to mass production in which ever longer runs at decreasing marginal costs hold the only key to

increased productivity. On the contrary the new technology has often been linked to the development of more flexible manufacturing systems which allow a quicker response to ever changing consumer demands in the fashion market, or to greater economies in materials usage, higher quality or more design content, all of which provide alternative, though not necessarily mutually exclusive, levers on output per unit costs.

b) Characteristics of Sectoral Demand and Changing Patterns of Demand

Development in the European market for footwear relates in the first instance to the general development of the European economy. During the 1950's and 60's product markets in most of the economies which today belong to the EEC experienced rapid and almost uninterrupted expansions. The long boom was initiated by reconstruction after WWII and strengthened by continuously increasing incomes and populations whose appetite for consumer goods seemed insatiable. The consumer society of the sixties and seventies was oriented towards the acquisition of a range of domestic labour saving and leisure using prestige consumer durables, such as cars, washing machines, and televisions, and services such as eating out and holidays abroad. Positional goods and services of this kind helped to demonstrate economic success and confirm status. They were wanted for their intrinsic worth but also to differentiate their possessors from the rank and file and distinguish them as members of an elite denominated by spending patterns as well as prestige incomes and occupations. Widespread consensus about desirable consumption development fostered the growth of large scale demands for particular items as incomes rose and facilitated their mass production.

By the mid-1970's most households had acquired a range of consumer durables and the market had reached saturation. Widely disseminated possessions cannot serve the functions of positional goods, and consumers, searching for distinct and different commodities, found a new interest in semi-and non-durable consumer goods. Simultaneously

steadily rising per capita incomes reduced price sensitivity and allowed consumers to become more quality conscious. Consumers turned away from stereotypes of desirable lifestyles and the mass produced goods that went with them. A new stress on individuality and heterogeneous group identity developed. In the seventies style and image were created and recreated through a combined effort of consumer oriented market research and sophisticated marketing and sales instruments, especially advertising. But the new connoisseur consumer has an income elastic aversion to intensively advertised, marketed and branded products. Quality conscious and no longer seeking to identify via consumption with other groups, even the economically successful, (s)he seeks to appear as a discerning individual. Demand is for variety, distinction and individuality. Markets fragment. Mass production becomes anachronistic.

c) Footwear and Changing Demand

How does footwear fit into these general developments in the markets for consumer goods?

It is often argued that demand for footwear in the developed countries has reached saturation point and is unlikely to grow faster than the population. Wide variation in shoe consumption per capita, (see table 1), and in the proportion of total spending devoted to clothing and footwear, (see table 5), illustrates the uneven development of the footwear market among European countries, and suggests that there are places where consumption can be increased. We will come back to the important suggestion that there is no homogenous European market but only a series of partially integrated but in many ways distinct national markets. Within particular developed countries there are growth points due to changes in the structure of the population which must be identified by producers seeking to break into particular markets.

Changes in style always provide perpetual motion to the high fashion segment of the market which is a growing component of overall demand. The new demands for quality, distinction and individuality extend the implications of this point. Footwear, like other semi-durables, is likely to become a less standardised item, meaning that producers will have to become more aware of particular market niches. Fashion will become increasingly variable and the fashion field itself will be fragmented along with the more staid classical part of the market. As a result of these changes in demand large retailing chains carry an increased number of shoe types, and, like clothing, the footwear market is increasing its number of seasons and its 'in season' changes in stock. In developed countries although the market may not grow in terms of pairs per capita, purchase of higher quality footwear may be preferred as incomes increase.

Alternatively new and perhaps more homogenous demand may be found in the developing and COMECON countries. The drawbacks here are that the demand in the developing countries is for low priced products and therefore the emphasis has to be on volume sales. Like the low quality end of the market in the developed countries, developing country markets are susceptible to competition from low wage producers. COMECON orders, although sufficiently large to be the basis of high volume production, are stringently quality controlled. Both markets may be unstable for political and economic reasons. Third World countries may experience foreign exchange crises and payments problems. COMECON trade is organised on a bilateral basis and depends therefore on the domestic purchase of COMECON products. COMECON buyers may switch goods within a bilateral barter for political reasons, moving suddenly from, say, wine to footwear, which can be disastrous for firms that have geared up to anticipated repeat orders.

The organisation of the retail market for footwear is of crucial concern to manufacturers. Differences in retail networks among European countries are important (see tables 6-8). In some countries, the UK for example, the distribution network is highly concentrated both structurally and geographically witness the high

percentage of retail sales made through multiples. It has been argued that such concentration facilitates access to the domestic market for the agents of foreign manufacturers. One senior executive put the general argument in the following terms:

'In Leicester they (the agents) are able to go to one building where six chains are represented, with one senior controlling buyer representing 2000 retail outlets. At the same time, whilst they are in Leicester, they can visit seven other major multiple retail chains, and if they can take a further three days they can take in Leeds (Stylo) Manchester (Timpsons) and Bristol (Lennards). They have then taken in 60 to 70 per cent of the retail purchasing power in the UK.' (quoted in Mounfield, Unwin and Guy, 1982, p. 104). But while making it easier for firms to make contact does a concentrated retail network necessarily exclude small scale suppliers because of the size of the orders? British Shoe Corporation (BSC), for example, which sells around 50 million pairs of shoes per year, which is estimated by the Monopolies Commission to be 23-24 per cent of the market allegedly still needs small volumes in some lines and so has some opportunities for small suppliers.

The UK is at the extreme of the European spectrum here; indeed the same executive went on to complain that 'there is nowhere at all for a British manufacturer or his agent to go on the continent to one city representing a chain of even 100 retail outlets' (Mounfield, Unwin and Guy, 1982, p.104).

Independent evidence suggests that this may be an exaggeration. Footwear retailing in Austria is dominated by chain stores and buying rings, which hold 80 per cent of the market. There are six key buying points: two chain stores and four buying rings. The two main chain stores, Humanic and Stiefelkonig, buy direct from the companies' head offices which are in Graz. The buying rings serve some 770 retail outlets (Makrotest, 1985). The Swiss retail trade is dominated by multiple retail chains and two main buying cooperatives, which together cover 40 per cent of the market (Makrotest, 1985). In

Sweden large retailers usually buy direct from importing manufacturers often through agents and try to avoid buying from importers and wholesalers to obtain better prices. But agents and wholesalers are important in the Swedish provincial market given its fragmentation (Incubon, 1986). Italy stands at the other extreme: footwear distribution, like distribution in general, is very fragmented.

Despite the differences in the organisation of distribution across Europe, there are some common trends. Associated with the decline in demand for standardised products, a decline in the share of footwear sold by specialist retailers is anticipated, although multiples will continue to dominate. The impact of the footwear intensive sports market is likely to increase encouraging the growth of specialist sports outlets. More speculatively, the development of low price discounters located away from the shopping centres could have a destabilising effect on established retail patterns in several countries. Prospects for selling directly into homes, for example, ordering via viewdata, could begin to be important by the end of the 1980's. Both discounters and direct selling in the developed country markets are likely to compete for the commodity end of the market where cheaper mass produced footwear is well placed.

Although some developed country markets are already closed, the entry of Spain, Portugal and Greece into the EEC will have a competitive impact. It is arguable that in the developed markets much of the impact from low cost suppliers has taken place and import penetration has stabilised. Lower cost producers may now be turning to the developing countries' markets in Africa and the near East with competitive implications for manufacturers who already sell there. A buyers' market in the Gulf States has already been created by the decline in oil prices.

With the emergence in the 80's of a new giant producer and exporter in Brazil, a further uncertainty is introduced. President Reagan's recent decision not to impose further barriers on imports of shoes in

to the USA caused sighs of relief in many traditional European manufacturing centres such as Northampton, Alsace and even Florence. Had Reagan bowed to pressure from the American industry and blocked imports, a substantial share of Brazil's rapidly expanding output, as well as that of Taiwan and S. Korea would almost certainly have been diverted to Europe. Indigenous industries in Europe have taken too much of a battering to welcome any further low cost imports and there is always the possibility of a reaction against GATT and in particular the favoured treatment of underdeveloped countries which automatically gain from any liberalisation without offering concessions in return. This has a disruptive effect on trade between developed countries because defensive action has to be taken against all GATT signatories rather than selectively. It is always possible that pressure on governments will grow to the extent that action in the form of tariff increases will be taken against low cost producers.

Summarising the implications of intense competition and changing patterns of demand for footwear manufacturers:

First, it will be increasingly important for manufacturers to define the market segments on which to specialise and have a clear idea of the consumers' needs.

Second, a closer relationship with the retailer will help the latter convey his appreciation of the market.

Third, the manufacturer must attempt to minimise supply lines so as to be able to respond to market demands.

Fourth, a better and prompter supply may be facilitated by the development of domestic sources of raw materials and components.

Fifth, the selective adoption of appropriate new technology will strengthen any industry's competitiveness and enhance its ability to respond flexibly to changes in demand.

Sixth, the importance of style underlines the role of design in successful competition.

Finally, shoe manufacture has traditionally been regarded as a labour intensive assembly operation in which high wage producers could only compete by automation, but companies that hope to be successful in the fashion market must be able to switch production lines quickly and meet relatively small batch orders at short notice, which may limit the degree of profitable automation. It may be more a matter of automating individual items of machinery and processes than establishing assembly lines. Below we follow through some of these implications to the development of what has come to be known as the 'just in time' manufacturing philosophy and to the organisation of the firm.

d) Links between Manufacturers and Retailers

The nature of the relationship between the manufacturer and his/her customers can exercise a strong influence over the firm, affecting the organisation of design, the batch size and scale of output, the security of orders, and the ability to make long term investment. International differences are again important, and the British case may not be typical because of the concentration of retailing, nevertheless UK experience covers the range of forms of integration. The big difference can be put in terms of firms producing their own brand compared with firms doing made to order (MTO). Branded footwear is advertised and sold through independent retailers, department stores and the manufacturers own shops. C. and J. Clark Ltd is an example of such a manufacturer with a strong presence in British high streets. MTO is literally produced to the customer's order and may carry his/her brand. The different pressures imposed

by brand name production and MTO often persuade entrepreneurs to do both within the same firm.

Own brand producers have to design independently and then provide an in-stock service to the retailer. Success requires the minimization of stock, while at the same time having shoes which are in favour available on demand. There is a widely acknowledged tendency for producers of their own labels to reduce risks by aiming for classic staid designs rather than high fashion.

In contrast MTO has to keep current with fashion trends to produce fashionable footwear carrying the retailer's own label. MTO manufacturers vigorously canvas their customers for design ideas. Indeed at one extreme the design is provided by the customer who may, for example, want to restock a particularly successful imported shoe but not be able to source from the original overseas supplier. More generally the customers bring the ideas if not the shoes. Mounfield, Unwin and Guy summarise the impression gained from their interviews in the MTO sector thus: 'The vast majority of the firms see design as a copying or adaptive function in which the customers'/buyers' exert a crucial influence' (1982, p. 111). Although much of the MTO output is aimed at the 'young' market, classic designs have not been entirely ignored as they provide an element of stability in a fast moving world.

The dependence of the MTO manufacturer on the buyer extends beyond the expectation of more design help. MTO manufacturers' chief outlets are the multiple shoe retailers and so they see themselves as particularly vulnerable to the growing importance of large retailing organisations. Firms often confuse strong marketing with the establishment of good personal relations with a particular buyer for a large distributor. The latter can, of course, be useful but the firm can also become too reliant on particular individuals whose positions, favour and authority are not permanent. When a particular customer's orders are large relative to total output, the firm's bargaining position can become unenviable. Mounfield, Unwin and

Guy's (1982) testimony contains many clear illustrations of these pressures on British manufacturers and the associated incentives to cut loose from these customer-producer relations. Alternative customers were sought but they often required the development of better quality and different products.

When trade is bad the manufacturer with own brands has the capacity to make responses which are more difficult for the MTO producer: for example, when costs rise the former can adjust prices but the MTO manufacturer has much less room to manoeuvre. In such circumstances the MTO producer may take the initiative more often, for example on the design front, trying to drum up business by offering new samples. Preemptive action involves the establishment of an own label range to be produced alongside the MTO, and which can be used to fill in gaps in the production schedule and increase the firm's control over its environment. MTO is especially vulnerable to import substitution. Increased import penetration in the UK in the eighties hit particularly hard those firms in Leicester which were producing ladies volume MTO in the low and medium quality range.

The MTO manufacturer has more difficulties planning production than the own brand producer as (s)he must compete on the basis of availability to do repeat orders, the development of within season styles, and short response time. The MTO firm has to be in a constant state of readiness to react.

But for both types of producer, and whatever the structure of retailing, the changes in the demand for footwear have prompted innovations in marketing philosophy. Ian Croft of British Shoe Corporation summarised this by repeating the dictum heard so often in the apparel industry (see Zeitlin, this volume): "A company must now make what it can sell rather than sell what it can make". (Croft, 1986). The trick is to know what can sell.

Two pieces of advice are particularly relevant:

First, to make sense of the overall market, manufacturers need to look at different segments and identify groups of consumers who share characteristics and buying habits. An understanding of the composition of the market clarifies where manufacturers stand in the various segments and helps them identify opportunities in segments where they are currently not represented.

Second, footwear retailers in Europe are rapidly following apparel retailers in emphasizing a quick response strategy as the way to cut costs. In particular quick response reduces the costs of forced markdowns, of stockouts when customers leave a store without their intended purchase because it is not available in the preferred size, colour, or style, and of inventory. Quick response focuses on integrating relationships between segments of the industry, better information flow between retailers and suppliers and more flexible technology to achieve a faster response with less inventory throughout the system (Frazier, 1986). Attention to the determinants of response is especially important to manufacturers trying to compete with producers who enjoy greater proximity to the market.

The production counterpart of quick response is just in time manufacturing.

(e) The 'Just in Time' Manufacturing Philosophy

For the past 30 years observers of Japanese industry have been conscious of production practices which contrast significantly with those in the West. Investigations revealed a startling picture of lower inventories, faster throughput times and higher productivity in

Japanese factories. How was this achieved and could the results be replicated in the West?

Just in Time was the phrase invented to describe the philosophy behind Japanese manufacturing. The Japanese do not build contingencies into their production systems to protect them from possible interruptions. Instead they aim for continuous production where components are in the right place, just at the right time: 'Just in time' (JIT). 'As a consequence, buffers of inventory in temporary storage are largely eliminated, factory floor space is dedicated to productive activity and overheads are drastically reduced' (Tyler, 1986).

In the seventies, many companies sent their managers and engineers to Japan on fact-finding missions. The objective was to study JIT and identify those aspects which could be successfully transplanted to Western Europe and the US. In the latter, the breakthrough came in 1980, when several major companies took initiatives with JIT. In the last six years the success has been impressive (World Class Manufacturing, 1986).

How does JIT fit in with the changes in markets and international competition described above? First, JIT facilitates the quick response strategy essential in demand led production. With JIT it is possible to aim for a 'pull through' as opposed to a 'push through' production system. Second, JIT promotes improved performance independently of high investment, although resources released by JIT economies can be reinvested to achieve further improvements. Third, JIT is concerned with reducing overhead costs, not necessarily labour or material costs. The emphasis is on better management, improved planning, the removal of costly interruptions and waste, the elimination of non-value added processes, and the replacement of storage areas by manufacturing activity. Fourth, JIT is a philosophy and not a system that companies can buy and install. It requires the involvement of the workforce at all levels. An adversarial management style is the antithesis of a JIT management style. It

follows that the introduction of JIT will involve transitional trauma. 'Upheaval is inevitable because JIT is a different philosophy, hard to accept at first but obvious when one's attachment to traditions is broken.' (Tyler, 1986). As one keynote speaker at the First International Conference on Just in Time Manufacturing held in London in April 1986 put it 'JIT is the way you would do it if you hadn't already started doing it another way!' (quoted in Tyler, 1986).

JIT's relevance to manufacturers in markets characterised as above makes it of obvious interest to footwear manufacturers. In addition characterisations of the footwear production process suggest that JIT can provide a fruitful route to cost reduction.

(f) **The New Competition and the Organisation of the Firm**

It was suggested above that the most important recent change in the market for footwear has been the emergence of a significant demand for varied and customised goods produced in short runs. In the past many commodities were produced according to the techniques originally developed by Taylor and Ford involving transfer machines and large production lines. Both types of technology were limited to large industry: transfer machines because of their cost and rigidity, and assembly lines because of their dimensions alone. Across a wide band of industry the advantages of mass production technology have been significantly reduced by the diversification of the product market, and the competition in terms of quality and variety which this implies. The diversification of demand puts a premium on the capacity to produce in short series at competitive prices: 'pull through' as opposed to 'push through'. This is not entirely incompatible with assembly line production, the flexibility of which is very variable: least where tasks are very fragmented and greatest where each position is assigned longer operations. The development of a flexible and much less expensive technology has also facilitated decentralisation. Shorter runs can mean smaller firms.

In many sectors assembly has been fragmented with individual firms undertaking the manufacturing of particular components. But the key point is that they are produced with precisely the same techniques which would have been used had the firm decided to make them directly. Industrial economists have long argued that the economies of scale should be calculated for phases in production and that the economies which result from the juxtaposition of similar operations are often negligible. The sectors that are being restructured in this way are those characterised by limited economies of scale in vertical integration.

However even if the importance of technical economies of scale has been overstated, it could still be objected that with fragmentation in the industrial structure the smaller firms will suffer certain disadvantages. First, there are indivisibilities in the administrative work of firms which burden them with relatively high overheads. Second, larger firms may enjoy significant pecuniary economies of scale in the acquisition of raw materials and credit. Third, smaller firms may find it hard to invest sufficiently in training.

To some extent these difficulties can be overcome by the creation of associations of producers to provide administrative services and to coordinate purchasing and credit negotiations, thus establishing on a cooperative basis the conditions for achieving maximum economies of scale of specific operations. Training difficulties can be alleviated by sector specific units within existing public training authorities which work in close coordination with the firms. Some of these structures and interlinkages can be illustrated by the actual organisation of the Italian footwear industry (ILO, 1985; Brusco, 1986). The small firms of the Italian industry gain from specialisation and flexibility while compensating for the disadvantages of vertical disintegration by networking within industrial districts, collective marketing and putting out administrative and other activities to specialists.

It is important to note that the diseconomies above may be offset by the advantages inherent in small and medium size firms with respect to the new competition: the ability to produce in short series at competitive prices. This is not entirely incompatible with assembly line operation, but an increasing number of studies suggest that small and medium size firms, able to draw on broadly skilled workers and assisted by the increased availability of flexible technology in the form of multiple use automatic machinery and employing batch production rather than assembly lines may be most able to move from product to product in response to consumer demands.

In addition, whereas it used to be argued that goods produced in long runs by big firms using a large amount of specialised machinery and highly subdivided labour was the least exposed to competition from developing countries, it has become increasingly apparent that this may not be the case. Third World countries may be forced themselves to go this route by the low skill levels of their labour forces and such a direction may be facilitated by the export of capital from advanced industrial economies. Developing countries setting up industries can obtain turnkey factories embodying the latest equipment. It is not inconsistent to also note that Third World competition is usually aimed at the bottom end of the market and it is often possible to counteract the competition by shifting up market. The high quality and design intensive goods associated with this end of the market cannot easily be produced in developing countries because of their distance from the consumers, their consequent difficulties in predicting shifts in tastes and the low skill level of their labour forces.

(g) Footwear Production and Changing Technology

A shoe is a complicated piece of personal tailoring. Its manufacture has two peculiarities which have important technological implications: it is constructed in three dimensions on a form called a last, and it is produced in mirror image pairs. Stocks of lasts represent a considerable investment. Any increase in output

necessitates either a corresponding increase in the number of lasts or a reduction in the time during which shoes remain on the last.

1. Materials

The material used in shoemaking must be strong yet capable of being shaped, often in complicated ways. It must be able to retain a shape when set and yet remain pliable and comfortable in wear. Leather's three dimensional fibre structure makes it ideally suited to shoe manufacture, hence its widespread use for shoe uppers and soles. But despite the efforts of the tanner, leather is discontinuous, irregular in shape and variable in stretch and surface appearance. It requires skilled pattern cutters capable of assessing the materials potential and maximising its utilisation.

Initial developments in shoe industry technology concentrated on:

1. developing cheap and easily manufactured lasts;
2. decreasing last turnabout time by accelerating construction during those phases of construction in which the shoe is on the last; and
3. finding a cheaper substitute for leather, which could perform satisfactorily in manufacture and wear, which had a uniform surface structure and shape and preferably could be supplied in rolls.

Mouldable plastic has provided important economies in last fabrication. Plastic lasts have now widely displaced wooden ones which are retained in use mainly as prototypes or in design

departments. The use of heat to accelerate setting has reduced the time that a shoe has to remain on the last and cut production time.

Rising leather prices during the Korean war encouraged shoe manufacturers, led by those in the UK, to move to resin rubber, PVC and other materials for sole making. The development of these new materials promoted vertical disintegration with specialist sole-cutting and bottom stock manufacturers appearing as independent producers able to realise economies of scale in the production of this potentially standardised component. Initially non-leather soles were sewn on in the traditional way, but the development of appropriate cements and the application, from the plastics industry, of direct and injection moulding, transformed shoemaking technology in the 1950's. Both developments reduced time on the last but moulding involved expensive investment which needed long runs to be economic and so required styling that was not subject to rapid change. Cemented synthetic sole construction suited the then current fashion emphasis on flexibility and lightness, demands which leather soling was less able to meet without encountering wear problems.

It proved much less easy to find an aesthetically acceptable and practical man-made alternative to leather for uppers. Instead economies were sought in cutting departments, where the producers of leather shoes faced particular problems as a result of their raw material being an animal skin of variable size and quality: what area of leather has the tanner supplied (as opposed to invoiced), and how many pairs of shoes can be cut from a batch of skins? Little science had been applied to either problem. Incoming leather was assessed by placing transparent plastic grid sheets on the skins and counting squares. The utilisation of the area was very much in the hands of the cutters, the most craft intensive job in the traditional shoe industry. At this stage more scientific leather measurement was attempted to provide the basis for efficient incentives to leather utilisation.

The new 'breathable' synthetics of the 1960's seemed to offer consumers some of the alleged advantages of leather in terms of comfort and appearance, plus additional benefits in terms of easy care and scuff resistance. Expertly promoted, synthetic uppers were initially accepted by consumers. The elimination of pair matching, an inherent problem with leather, and the ease of handling and cutting more than offset the initially higher cost of the synthetics. Costs fell anyway as production of synthetics increased and economies of scale were realised.

The success of poromerics during the 1960's had an important impact leading to consumer acceptance of the much cheaper, plain or fabric-backed vinyls. Shoe manufacturers now had an easily fabricated uniform material for use at the top and bottom end of the quality range.

Leather, however, not only remained the most preferred shoemaking material but actually improved its relative position in the 1970's : a resurgence not unconnected with the increased demand for quality described above a a key trend in consumers' goods markets. It has directed the attention of shoe technologists back to scientific materials utilisation, and there have been important recent developments in leather assessment, cutting standards and pattern fit.

Monitoring of leather measurement indicated a 5 per cent discrepancy between measurement in the tannery and measurement in the factory. Not only did this mean that manufacturers were being overcharged but they were making cutting estimates based on a wrong assessment of leather area. Photoscanning calibration equipment allowed manufacturers to check measurements for themselves instead of relying on the accuracy of suppliers.

A programme, in the UK, at SATRA (Shoe and Allied Trades Research Association), funded by the Department of Trade and Industry,

resulted in SATRASumm which deals with both the measurement problem and a second issue; how to provide a rapid, accurate reading of pattern area which together with relevant software could be used to assess pattern interlock for maximum leather utilisation (Department of Trade and Industry, 1986; Financial Times, 12.4.85). The system uses two new instruments. Tablescan was developed by Bramley Tanning Machinery of Leeds and GSM Controls Huddersfield. Parallel rails down the sides of a 10 by 5 ft. glass table support the two ends of a 5 ft. measuring bar housing fluorescent tubes and an array of photodiodes. As the bar slides on the rails and is swept across the skin, the diodes register reflected light and a microprocessor calculates the area to 0.1 sq. ft.. The second unit, Patterscan uses similar methods and is based on a Commodore microprocessor and SATRA components. The patterns are passed through the unit, in the flat, which gives an almost instantaneous readout of area. The associated microcomputer is programmed to combine pattern measurement and information on upper material to optimise their interlocking for best materials utilisation, and to produce a norm for the cutter's allowance. The SATRASumm package includes leather assessment training to enable cutters to assess effectively the usable area of skin. The system costs around £10,000 for companies using leather and £5,000 for companies using synthetic materials.

What are the likely savings from adoption of such a system? Cost breakdowns of women's leather-uppered shoes showed that materials accounted for 47 per cent of total costs, and the leather upper itself represented 25 per cent. In an attempt to compare traditional methods of leather measurement and cutting, SATRA installed SATRASumm, on loan, in five UK companies and audited the system to assess the commercial benefits. There is no doubt that measurement control of incoming leather was greatly improved. Additionally changes in the expected quantity were assessed and cutting allowances modified accordingly.

A primary aim of the project was to increase materials utilisation and here there was clear success. with utilisation increasing from between 2 to 10 per cent with an average increase of 5 per cent. The

increased leather utilisation was worth an average £33,500 per year for each factory. Moreover in three of the companies the level of rejects attributed to faulty materials or incorrect cutting was significantly reduced. The reduced number of rejects would save an additional £4,600 a year. The project also revealed that certain shoe styles were causing too much waste in cutting. These styles were quickly identified and when possible, modified to reduce waste.

By the completion of the project the factory personnel involved in the system had halved the administrative time needed, and become more aware of the value of measurement and of product quality than ever before. Terry Freer, head of SATRA's Management Services Department sums up: "The project demonstrated in a practical way that the use of precise area measurement techniques, coupled with a proper understanding by the industry of what quality is all about, could enable manufacturers which have to use a physically variable natural product to control and reduce their costs. There is no doubt that a high standard of materials measurement technology is a vital first step to the improvement of product quality". (quoted in Department of Trade and Industry, 1986).

The results of the project were also expected to interest allied industries such as leather clothing manufacture, glovemaking and handbags manufacture. Significantly all the participating firms retained the equipment and were reported as making savings.

Bob Hackney of SATRA Footwear Technology Centre at the CFI Annual Footwear Conference estimated the payback period of SATRASumm, in saved material against the cost of the system, for a factory making 15,000 pairs of ladies' or 10,000 pairs of men's shoes a week, at an astonishingly short 11 weeks. At this time (December 1986) 60 systems had been sold in the UK. Mr Hackney thought that it was strange that more UK companies had not invested in the system in view of the rapid payback (Beeby, 1986).

A recent development illustrates the industry's awareness that quick response is vital in the 1980's. A system, also developed by SATRA, called QuickSumm reduces the time for cost estimation to two or three minutes per set. The SATRASumm and QuickSumm systems can now be interfaced to CAD systems. SATRA suggests that further approaches to materials savings will involve the replacement of rigid "go/no go" specifications with more flexible performance guidelines based on an assessment of the risks involved.

2. Production

Footwear manufacturing is an assembly process in which, depending on the method of shoe construction used, there can be up to a hundred separate operations. Production is normally divided into four sub-assembly operations (see figure 1): clicking when the upper pattern is cut; closing when these pieces and other bought-in parts are prepared and stitched together; making when the uppers are pulled over the last and attached to the insole, and the sole and heel attached; and, 4. finishing when the shoes are inspected, minor defects remedied, spraying and touching up undertaken and the socks inserted. Design can be viewed as an additional operation. The increasingly important question of its optimal organisation and relation to production and the market is discussed separately. Here we are only concerned with the impact of technological change on the way in which design interfaces with production. Bottom stock preparation can also be identified as a separate process and indeed is frequently subcontracted to specialists who can achieve substantial economies of scale as soles are relatively standardised and free from rapid fashion changes.

The traditional organisational problem in a shoe factory is to synchronise the four distinct sub-processes, to reconcile their different technological requirements, and, in particular, to feed the small batch work done in the closing and clicking departments into the relatively mechanised mass production making operation. So many styles, finishes, colours and construction methods are possible that

many firms feel that small batch production is necessary at least in some of the stages of production. On the other hand long runs are highly desirable in the making process and with respect to the amortisation of certain style specific investments such as the knives.

Design

Shoe manufacturing begins with design. Design fixes the shape of the last, the appearance of the upper, the type of sole, and the height and shape of the heel. Here we are concerned with how design links into production. Traditionally the shoe designer worked on a last (representing the basic structure of his/her design) covered with masking tape. The latter allowed the design to be converted into a pattern. On completion of the design, the tape was removed, and laid out in the flat and patterns drawn from this template. An intermediate technology uses vacuum moulding of the last to produce a thin plastic shell on which the designer can draw and experiment. Once the design is complete the shell can be opened out and used as the basis for pattern cutting.

With computer-aided design (CAD) and computer-aided manufacturing (CAM) the process is revolutionised. The shoe designer can now draft with a light pencil straight onto a visual display unit. Micro-processors convert the two-dimensional image into a three dimensional one which can be viewed from any angle. By drawing on material and production data from the data bank, and digitised colour books, the designer can superimpose coloured upper patterns with almost instantaneous costings. Once the pattern is determined, the computer can produce patterns for modal presentation, and programmes for laser or water jet cutting, which can allegedly achieve materials savings of about 3 per cent, and digitised tapes for automatic sewing, and workflow management control schedules.

CAD systems have been slower to be adopted in the footwear industry than in clothing. Although more frequently used in Italian shoe manufacturing, (Brusco, 1986) they are not in widespread use in the UK. Although systems which offer the opportunity to design on screen have been introduced by several large British companies in the 1980's, this facility appears not to be fully utilised in any one company (Rubery and Wilkinson, 1986).

Of more immediate practical significance in the UK industry has been the opportunity to use these systems to aid in the process of putting a shoe design into production, by providing estimates of materials costs, pattern assessment and layout, specifications for pattern cutting and allowing computerised grading of patterns, one of the most skill-intensive jobs in the traditional shoe industry. Rubery and Wilkinson believe that it is the scope for using the equipment to develop patterns to fit an overall design of a shoe which minimises costs that is likely to lead to a wider diffusion in the British industry and not the on screen design option (Rubery and Wilkinson, 1986, p. 21). This belief appears to be shared by SATRA which, as we have seen above, has tried to harness the materials saving aspect of CAD in its pioneering of small scale programmes on relatively cheap microprocessors, which therefore remain within the budgets of even small and medium sized firms. Rubery and Wilkinson note that small firms' solution to the pattern grading problem is either to continue to use the highly skilled labour available in-house, or to contract pattern grading out: a significant development in view of the predictions above about vertical disintegration. Contracting out may develop sufficiently to justify specialist firms acquiring the most advanced equipment.

Clicking

Although new clicking equipment became available in the 1970's, its dissemination has been minimal (ILO, 1985). The clicker still uses the swing beam press but smoother hydraulic action allows the knife to be positioned more accurately and more precisely with reduced

waste. Touch button operation and minimal knife head clearance speed up press operation: relatively minor innovations but contributing significantly to improvements in machine productivity.

Closing

Between 40-50 per cent of the total direct labour cost of making a shoe occurs in the closing room (Anderson, 1986). Mass production methods are not easy to apply and so closing has always been a bottleneck in footwear production. Indeed a special department exists within SATRA to design strategies to combat stitching hold-ups: Upper Engineering Research headed by Alan Carter. Closing rooms are eminently suited to reorganisation on the basis of JIT.

The work content in closing extends from skiving, folding, cementing, printing, holepunching, eyeletting and pattern sewing, to assembling and stitching the pieces together. Faster and automated movement of work between stations, and automated stitching are considered the two most promising new technologies. Microelectronics and computers have an important role to play in the stitching room, particularly with the increased use of automatic stitching machines. This technology has been readily accepted by the UK footwear industry (Whittaker, 1986). Three UK firms have installed SATRATrack, a 40 station computerised closing room transporter for directing and controlling work. However it is sometimes argued that conveyance by trolleys rather than tracks is preferable as the track slows assembly to the speed of the slowest worker on the line (ILO, 1985).

The speeds of stitching machines have increased as a result of technical advances in needle steels, oil feed trims, faster motor operations, needle positioning, underbed thread trimming and back tracking (ILO, 1985). The recent development of microprocessor controlled profile stitching makes it possible to produce complicated stitching patterns rapidly and cheaply and to assemble small pieces economically, saving on materials.

Microprocessors can also be used as an aid in training operators. They can record and analyse the operator's precise movements and so be a guide to more accurate and faster work. SATRA has developed such a monitoring programme called Visionstitch. It works by recording information about a machine and how it is being used, and presenting it as a speed/time graph on a visual display unit. By allowing the operator to compare one technique with another the job becomes easier and shorter stitching times are achieved. As the system became increasingly sophisticated, the programme was translated from the original apple computer for use also with the more powerful, but still inexpensive, IBM PC XT. After training with Visionstitch operator cycle times are held to be 17 per cent faster (Anderson, 1986). Visionstitch can reduce the learning time on new machines and so reduce the cost differential between small and large batch.

Visionstitch was introduced two years ago and since then some 50 systems have been ordered and it is being used in 9 high labour cost countries around the world (Anderson, 1986). The equipment is currently used in some 20 UK companies, but Rubery and Wilkinson suggest that as piecework means that some of the benefits accrue to the workers the incentives for adoption are reduced (Rubery and Wilkinson, 1986, p.24).

Future developments in the stitching room are predicted to involve fibre optics which can observe individual stitch lengths and adjust subsequent stitch lengths automatically. This will eliminate the small variations which currently hinder the introduction of automation (ILO, 1986).

Closing is sometimes contracted out. The motivation is not potential economies of scale as in bottom stock preparation, but the economies derived from relocation in low wage regions, which are especially important in this, the most labour intensive, stage in shoe production. India, the Republic of Korea and China are at present prominent suppliers of stitched uppers, with shoe manufacturers in

the US as their main customers. Shoe uppers are much less standardised than soles however. Closing of fashion shoes, where a quick market response is essential, is likely to remain in the hands of the mainstream manufacturers. Closing of certain classical styles or shoes with a stable mass market may increasingly be subcontracted to low wage economies.

Making

New technology has had a steady impact on the making process. Semi-automatic toe, side and seat lasting, automatic cement application and automatic roughing have reduced the number of work stations and the labour content of the remaining operations. A combined toe, side and seat laster has been developed but the cost is so high that it requires long runs to be economical, and anyway its productivity advantages over the two man toe and side laster and back-part moulder and seat laster are marginal (ILO, 1985). Of more general interest has been the development, primarily in the Italian and German footwear machinery industry, of more flexible lasting machines. These can more easily accommodate small batch production than the lasting machines produced by British United which required significant set-up times if styles were changed and so were only suited to long runs. Several microprocessor controlled lasting machines are now on the market.

BU also produced a relatively unsuccessful automatic rougher in the 1970's which has now been superseded by a more flexible microprocessor controlled machine. The latter is not only more accurate than the earlier machine and so less likely to damage the finish of the shoe, but also it does not require the template to be changed when the line switches, and so minimises set-up time and is much more suited to small batch production. Cost as yet limits the machine's attractiveness to firms with considerable volume.

Finishing

The prefabricated sole or sole unit has eliminated much of the work in finishing but even here further savings are possible by improved roughing and cement application during the earlier stages of production. The use of improved adhesive applicators is a simple and inexpensive way of saving costs and improving quality (Beeby, 1986).

Microprocessing and Management Information Systems

Probably the most important and common investment for a large number of companies in the eighties has been the computerisation not of design or manufacturing but of information on payroll, work patterns and stock control. At first computers were introduced as main frame or mini systems for administration and financial functions and electronic Data Processing centres were formed (Whittaker, 1986). Such systems provide a basis for planning production to meet demand and some systems include databases for estimating piecework prices.

Management information systems are essential to the operationalisation of JIT. They facilitate the tailoring of production to orders and the integration of new orders into an ongoing production schedule. As a result they reduce turnabout time and work in progress. They also help to gear stocks to demand and reduce the tendency associated with production based on a short response time to overstock materials "just in case". As a result they prune materials inventory. They cut administrative costs including overhead labour. Built in computerised databases help with more accurate costings and with cost control. Finally they make it easier to identify possible bottlenecks and so facilitate preemptory action.

Most European firms have installed such systems recently or are planning their adoption (Rubery and Wilkinson, 1986; Brusco, 1986).

Rubery and Wilkinson identify the main constraints on diffusion in the UK as being doubts about the suitability of software and the administrative costs of set up. The potential benefits to management under the system of small batch and short response time are widely acknowledged (Rubery and Wilkinson, 1986, p.22). Diffusion in Britain has probably been assisted by the encouragement and help given to firms contemplating the use of microprocessors by SATRA whose activities in this area have underwritten the costs of search and information gathering for individual firms.

SATA also encourages the use of microprocessors for technical and production functions. Nearly 200 have been installed in member companies for use with such systems as SATRASum, SATRAScope, Vision Stitch and Process Monitoring. SATRA's aim to maximise the accessibility of computer usage required that their systems be designed to run on a sixteen-bit micro-system such as IBM PC (Whittaker, 1986).

Computer Integrated Manufacture

In the longer term, of course, the ever increasing impact of microelectronics and computers and the consequent increases in productivity, have led some industrial experts to suggest that the end point for the footwear industry is computer integrated manufacturing (CIM) by the year 2000. CIM is like conventional manufacturing except that information is transmitted electronically. The database integrates all design information from the CAD system with order processing so that it can plan and control the actual manufacture. It also controls the production machinery, automatic delivery tracks, and despatch from the factory (Whittaker, 1986). CAD/CAM links are an essential stepping stone to the totally automated factory envisaged in CIM.

At the current time the footwear industry is similar to many others in its creation of islands of automation. However the use of

microprocessing by firms in the UK footwear industry, although increasing dramatically. (Whittaker, 1986) is less than in other sectors. Automation is more viable in clothing manufacture than in footwear manufacture because all the materials used are synthetics and there is no lasting process. Even at the stage of design the nature of a shoe is an inherent obstacle to computerisation: a shoe has to be felt and held and not just looked at to be appreciated. The automation of leather cutting is a major obstacle in the footwear industry's path to CIM production.

As Rubery and Wilkinson point out the developments in mechanisation currently in use have not fundamentally changed the method of production (1986, p. 25). Some of the main constraints on further automation, as suggested above, seem inherent to the product: others are to do with the current structure of costs and benefits and so more amenable to change. The use of an unpredictable material, in leather, and the problems in developing robotic systems which can pick up soft materials, and computerised stitching in three dimensions, seem to fall into the former category. The costs of implementing computerised systems in an industry dominated by small firms may fall in the second category. The role played in the UK by SATRA suggests that it is possible for the relevant information and services to be developed collectively by an industrial research establishment. The operation of such an institution may prove significant in offsetting the disadvantages of small firms.

As the Director and Chief Executive of SATRA, Graham Butlin, says it is important not to 'become over-excited about the technologies themselves. It is what they can achieve that matters. Cost effectiveness must be one of the main criteria by which our judgements are made'. For many firms involvement with short runs of widely varying designs must impose strict limits on the degree of automation that can profitably take place. And our analysis of market developments suggests that this basic constraint is likely to tighten rather than relax in the medium term. Dramatic changes in footwear manufacturing may thus remain in the future. However the newest technology differs from earlier automated machinery in one

significant respect: it is much more flexible. So it is eminently compatible with small batch, line change and flexible specialisation. Consequently it provides a much better fit with the evolution of the market and the demand of consumers than the automation of ten years ago.

h) Size of Firms and Economies of Scale

According to Mounfield, Unwin and Guy, the typical footwear factory in Britain, is a unit employing some 2-300 workers producing between 10,000 and 15,000 pairs of shoes a week in maybe fifty styles, in up to 15 sizes, with perhaps four different width fittings, and in a variety of colours (1982, p.92). The stereotype accords with formal estimates of the economic scale of shoe production. Pratten, in his classic study (1974), estimated that although scale economies increased steadily up to production levels of about 1200 pairs per day, which would be the output of a firm with approximately 150 employees, cost variation was not so large as to rule out operation below this scale. His 1971 data suggest that operation at half this scale would only raise costs by about 2 per cent. With respect to the upper bound on efficient operations the Footwear Institute Study Steering Group Report of 1977 found that beyond 10,000 pairs per week, 2-300 employees, production economies were exhausted and costs began to increase. Non-production activities such as marketing and finance continue to provide the biggest firms with economies of scale. Many of these firms run multi-plant operations to reconcile the limits of technical economies of scale with the gains from spreading non-production overheads over larger volumes, and often locate the different plants overseas to take advantage of low wage costs and gain entrance to new markets. Italy provides a precedent for believing that smaller firms can realise some of these economies by collective marketing and ordering of materials, and financial cooperatives (ILO, 1985, p. 51).

Although technical change has increased labour productivity since these estimates were made and so the typical firm produces more shoes

per week, footwear production remains a small scale manufacturing activity worldwide. In Britain today typical output levels are around 10,000 pairs of men's and 15,000 pairs of ladies' shoes per week. Britain seems to be about average with a higher concentration of small firms than France and the United States and a lower concentration than Italy (Rubery and Wilkinson, 1986; ILO, 1985; Pearson, 1983; and, see table 9). In Italy in 1981 93 per cent of firms have less than 50 employees and 55 per cent of all employees work in such firms, compared with 67 per cent and 8 per cent respectively for the UK (ILO, 1985, Table A33). In Italy the average number of employees per firm is an astonishingly low 17: whereas in the UK it is 110 (see Table 14). In contrast to both countries, in the United States in 1979, only 8 per cent of all production come from firms producing less than 500,000 pairs per year (Pearson, 1983, Table 5.5).

In Italy the industry is vertically disintegrated whereas in the UK there is significant subcontracting only in pattern grading, knife making and closing. The concentration of footwear components suppliers which are often national firms in the UK also promotes industrial concentration, in contrast to Italy where there are large numbers of components suppliers throughout the footwear industrial districts.

Rubery and Wilkinson argue that decentralisation in the UK industry is primarily a strategy to overcome bottlenecks in closing by establishing small factories to tap supplies of female labour either under existing management in order to secure control, or on a subcontract basis in order to reduce the overhead costs associated with closing labour (1986, p.26). They found a limited amount of subcontracting between firms to alleviate demand pressures but no clear trend towards decentralised systems of production. Indeed they argue that the increasing emphasis on rapid response to small batch orders has actually strengthened the incentive for firms to remain integrated in order to retain control over the whole production process (1986, pp. 26-27).

Nor does it seem that size of firm is a very significant factor in determining the production organisation or the relationship to the market. Obviously very small firms are excluded from the big volume market and are less likely to make their own brand of shoes, but some small firms are specialist producers in markets in which they have some control over prices (for example very high quality men's shoes or novelty shoes like motorcycle boots). Both small and large firms 'make to order' and do small batch rapid response production.

It is clearly rather empty to generalise about the optimal scale of operations without reference to the kind of shoes produced and the market niche targeted. According to one British manufacturer, in the top quality bracket 1,000 pairs per week can be economic, while at the bottom end 60,000 may be necessary (quoted in Mounfield, Unwin and Guy, 1982, p. 129). Significantly the same producer argued that for the fashion industry the variety and speed of design and throughput to the market causes 'the need for a small tight team for fast flexible reaction, and so in practice in the fashion field, this makes a unit over 15,000 pairs a week a decided disadvantage' (quoted in Mounfield, Unwin and Guy, 1982, p. 129). In this segment of the market and for leather shoes the economic size is somewhere between 6,000 and 15,000 pairs per week. For synthetics, lower quality, and standardised items bigger volumes are clearly needed.

Failure rates do not signal clearly any dramatic trends in optimal size of operation in Britain. On the one hand Rubery and Wilkinson found that in the 1980/1 recession many of the small specialist closing rooms had folded (1986, p.26). But on the other hand Mounfield, Unwin and Guy's plant level data suggest that the probability of a plant going out of business or shedding employment in the seventies and early eighties was associated with size defined by the number of operatives, with medium size plant being most at risk (1982, p. 73). Larger units are often members of groups of firms and often have superior access to financial resources to help them through the hard times. The basis for the smaller firms' survival is less apparent, but we cannot rule out a superior ability to adjust production and meet changes in demand.

It remains to note that size is not solely determined by technical economies of scale. Sub-optimal scale may be preferred if expansion requires delegation and decentralisation of control, a consideration that appears to loom large for a particular kind of firm which remains important in the footwear sector: the family firm (see Mounfield, Unwin and Guy, 1982).

i) Design

Design is not only the starting point of making a shoe but an increasingly important element in a firm's success; perhaps even a nation's. The Italians, world leaders in design, have the most successful European footwear industry. Britain it used to be argued, was weak on design, and this undoubtedly played a role in the contraction of the British industry. Significantly, in the context of the recovery of the industry in the UK, British firms are taking more of an interest in design.

In Italy design is a component of shoe production that is usually produced independently by specialist suppliers. The designers may have longstanding and secure arrangement with particular firms but they stand at arm's length from them. In Britain design is sometimes bought in from independent producers but often in house designers produce not only the season's range but also within season variations. Own brand producers must generate their own designs but as we have seen risk aversion constrains the designer to the middle of the road. In the MTO sector the design often evolves from consultation with the customer. Some firms think that they do initiate and innovate in design but more usually British firms copy and adapt particularly Italian designs (Mounfield, Unwin and Guy, 1982). It is not a lack of provision for craft and design education in Britain but a seeming inability (which perhaps relates to structural obstacles already enumerated) to capitalise on these skills by the industry itself. Designers are seldom represented in the upper echelons of the firm where marketing and production predominate. Many British shoe designers work abroad, in the Italian

industry for example. SATRA does not appear to be willing or able to promote design consciousness as intelligently and usefully as it has taken on technological change, although the weakness of British design has long been recognised by SATRA executives as a serious problem (see the interview with a senior member of SATRA quoted in Mounfield, Unwin and Guy, 1982, p. 96).

Conditions in service industries can affect footwear firms capacity to pursue innovative design. In Italy where lasts are relatively cheap and where the engineering firms are closely associated with the footwear firms, design begins with the form. Decisions about the shape of the shoe are the first step in the design process and are often automatically linked into last production. In Britain where lasts are twice as expensive and their supply problematic, designers are often constrained to accommodate their designs to an existing stock of lasts with a few extra degrees of freedom provided by the possibilities of last modification. The British designer works out from the last whereas the Italian designer works in to the last. The difference in the potential for creativity is clear.

Within the industry there is a debate about the most appropriate way of building design into the firm, and in particular whether the designer should be hyperconscious of the firm's technological capacities. The arguments on both sides are clear. Designs which a firm cannot produce are useless, and it is clearly efficient to be able to foresee and forestall technical problems in putting a design into production. But the designer can get too constrained by the need to accommodate the production manager. A firm that used a freelance designer who devoted 75 per cent of his time to them argued that the arrangement had important advantages: 'If you employ a man with the firm to design, he tends to design what the employer wants. If he is independent he can cock a snook at us or say "I think you ought to be making this". There is a temptation for the works manager to go for the designs which are easy to make. Management could act as a brake on design' (quoted in Mounfield, Unwin and Guy, 1982 p. 114). Perhaps in the past British design has been too well integrated with production which along with the prevalence of copying

has conflated the designer and the pattern cutter. The latter's skill and importance are not to be depreciated but it is important in the first instance to keep these functions separate.

j) Summary

Footwear manufacturers traditionally faced two interrelated problems: first, how to integrate small batch methods most suited to clicking and closing with mass production appropriate to making; and, second, how to combine a variety of models in a coherent production plan which minimised idle factory time in all departments. Strategies ranged from producing 'hand made' high quality shoes in limited volumes for sale at the top end of the market to mass producing standardised footwear. Technological developments favoured automation, though it was not easily combined with the maintenance of quality, and often required long runs of standardised products to be profitable.

Producers in advanced industrial countries who have pursued the mass production strategy have been increasingly threatened by imports from low wage countries. The latest in automated technology has not helped them fend off such competition because it is also available to the low wage competitors in the form of turnkey factories established by international firms and operable by relatively unskilled labour. The collapse of the American industry illustrates the impossibility of remaining competitive in a high wage economy by continuing to mass produce standardised shoes. To survive, European shoe manufacturers must capitalise on their advantages: design capability, skilled workers, and proximity to their markets.

Independent changes in consumers' preferences have led to an increase in the demand for customised, high quality, and design intensive shoes in contrast to mass produced basic models. At the same time the most recent developments in automation, unlike those of ten years ago, do not require long runs of standardised products to be

economical, but are more amenable to the efficient production of small batches.

So a strategy to resist low cost foreign competition has emerged. It involves footwear producers in a more continuous response to changes in style and the production of a larger variety of non-standard shoes, while holding the line on costs and maintaining quality. Consequently it requires production in small batch, facilitated by flexible automation, and at top speed so that inventory costs can be minimised throughout the system. Whereas in the old competition firms competed on the basis of price, today though still important, price is only one dimension of a product's attraction. Design, speed of response and quality are increasingly important.

European footwear industries continue to exhibit distinct national patterns in both firm strategy and industrial structure. The fragmented Italian industry has achieved enormous international success on the basis of strong design and the intensive use of modern equipment in specialised firms which are linked by market and non-market ties to facilitate a flexible response to changes in demand. On the other hand, after a tremendous battering, the British industry seems to be fighting back on the basis of building increased flexibility into it: vertically integrated firms by investing in new equipment particularly management information systems.

What future is there for countries on the periphery of Europe in footwear production? Low wage economies might hope to gain from the relocation of closing if the wage differential is big enough to offset transportation costs and the styles sufficiently classic to survive disassociation from the European market. Closing provides employment for semi-skilled women workers but is a low value added activity. Perhaps once closing is established other phases of shoe production may also be relocated but to the extent that this widens supply lines it tends to involve precisely those standardised items in which other even lower cost producers can be competitive.

The subcontracting of shoe production leaves the indigenous producer dependent on the parent firm and exposes them to the vagaries of head office decisions. In particular, made to order production can always be subcontracted where labour is even cheaper. Workers may be less skilled elsewhere but this can be offset by increased automation. Alternatively producers in the periphery can seek independence by mass producing standard shoes themselves using up-to-date equipment and hoping to be competitive in the low end of the European market or in the COMECON countries.

Finally producers in the periphery can try to follow the Europeans themselves into those segments of their markets that are relatively protected from low-wage competition, though this will involve them in developing their products and processes to compete in terms of design, delivery dates, market response and quality. These moves may not be easy for a country at some distance from the markets which it seeks to serve and with different manufacturing traditions.

As we shall see Cypriot producers are choosing among these courses. All have their risks and none are likely to be easy. But whatever strategy is pursued the Customs Union puts additional pressure on the manufacturers : unless they can compete with their European counterparts they will not only miss export opportunities but they will lose out to imports in the domestic market. Cyprus has a heroic economic history. Overcoming the difficulties and seizing the opportunities of the present requires a continuation of this tradition.

THE FOOTWEAR INDUSTRY IN CYPRUS

a) Importance, History and Market Evolution

In 1985 the Cypriot footwear industry accounted for 3 per cent of manufacturing gross output, 5 per cent of value added in manufacturing, and 7 per cent of manufacturing employment (see table 10). Comparison with data from a recent report suggests that these characteristics of the industry have changed little in the eighties. In the same year 56 per cent of the sector's output was exported, a higher proportion than any other industrial group, and footwear comprised 11 per cent of total manufacturing exports. But as can be seen from Table 11 the trend in the 1980's is for exports as a proportion of footwear production to decline, reflecting the contraction of traditional export markets as described below.

Although the Cypriot footwear industry enjoyed some growth in the 1960's, like much of Cyprus's manufacturing, its most rapid expansion was in the years after 1974. The expansion involved both the growth of existing firms and the founding of new enterprises. Of the nineteen largest firms that we visited 10 were founded in the 1970's, and 9 of these after 1976. Two of the firms which predated 1974 had moved in the 1960s to the south side of the island.

Three particular circumstances combined in the second half of the 1970's to produce a unique historical conjuncture favourable to the footwear industry's growth:

1. a consumer boom in the Gulf states, itself the product of the oil price increase and the enormous flow of revenues to the oil producing countries;

2. a distribution of income in the Gulf states and an inflow of foreign labour into the area, both of which favoured the sale of semi-durables such as footwear;
3. the simultaneous tragic civil war in Lebanon which disabled Lebanese businessmen in the performance of their traditional entrepreneurial and mercantile activities in the region, so making room for new salesmen offering different sources of supply. Many sectors of Cypriot manufacturing gained from these same circumstances, but they had particular long run significance for the footwear industry.

The market for footwear in the Gulf was primarily a market for sandals and not shoes. Catering to this market involved orienting production towards a specific type of footwear with a distinct technology and clear market limitations. Sandal production is less skilled, lower value added, more standardised and more amenable to mass production assembly techniques than is shoe production. It was not just that the sector became oriented to a low quality/low value added end of the market, with the obvious difficulties involved in producing a higher quality variant for sale to more sophisticated consumers. It became specialised in a type of footwear that has a very limited and narrowly seasonal demand elsewhere in the world.

Prior to 1974 the industry had been primarily concerned with the domestic market with some exports primarily within the region. The opportunities in the Gulf not only attracted new entrants to the industry who were from the beginning oriented to exporting sandals, but also persuaded many of the older producers to turn to exports. The whole sector restructured in terms of markets, quality and product types.

Large profits were made in the halcyon days of big oil revenues, but the legacy was not so auspicious. Managing directors of Galides and Ariston both old established companies described the restructuring

within their firms in response to the profitable opportunities in exports to the Arabs. Perhaps, with hindsight, they acknowledged the downgrading of skill and quality which accompanied this switch; a deterioration which both firms are now struggling to reverse. With the decline of oil prices what had been a sellers' market turned rapidly into cut throat competition exacerbated by the increasing presence of salesmen representing low cost Far East producers.

Many Cypriot manufacturers complained that exporters from Cyprus had played a key role in spoiling the Arab markets by competing against each other and by insufficient attention to quality and delivery dates. Encouraged by the low capital intensity and technological simplicity of sandal production, workers were described as founding very small units of production in response to the boom in exports and trying themselves to break into Arab markets when they were incapable of producing sufficient quality or the requisite volumes on time. Further fragmentation followed as these operators attempted to subcontract parts of larger orders with additional adverse effects on quality as responsibility became diffuse. Whether very small scale producers were particularly responsible or not, (other sources suggested that many of the large scale producers who began operation in the late 70's had early problems with quality), damage was done to the reputation of Cypriot producers as a whole. The folk memory of this experience is an important element in the larger manufacturers' hostility to very small production units and the enthusiasm of some of them for quality control.

Many manufacturers agreed that easy sales in the Gulf did nothing to promote improvements in marketing, which remained rather primitive. Personal contracts and biannual visits did not stand up well in the vigorous competition of the 1980's. Many entrepreneurs spoke bitterly about customers of long standing who turned to cheaper suppliers when the oil price fell. Producers have learned that markets have no loyalty but their confidence in their ability to market has been undermined. They also, know that their experiences in the Arab market, edifying though they might be, are not very relevant to the design of a marketing strategy for Europe.

Amateurish marketing is not restricted to the footwear sector. One manufacturer who produced travel goods, an industry with a very different pattern of development, exports 80 per cent of his output to the UK, but has a similar attitude to marketing, relying on personal relationships and family contacts.

Exporters also spoke with hostility about other Cypriot exporters whom they felt had competed unfairly in the Arab market; stolen order books, or enticed customers away by undercutting. However naive these complaints, they represent exacerbated tension and hostility between producers, the logical consequence of competition in a declining market and a significant obstacle to cooperative action in the future.

Many manufacturers also agreed that the superprofits of this period were not always ploughed back into improved technology. Again the undemanding nature of the Arab market ironically had long run adverse effects not perhaps so much on the amount of investment taking place, which was encouraged by generous investment and depreciation allowances, but on its form. Manufacturers, producing large orders of relatively standardised and uncomplicated sandals, sought competitive advantage in spreading overheads over long runs and increasing competition by the subdivision of tasks in a fragmented assembly line operation. Investments were geared towards automating and deskilling the production process. Their particular forms may not be very conducive to the flexibility that Cypriot manufacturers may need in the future. When competition in the Gulf intensified manufacturers sought to maintain their sales by adding ornate stitching and patterns to the sandal uppers. The advent of microprocessor controlled profile stitching makes replication of complicated patterns cheap and relatively unskilled.

The decline of the middle eastern markets in the 1980's suggested the need to reorient production and look for new customers. By and large this also means producing shoes not sandals: practically different commodities. Some Cypriot producers will not be able to make this

transition. Others may not want to make it, confident that they can survive in the increasingly competitive market for Arabian sandals. Economic recovery in the Middle East is not improbable and even in the relatively depressed 1980's Arab countries continued to import on a significant scale (see table 12). Cyprus cannot afford to neglect a market in which they have distinct logistic advantages. The difficulty is in the nature of the export which can too readily be mass produced in the Far East. Significantly one manufacturer claimed to have invested \$1.5m in 1986 in machinery and robotics in a highly automated factory producing casual shoes for export. Although he intends to operate the plant it was clear that the more important objective was to establish a technological showpiece on the basis of which he hoped to export turnkey factories.

Some producers have already risen to the challenge, witness the changing structure of Cypriot shoe production as shown in table 13. The contribution of sandals to the value of total production has clearly declined from 1982 onwards. In contrast the share of leather uppers has risen consistently since 1982 with the proportion of other footwear types constant.

Who is buying Cypriot footwear today? First although exports in absolute terms appear stagnant or even declining and as a percentage of output are clearly trending down (see table 11) more than half of output is still sold overseas. Table 14 shows the destinations of footwear exports from 1982. Despite the restructuring of output, exports still go overwhelmingly to the Arab countries which between January and August 1986, for example, took 78.8 per cent representing a larger share of total output than was sold on the domestic market. The weight of exports to the Arab countries has been approximately constant in the eighties, and although predicted to decline in the longer term, it will remain a major component of demand through 1990: 36.6 per cent compared with 41.8 per cent for domestic demand according to I.T.A. estimates (Siekkeris, 1986).

As good pragmatists Cypriot manufacturers are manoeuvring within their traditional markets rather than abandoning them completely. Although exports to Arab countries are not broken down by national destination, it seems that there has been a retreat from Libya, which was an important customer but whose economic decline is chronic, a retreat hastened by difficulties in securing payment for despatched goods. Saudi Arabia, the magnet for Cypriot producers in the past, remains an important market: indeed Saudi could absorb more than five times Cyprus's total exports even at current levels of demand. Although Cyprus undoubtedly supplies a bigger share of footwear imports than of other commodities, even assuming that Saudi took all of Cypriot exports to the region, they could only have comprised some 14 per cent of shoe imports in recent years. Given the geographical advantage that Cyprus enjoys here there must be scope for an expanded market share. There are also opportunities in some of the smaller regional economies, such as Jordan, which have experienced steady growth in demand for footwear.

The persistence of exports to the Arab countries in the context of a restructured output suggests that exporters are manoeuvring on a second level: selling shoes in markets that were traditionally for sandals. Firm level information confirmed that increasing the quality and value added of exports was a conscious strategy for many manufacturers, who saw it as the only possible response to lower cost competing products in their traditional ranges.

The manufacturers are clearly groping towards a strategy which our analysis of the footwear industry internationally also pinpoints. The regional market cannot be neglected; indeed there is scope for its development. But it should be a selective development with reference to Cyprus's dynamic not static comparative advantages. The producers should identify niches within the regional market which can afford them some relative protection from competition. Better quality and high fashion, with Cyprus relaying European style to the area, may be a more viable long run competitive strategy than increasingly ornate stitching on traditional products.

The second biggest export market is Russia where 119,000 pairs of shoes with a value of £C1,533,000 were sold in 1985 (9.2% of total exports). Cyprus also exports to Czechoslovakia and Bulgaria. Trade with the Eastern block is organised through trading companies, one at least of which has been in operation for some twenty years. With the weakening of more traditional market in the region, exporters to the USSR and Eastern Europe have represented a valuable addition to the order books of many producers several of whom have specialised in producing fashion boots and shoes for this market. One major firm which exports 50 per cent of output in the last couple of years has exported half of this to the USSR; another similar company which exports 95 per cent of its output described itself as becoming increasingly dependent on Russian orders which it has been making for the last four years and without which it could not survive. During our factory visits we met several managers who were anxiously awaiting the response to samples sent to Russia. Russian orders are particularly attractive to Cypriot manufacturers because of their size, which one manufacturer said was 20-30 thousand pairs on average in recent years and had been as large as 60 thousand pairs four years ago. The same manufacturer gave 25-50 pairs as the average size order for the domestic market. Large orders facilitate long runs of the same model which the manufacturers see as the key to spreading overheads and so cutting costs.

The COMECON market is not without its drawbacks. First, like the Arab market it has promoted a rigid specialisation in specific products and processes. The orders are primarily for ladies' fashion boots and involve the development of models which do not transfer readily to the domestic market both because Cyprus's climate limits the demand for winter footwear and because Russian boots frequently incorporate heavy non-slip and waterproof soles. Firms may well be able to capitalise on their experience selling to Russia and Eastern Europe in the Scandinavian and Northern European markets where market research suggests there are opportunities for Cypriot producers (GOPA, 1982).

Second, producing for the Russians involves the firms in designing for a particular market. They do not merely make to order as with some other European customers. After some preliminary discussion with agents representing the buyers, they have to produce samples, which are then sent to Russia as a basis for the orders. Samples are expensive. One manufacturer held that each sample cost £C100, and that he produced 300 per season. Of course, samples are needed to develop exports but this case seems particularly sample intensive because of bureaucratized and formalised communication and the distance and singularity of the market.

Third, the Russians have proved very demanding about quality. They employ their own specialists to visit Cypriot factories and check quality before shipment. There have been problems in the past when goods were returned and compensation and penalties for delay had to be paid. In the longer run these difficulties may well have positive implications for the industry if they force improvement in quality and the institutionalisation of quality control within the firms themselves.

Finally, trade with the Eastern block is bilaterally and bureaucratically determined. Every five years the Ministry of Commerce and Industry and the Eastern bloc representatives draw up lists of goods which can be exported to Russia. Trade in those goods is then organised by several trading companies one of which has been in existence for 20 years. The problem is that the value of Cypriot exports cannot exceed the value of Russian imports into Cyprus. Trade is bilaterally balanced. Consequently anything which erodes Russian and Eastern European imports into Cyprus must cut the opportunities for Cypriot exporters. After the Customs Union if European goods displace COMECON imports it will reduce trade with the Eastern bloc. We were assured by the representatives of an involved trading company that the prospects for Cypriot shoes in Russia were excellent. But even without the threat of the Customs Union, the market is insecure. The list of acceptable goods may change or the total volume shrink suddenly as a result of a political shift within Russia or Eastern Europe. Wine for instance was recently removed

from the list of acceptable goods causing difficulties to Cypriot producers who had geared up for Russian exports.

The UK, Cyprus's biggest customer in Europe, took some 90,000 pairs of shoes in 1985 valued at £773,000 (4.4% of total exports). The small proportion of total exports going to Europe (see table 14) suggests how much manufacturers will have to do to break into this market.

Firms which have links with international manufacturers are relieved of some of the burdens of marketing. Bata in Cyprus, receives marketing assistance from the company, and, although prevented from selling in certain markets so as not to compete with other Bata units, is allowed a free hand in other areas. At the time of our visit the production manager was working on a model obviously intended for the American market which had previously been made in France but production of which was being shifted to Cyprus, and which the firm had no responsibility to market but would simply ship back to the USA. At Atlas the marketing is largely done by Clarks International with 35 per cent of their output being destined for the Far East. Recently the firm has done some of its own marketing but this did not involve Clarks branded goods, Alfa who produce for Ecco of Denmark under a licensing agreement, send part of their output back to Europe where it is re-exported to Canada, the Far East, Czechoslovakia and Bulgaria. Alfa do handle their own sales of Ecco in certain markets viz. Cyprus, Africa, Arabia, and the Eastern Block, but even here they also get help from head office.

Many manufacturers felt that assistance with marketing was one of the primary benefits that a firm obtained from an agreement with a multinational. Several also expressed the view that such help was a necessary condition for exports to Europe. It is clear that small firms like those in Cyprus cannot individually shoulder the costs of large marketing establishments. Some combination of collective activity and state assistance is needed. Sector level initiatives from the newly established Export Promotion Council will be important

in the latter category. There are institutions and practices already in place in Cyprus that can help to promote the cooperation and joint ventures also needed: namely the Employers' Federation and the Chamber of Commerce, and subcontracting and family ties between firms. Unfortunately increased competition, at home and abroad, has generated hostilities between firms which are not conducive to cooperation. Breaking down these antagonisms and building on the positive features of relations between the firms must receive top priority.

For many manufacturers in the eighties the immediate solution to the need for new customers was to turn to the domestic market. Several manufacturers described a conscious decision to move away from exports to the Gulf and concentrate on the home market. Significantly, these were often the older established manufacturers who had had earlier experience of the domestic and non-Arab market and who were best able to make the switch back. One such firm's output has evolved from 80 per cent export/20 per cent domestic market in the late 1970's to the complete reverse: 20 per cent export/80 per cent domestic market by 1980. Turning inwards in this way has often been accompanied by specialisation, for example in ladies' fashion shoes. There has also sometimes been a more sophisticated approach to the product differentiating the line, producing for specific market segments and signalling this by different trade names. Ariston's development of their relatively up-market Roma line is a good example of such a move.

But the industry's capacity is developed well beyond the needs of the 600,000 plus residents of Cyprus despite their apparent consumption of rather more shoes per capita than their per capita income might warrant (see table 1). The 900,000 or so tourists who visit Cyprus every year provide a vital boost to demand contributing to the surprisingly high domestic consumption. Several producers of high fashion ladies' shoes, marketed through their own outlets, held that some 20-30 per cent of domestic sales were to tourists. If these disguised exports are counted the industry's contribution to the balance of payments is even more significant.

The manufacturers' estimates suggest that in recent years some 250,000 pairs of shoes and sandals are purchased annually by visitors to the island: implying that 28 per cent of tourists buy footwear while in Cyprus. Although this is a good record, there is room for improvement. Advertising footwear as a Cypriot 'speciality and a tourist's bargain could boost sales. Sandals, though not the models developed for the Arab market, could be especially attractive in the seaside areas. If every tourist left with at least one pair of shoes this would represent an 8 per cent boost to total demand as well as familiarising consumers in Europe with Cypriot products.

Current marketing methods within Cyprus do nothing to develop sales to tourists. With one notable exception (rewarded by an increasing market share) shoe shops are cluttered, disorganised and uncomfortable. Window dressing and displays are old fashioned and incoherent. Presentation needs to be more modern emphasising a single theme, colour or mood. At the moment the archaic presentation obscures the fashion consciousness of the products. Retailers could also follow Europe in presenting shoes as an integral part of a look and so combining the presentation of clothing and footwear. Projecting this idea backwards producers could benefit from relating shoe design to fashion trends in clothing. Footwear manufacturers must study advanced clothing fashion more seriously because new silhouettes, balance of proportions and lead colours are all relevant to shoe design.

Footwear imports for home consumption increased from £721682 in 1980 to £1,497171 in 1983 only to drop back by 1985 to £1,264772. For the period 1980-5 it is estimated that for every 15 pairs of shoes exported from Cyprus one pair was imported and one pair out of every six pairs sold on the domestic market is imported. (Siekkeris, 1986). This represents a considerable growth in import penetration from the early seventies and although the trend in the eighties has been stable and between 1984 and 1985 even declining the share of imported shoes does not take account of the substantial purchases by Cypriots when abroad.

The increasing frequency with which Cypriots are holidaying abroad and the increased numbers studying overseas suggest that opportunities to buy while overseas and so avoid the import duties have increased. The substitution of disguised for recorded imports may well explain the trend rather than a stabilisation of import penetration. Assisted by 'xenomania' imports already jump high tariff barriers to represent 16 per cent of the final consumption (Siekkeris, 1986), and with entry to the Customs Union this could increase dramatically. There is no room for complacency about Cypriot competitiveness in the home market.

The intensification of competition in the domestic market is reflected in the increasing frequency of sales, the introduction of in-season mark-downs, and, most important, the development of retail outlets. Manufacturers are desperate to develop their access to customers. It is an obvious strategy to minimise the impact of imports by selling shoes. If you cannot beat the importers then you can get a slice of their revenues. Moreover, retailers' margins seem attractive compared with manufacturers' profit. Many manufacturers have owned retail outlets for years but are now realising their new importance. Of the nineteen firms visited nine had direct access to the retail market, and several of those that do not are interested in acquiring space. At least five had more than three shops, two were in the process of developing new shops, and another two were expanding their factory outlets. One manufacturer, who had in the past operated 23 shops, spoke with regret about how he had run down that side of his business. The manufacturers are also anxious to augment and expand existing outlets in Limassol and Larnaca.

Increased competition in the home market has also contributed to intensified tension among manufacturers who might have considered each other allies in the joint conquest of some export market. The confidence of the industry in 1987, and in particular the feelings among manufacturers, are not auspicious for the development of the joint endeavours and activities necessary if small producers in a tiny island economy are to make any inroad into the European market. In this sense the timing of the entry into the Customs Union is far

from optimal. The footwear manufacturers have already been battered by their experiences in the Middle Eastern markets and are increasingly suspicious and afraid of each other on the home front.

The manufacturers are acutely conscious of the need to upgrade and improve their products if they are to enter the European market or indeed compete with European, particularly Italian and Portuguese, imports for domestic demand. The sandals that have been their traditional export are nonstarters here, and the shoes produced for domestic consumption are often unsuitable in design and fitting for the European market. The adverse legacy of the good years in the Gulf is widely acknowledged, and there are signs that the industry is struggling to restructure. But unfortunately a clear analysis of the historical process that brought the industry to this difficult pass may not necessarily guarantee solutions.

b) Structure

How does the structure of the industry, and particularly the size of production units, compare with footwear manufacturing elsewhere? Although we do not have a sufficiently long time series to trace the fragmentation which allegedly happened in the late 1970's data for 1985 certainly depicts an industry containing some very small firms employing less than 4 people but also some relatively large ones (see table 15). The largest 8 firms employ more people than the next largest 27 firms. 13 firms have over 50 workers. These 13 firms represent 8 per cent of the total number of firms in the sector but employ 49 per cent of the workers and produce 48 per cent of gross output. In comparison in manufacturing as a whole, firms with over 50 workers comprise 2 per cent of firms but these firms absorb 37 per cent of employment and produce 49 per cent of gross output.

At the other end of the scale 74 firms employ less than 4 workers, comprising 44 per cent of firms but producing 3 per cent of gross output and generating 5 per cent of employment. In manufacturing as

a whole these very small firms comprise 76 per cent of all firms producing 13 per cent of output and providing 19 per cent of manufacturing employment.

Footwear has more large firms and proportionally fewer very small firms than Cypriot manufacturing generally. Interviews with both the larger manufacturers and the small operators linked the growth of the latter to subcontracting, particularly of closing, which constitutes the traditional bottleneck when a firm is operating at full capacity. We visited, in the 'dead season' when both the domestic and export markets were particularly quiet. Many of the small workshops were unable to get any work as the manufacturers to keep their own factories open had centralised production.

In comparison with European footwear industries Cypriot production units are small but not unduly so (see table 15). The average size of firm and the number of very small firms is particularly comparable with the Italian industrial structure, with production radically disintegrated rather than highly integrated as in the UK: a point underlined by the frequency of subcontracting in Cyprus. According to the ITA's survey some 94 per cent of all firms in Nicosia were engaged in subcontracting relations with other firms (Siekkeris, 1986).

It would be premature to associate this similarity in the structures of the Italian and Cypriot industries with a convergence in production strategies. Indeed we have already suggested that subcontracting in Cyprus has developed as a buffer to cope with variation in demand rather than as an organisational form facilitating flexible specialisation. However this brief comparison does suggest that it would be wrong to predict an uncompetitive performance or a lack of potential for the future from the size distribution and average scale of Cypriot industry. The industry's structure compares not unfavourably with certain European success stories, particularly given that in high income countries market developments favour small and medium sized businesses with even huge

retailers like the British Shoe Corporation looking for small volumes on many lines and so willing to work with small factories.

Of course, even the biggest Cypriot firms would be unable to deal with orders from say, Marks and Spencer, which stocks a few models that are expected to enjoy volume sales. But remember that one of the larger producers had met orders from Russia for 60,000 pairs of boots. Pooling among firms could facilitate the fulfillment of orders which are beyond the scope of single firms.

Whether or not the firms would be willing to take orders that absorb a substantial share of their annual capacity is another question. Several manufacturers expressed reservations about becoming too involved. One producer of 765 pairs of ladies' high fashion shoes per week felt that he could not accommodate export orders because they would take up too large a chunk of factory time: he could not program them in. Other producers expressed anxiety about the undermining of their independence. One manufacturer claimed to have been originally contacted by Clarks when they were considering a joint venture with a Cypriot producer. He rejected the approaches at the time because he wanted to maintain his firm as an independent entity for his children to inherit.

Another producer of shoe components was supplying 60 per cent of his output to Atlas when they required a change in materials to reduce the hydrolysis of their soles in tropical climates. Afraid of the real difficulties involved in making the change, and aware that his other customers would not want to pay the higher price of the improved soles as their performance in hot humid climates was of less interest, the manufacturer saw that his choice was to become wholly dependent on Atlas or to stand back from the relationship. He declined to make the switch and Atlas now source overseas.

Loss of independence emerges as the cost of displacing responsibility for marketing onto a multinational collaborator. Once the

multinational handles sales the firm loses its lifeline to the market and making only to order becomes vulnerable to head office decisions to relocate production. Ironically during our Bata visit the production manager was busy planning in the production of loafers for the American market which had previously been made by Bata at Marsailles but had been shifted to Nicosia because of rising labour costs and other production difficulties in France.

The proud autonomy of the Cypriot family firms rules out their integration into a 'Marks and Spencers Model' of the retailer/supplier relationship with guaranteed orders for the producers but at the cost of significant dependence on the retailer. The firms' perhaps cogent desire to remain independent, in conjunction with the fragmentation of the industry, in comparison with distribution networks, means that cooperation and collective action in marketing are essential. The experience of the Italian industry which is also vertically disintegrated and, at the firm level, small scale, suggests that cooperation and collective action in marketing is feasible.

The footwear sector contains one public company in which the Cyprus Development Bank is an important shareholder. The other firms are almost invariably private companies whose shares are held within particular families. Family labour was also prevalent in the small workshops. As has already been implied, the dominance of the family firm is an essential ingredient in the dynamics and response of the industry.

Like their British counterparts Cypriot manufacturers often produce both MTO and own brand footwear, although some producers emphasise the former and some the latter. Again as in Britain, manufacturers like producing their own brands because it gives them some room to manoeuvre on price and quality. But these degrees of freedom may be eroded if the producers are dependent on traders or other manufacturers for access to the retail market. It is usually manufacturers with their own shops or factory stores who produce

primarily own brand, but even small firms which sell through independent retailers and other manufacturer. if they have a name on the local market, for example Afthaston, produce their own label shoes. Some manufacturers/distributors put out orders and add their own brand before sale.

Exports to the COMECON countries and Arabia are primarily of branded shoes but other exports are invariably MTO. Manufacturers like MTO because it alleviates them of some of the burdens of design and product development where Cypriot producers are weak. Not all responsibility is shed. They may still consult with the customers and be required to take the initiative and produce samples as with the Russian market. Again like their British counterparts the manufacturers show more initiative when times are hard and they need orders.

Manufacturers mix own brand and MTO in production in order to minimise idle time. When we visited in the 'dead' season, when a downturn in the domestic market had coincided with export difficulties, no factories were running at full capacity and many were entirely closed or operating only with a core labour force to produce next season's models. In these circumstances several firms were producing own brand for stock. The extent to which this is profitable is limited as the trick with own brand production is to minimise obsolete stock and yet have fast moving models available. It is only worthwhile to produce goods that are in demand. There is evidence that Cypriot producers of own brand use this tactic excessively and carry too much stock. Good decision making here requires rapid and accurate flows of information between retail outlets and the factory.

Manufacturers' combinations of own brand and MTO often represent an attempt to diversify over and above the search for decreased responsibility with continued independence described above. Several manufacturers identified segments of the market in which there was unexploited potential or where they could compete on the basis of

existing expertise within the firm. In one case a manufacturer was producing a standardised component, a polyester sole. He relied on volume sales to make an acceptable rate of return on his capital as the margin on the selling price of the p.u. unit was only 3%. He developed an import substitute for Dr. Scholl's orthopaedic sandals with which he felt he could be competitive in the domestic market, not only because of the tariff but also because the European firm had overpriced their product and limited its distribution to pharmacies, a deliberate market strategy which had paid off elsewhere but which did not work in Cyprus. The product was a useful second line because it utilised his particular specialised machinery (injection moulding equipment) and his expertise (in the properties of artificial soling materials). The sandal does not have huge sales but the profit margin on the selling price is 18%. Moreover it is an item which can be attractive to tourists and so the producer is not entirely dependent on the home market.

Another manufacturer has also added a specialist product outside the usual range to minimise idle factory time. Here the normal production is of high fashion ladies' shoes for the home market, the producer having deliberately turned away from exports to the Arabs. In the dead season he produces an orthopaedic shoe to order for a West German firm which provides both materials and design, and markets the shoe itself. Production is problematic because the firm's machinery is not ideal for producing such a heavy shoe, nevertheless the order fills a gap in the yearly schedule.

A third firm, which again produces high fashion ladies shoes has enjoyed some success by differentiating its output and distinguishing the products according to the market segments targetted. In particular it has enjoyed good sales of its more expensive up market shoes which now have their own brand name and market image. These examples of felicitous moves show the importance of charting the segments of the market and identifying profitable niches.

Footwear firms, like most manufacturing enterprises in Cyprus, are usually located on industrial estates within the metropolitan areas. The geographical distribution of the firms could provide the basis for the development of industrial districts. The proximity of footwear units and other firms, which might have labour or technological difficulties in common, also suggests that some shared solutions may be logistically feasible.

c) Investment and Profitability

Recent trends in both investment and profitability clearly relate to the adverse experience of the industry in its traditional export markets and the intensifying competition on the home front.

In 1985 net expenditure on fixed assets constituted 4.3 per cent of the industry's gross output or 10.1 per cent of value added. Comparison with earlier figures and time series for the aggregated category of Textiles, Wearing Apparel and Leather, suggest that there has been a decline since the early eighties. This accords with the evidence from the firm visits.

The impression of a footwear technical expert resident in Cyprus in January was that the average quality of the equipment in Cypriot factories compares favourably with Britain or Australia. Most firms had some older equipment, but in all firms there was evidence of considerable investment in the late 1970's. Just about all managers could indicate some piece of machinery bought in the last five years. Sewing machines in particular were usually relatively new and up to date. The problems were twofold: first, that the investment had not always turned out to be the most appropriate particularly as production has been restructured as described above; and second, that there was a generalised feeling that investments, which would at the current time help firms cope with changed circumstances and respond to newly perceived opportunities, could not, given the squeeze on profits, be afforded.

With respect to the first point, several smaller firms claimed that they had received bad advice from equipment suppliers and had made poor decisions with respect to major investments which were then albatrosses around the necks of the enterprises. It was claimed that these investments were unsuited even for the purposes for which they were intended at the time of purchase. More frequently, even large firms felt that they had made bad decisions by buying specialised equipment which required long runs to be profitable and which became decreasingly relevant with the fall off in Arab demand, reduced size of Russian orders and small batch production for the home market. There is a lesson to be learned here and one which is underlined by the argument that flexible small batch production may also be key to the European market.

As regards the second point, although the majority of firms claimed to have a good relationship with their bank and several seemed not to regard finance as a problem, there was a significant number of firms which had experienced difficulties obtaining finance for new schemes which they argued were needed if their firm was to innovate products and restructure away from declining markets: for example, one firm wanted to substitute high quality hand made men's shoes for sandals for export to the Gulf, another wanted to develop an already identified niche market. In both cases the firms had a record of modest success documented in their balance sheets and had produced feasibility studies.

The difficulty was not absolute but managers of the firm were resentful that they had to shoulder all the risks of innovation providing collateral security to the banks. The resentment was exacerbated by the memories that in the good times loans had been easily come by and banks anxious to lend to footwear firms, whereas now when the industry needs help restructuring banks are reluctant to get involved. As one small scale producer put it 'Banks are always willing to give you an umbrella when it is not raining, but when the downpour comes then you are on your own'. Given the disproportionate contribution of the industry to exports, there is a case for priority finance to help restructuring towards niche export markets.

Direct evidence on profitability was hard to get from the firms or their accounts. However, trends in gross output minus value added, labour costs, depreciation and interest payments, suggest that the rate of profit on sales fell from around 7.9 per cent in 1980 to 6.9 per cent in 1984. Other fragmentary evidence also suggests that the industry's difficulties have squeezed profits. Although sales have been maintained manufacturers argued that the combination of increased costs and weak markets had eroded profit margins. Several producers claimed that when they fixed their selling prices they tried to cover their overheads but in recent years had been forced to forgo their profit margins. Certainly if production values are deflated by the price index of leather and fur products as a proxy for costs the last few years show a decline. The decline in exports as a proportion of output (see table 11) also implies a profits squeeze as profit margins on exports, in the past at least, exceeded those on domestic sales. One manufacturer argued that if domestic sales were made via a wholesaler there was no room for manufacturers' profit. Manufacturers gave some indication of their margins, which varied with the value added, of course, but ranged from 3½ per cent on soles, to between 4-12 per cent on sandals, to 10-25 per cent on shoes. These seem to be towards the bottom end of profit: sales ratios in Cypriot manufacturing.

The difference between the manufacturers' and retailers' profit margin was substantial: the latter described by several manufacturers/distributors as between 30 per cent and 40 per cent. Expanded distributors' profits may be contributing to the squeeze on manufacturers.

In short most manufacturers attested to a decline in profits in recent years and were not slow to link this to their difficulties in re-equipping to meet the new demands placed upon them.

(d) Competitivity

Price Competitivity

The key, perhaps exclusive, ingredient in the old competition was price. Assessment of competitiveness then involves a comparison of wage costs adjusted for productivity. Cypriot wage costs are clearly lower than in Western Europe. Cypriot labour productivity is also lower though it varies with the capital intensity of production. Taking a crude but internationally tractable measure of productivity, production in pairs per person year, Cyprus lags behind Italy but is actually ahead of the UK (see table 14). But given the higher proportions of sandals and similar proportions of leather uppers in Cypriot production this lead does not survive translation into value terms, as suggested by the estimates of output per worker in ECU's which show Cyprus lagging behind both the UK and Italy (see table 15). British productivity is approximately 40 per cent higher and probably more given the gains in recent years. Some of this differential is offset by the approximately 46 per cent higher British wage (see table 14) but improvements in relative productivity are clearly imperative.

Independent evidence suggests that given its quality Cypriot footwear is not price competitive in European terms (Incubon, 1986): so strategies to reduce costs cannot be neglected.

The new competition emphasises other dimensions of competitiveness: quality, response time and design. Can Cypriot footwear producers build on these new aspects of consumer demand while simultaneously reducing costs and improving price competitiveness? JIT manufacturing philosophy suggests ways in which costs can be cut and simultaneously the other aspects of competitiveness improved without requiring mass production and low cost labour. Can Cypriot producers profitably adopt the philosophy. Finally how can the developments in

footwear technology enumerated above help in the particular circumstances of Cyprus.

Labour and Competitvity

As suggested above Cypriot relative labour productivity in footwear is sufficiently low as to offset most if not all of the wage differential. One obvious way of raising productivity is via investment. But capital intensity in the Cypriot context has generally involved automation without flexibility and the mass production of standard footwear. The three most capital intensive firms, according to information provided during our firm visits, not surprisingly have the highest output per worker (see table 16) but they also have low value added as a share of output. All three firms continue to emphasize the production of sandals and relatively cheap shoes for export to the arab countries. One of the firms which has become a model of automated production, is operated to promote the sale of turnkey production units throughout the world. The drawbacks of this strategy are first market limitations of producing a relatively simple product for a market that is open to Far East manufactureres with whom they cannot compete in terms of wage costs; and second the difficulties and expense involved in making the investments. Wisely manufacturers today are wary of investing in equipment that locks them into specific products and processes.

Worker attachment and skill levels also affect labour productivity particularly in the context of JIT. Several footwear manufacturers complained that the instability of the labour force disrupted production and reduced productivity. The average number of days lost per operative was lower in 1985 than the manufacturing average (3 compared with 5) as was the average number of days worked per enterprise which appears to be directly correlated. Quits may be more of a problem than irregular working and as high turnover discourages investment in training, it is important to reduce the quit rate. It was noticable that those firms where high turnover was allegedly a problem were often in older buildings where the canteen

and toilet facilities were poor. Relatively small investments in workers' facilities may pay handsomely. Given the concentration of manufacturing establishments on industrial estates perhaps some of these facilities can be shared.

Firms which classified more of their workers as skilled and semi-skilled often had higher labour productivity than other firms operating in the same segment of the market. The externalities involved in training create a prima facie case for government provision. Centralisation of training makes it worthwhile to invest in some of the most up to date training equipment described above.

The Higher Technical Institute at the current time provides no service course explicitly for footwear yet the industry could absorb some 40 graduates from vocational training per year. A course organised at the HTI could draw on the technical and personnel resources of the Leather and Footwear Testing Unit.

The Industrial Training Authority also operates schemes which are designed to raise the skill of the workforce, several of which are relevant to footwear. Their Management/Vocational Training Scheme does not have any action learning component and the only vocational training is through the Cyprus Productivity Centre whose vocational expert has wider responsibilities and cannot therefore specialise on footwear training. Another more relevant scheme encourages in house training only under the guidance and supervision of the ITA. In the case of an unskilled worker 100 per cent of the trainee's wage is paid by the ITA during the apprenticeship which lasts from 3-14 weeks. If the trainee is skilled the subsidy falls to 75 per cent. These sums and an additional small subsidy to cover the materials and supervisor's time are paid directly to the firm. The ITA is now directly training people to train within the firms. The scheme has the advantage of providing practical training on the job but is clearly open to abuse if employers substitute subsidised trainees for ordinary workers. The ITA tries to check this first by requiring the usual employment contract to stand, hence the payment of the subsidy

to the firm which continues to pay the trainee, and by trying to verify that there is a genuine permanent employment need. They also monitor the ratio of trainees to employees and can punish an organisation that they suspect of abuse by refusing further cooperation. The scheme has been widely used by footwear firms with only a couple of cases where use was not optimal and then perhaps more from disorganisation than intent.

The ITA has also subsidised employee training abroad. The latter has to be very specific to qualify for support and has only been used in the footwear and leather sector a couple of times. A leather clothing producer told us that he had applied for a grant to send his British trained designer daughter to Israel on a practical course which dealt with the integration of design and pattern cutting: a perennial problem in the industry. But the grant was denied because the description of the training schedule was insufficiently detailed.

The ITA has also brought specialists into Cyprus from abroad, their most recent venture being with an Italian designer who ran two courses one training in design from scratch the other an upgrading course. The officers of the ITA felt that the usefulness of the course had been eroded by the manufacturers selecting family members to attend the course rather than picking people according to their design capability. The deeper problem here is that the firms are staffed by family members regardless of their capability. The manufacturers complained that the timing of the courses was inconvenient and that the designer himself was either incompetent or unable to communicate.

The ITA also operate a very interesting scheme which tries to place unemployed graduates in firms where they receive vocational training as management trainees. During their training their salaries are subsidised on a sliding scale by the ITA with the subsidy declining over time as the trainee presumably becomes more useful to the firm. The salary scales are determined by the ITA. The graduate has to produce a report which describes the firm and its problems. About

100 people per year are placed on this scheme, but only 5 shoe firms have been involved and these not always successfully. The footwear sector is more dominated by family firms than other parts of Cypriot manufacturing and it is hard to integrate outsiders into these organisations, particularly in management positions. These problems undoubtedly contribute to weaknesses in management more generally.

One problem which came up many times in the interviews was the dependence of manufacturers on a few key employees whom they had trained to do specific jobs. If one such worker was absent, or worse still poached away from the firm by a rival manufacturer, production was jeopardised. The rigidity of the division of labour and the specialist nature of training, makes the firms vulnerable to disruption by absenteeism or labour turnover. Worker loyalty is thus something to be cherished and this reinforces our earlier suggestion that money spent on upgrading workers' facilities is far from wasted. It also suggests that employers should reconsider their training strategies and emphasise more multiskilling. The latter is also implied by the short response time and flexibility increasingly required in footwear. Significantly smaller firms have more multiskilled employees able to move around the factory from job to job as the need arises. Multiskilling requires good labour relations within the firm otherwise it is difficult for the employer to make the investment, but multiskilling may also help labour relations broadening the content of shopfloor jobs and relieving the monotony of very specialised tasks.

The majority of workers in footwear are women whose turnover rates are affected by their domestic responsibilities. On average about 60 - 70 per cent of the labour force is female with little variation among the firms (see also Siekkeris, 1986). In the closing department where the traditional bottlenecks occur the labour force is 100 per cent women. Footwear operatives are also rather young, some third of all workers in 1986 being aged 20 to 29. Younger workers usually have less job commitment. Both characteristics of employees contribute to the relatively low wages paid though cause and effect are hard to disentangle. Wages are 92 per cent of the

average in manufacturing (see table 16) but 27 per cent higher than in Textile, Wearing Apparel and Leather with which footwear is particularly competitive for labour.

Manufacturers have responded to the geographical immobility of women workers and their difficulties with domestic responsibilities by subcontracting closing to smaller scale workshops in the villages and to domestic labour. When the pressure of demand is high perhaps 25 per cent of closing is subcontracted. The union has defended its existing agreements by insisting that workers in the countryside work under the same terms and conditions as the main workforce thus the diffusion of production probably benefits women who otherwise would not be able to work. One employer outside Nicosia who uses labour from the villages has a non-union labour force. He operates a deliberately paternalistic employment policy to keep the union out and substitutes non-pecuniary benefits, for example subsidised health care, for wages. Although the average wage in his firm is lower than comparable enterprises, the smallness of Cyprus and the generally tight labour market mean that his terms and conditions cannot stray far away from those in the unionised sector. The high level of unionisation and relatively full employment prevent the vertical disintegration of production from operating to the chronic disadvantage of the workers. Conditions in Cyprus thus partly replicate those in the Third Italy where the fragmentation of production accompanied rapid economic growth and was, in general, not disadvantageous to labour. (Brusco, 1983).

Surprisingly, the development of childcare provision, as a way to reduce the difficulties women workers face and attract and retain good workers, has received no attention in Cyprus. Close family networks provide a substitute for formalised childcare but with increased mobility this will become harder to organise and the need for other provision acute. The collection of manufacturing plants on designated industrial parks facilitates the development of efficient

lective child care facilities serving all women workers on a particular industrial estate.

Although average wages in footwear compare favourably with those in the Textile, Wearing Apparel and Leather sector with which it is directly competitive for labour, conditions in the latter are thought to be superior. Several manufacturers complained that they were losing labour to the garments industry and particularly that women preferred the latter because it was cleaner.

In some sectors, such as hotel and restaurant, both conditions and pay are superior. Improvements in the conditions, and particularly the cleanliness, of some of the factories, is desirable. The manufacturers can substitute nonpecuniary benefits for wages to attract labour but the relative remuneration of operatives must make it difficult to attract and retain high quality labour.

In a sector where labour costs represents some 25 per cent of total costs, more than in manufacturing as a whole, manufacturers are particularly reluctant to contemplate a wage increase which they cannot see as immediately linked to higher productivity. It is important then to note that for a subset of nine firms, producing the same kind of products with similar techniques, the correlation between average wages and output per worker was .62. The correlation between average wages and value-added per worker was even more strongly positive (.75). Paying higher wages alone will not raise productivity but using better pay to attract and retain better quality workers certainly has important effects.

The impact of the relatively poor pay affects the quality of personnel beyond the shop floor. In one firm that we visited the production manager was a graduate of the Mediterranean Institute of Management and had initially been funded by the ITA. He had originally studied hotel management and economics in Yugoslavia but when he married in 1979 because of the shift work involved in the

hotel industry he decided to change jobs: hence the MIM course. By 1987 however his salary as a production manager of a shoe factory employing some 40 people was less than he was earning in 1979 when he left the hotel industry. He believed that this experience extended to all levels of employment. Given the better conditions and the perks involved in working in the hotel sector why would people in tourist areas like Limassol work in a footwear factory? Our impression was that the educational level of the employees in footwear is lower than say hotel services and it seems that people work in the former because they cannot get anything else.

Cyprus has a lower ratio of production workers than Italy but higher than the UK and so does not seem dramatically out of line in terms of overhead labour (see table 14). The introduction of microprocessors into accounting departments and their use in payroll and stock control implies major savings on clerical, stockkeeping, and accountancy personnel.

Materials and Competitivity

Footwear manufacturers use an expensive and complex material that is almost invariably sourced overseas and this creates problems for them with respect to all four aspects of competitiveness.

First, raw materials, primarily leather, represent more than half the sector's gross output about the same for the manufacturing sector as a whole. The cost of raw materials relative to selling prices varies considerably across the firms according to their product mix. The cost of the leather represents around 50 per cent of the manufacturer's selling price of an arab sandal for instance, between 30 and 40 per cent of the price of a lady's high fashion shoe, about 20 to 30 per cent of a child's shoe, over one half of a high quality leather man's casual shoe, and an even higher proportion of the selling price of a boot. The terms and conditions under which leather can be purchased have a direct impact on the price

competitiveness of the shoe manufacturer. Indirectly too the cost of raw materials can be crucial for manufacturers have to hold stocks of materials which they have to finance as part of working capital. The duties paid on imported raw materials are an additional cost and even though they are refunded if the finished product is exported the operation interrupts cash flow, a problem which the Customs Union will eliminate for those sourcing in Europe. Some manufacturers also argued that as the refund procedure was so cumbersome they did not bother to make claims for relatively small imports of materials. The holdings of large stocks of a valuable material also adds to the risks of the enterprise. Manufacturers can make capital gains and losses on their leather holdings if its price moves and can be left with useless stock if fashions change.

Second, manufacturers are also dependent on the quality of their leather for one of the important determinants of the quality of their overall product. Access to good quality leather is crucial to any attempt to move up market.

Third, if Cypriot manufacturers are to survive in the high fashion market they have to be able to obtain relevant materials at short notice. Sourcing overseas, which might be necessary to deal with the demands of quality, exacerbates problems with the need to move fast on high fashion orders. Fourth, even outside the high fashion sector delivery dates are important and the length of Cyprus's leather supply line can be a problem.

To cope with the threat to quality, fashion, and speed manufacturers react by overstocking. Footwear manufacturers stocks of raw materials to sales exceed the manufacturing average although total stocks to sales are more in line (see table 16 and 17). This in turn exacerbates the burden on working capital almost invariably financed by a loan from the bank at the going interest rate. Smaller firms sometimes, though not always, seem to be able to hold the ratio of stocks to sales down. Some firms are clearly inefficient here with ratios well over the industry average, although a dramatic move in

raw materials stocks : sales ratio can indicate a firm's attempt to improve the quality of the product.

Given the inflexible mass production methods associated with capital intensity in Cyprus, the more capital intensive the enterprise the greater the inclination to overstock because the greater the penalties to running out of materials. The three mass producers discussed above all have stocks: sales and stocks: census value added ratios in excess of the industry average and their materials stocks were particularly excessive. Significantly the manager of the most automated plant, who sourced overseas, described the problems of his supply pipeline as a nightmare. As a result he is currently burdened with materials stocks of about 40 per cent the value of sales.

Cypriot manufacturers could clearly gain from more scientific materials management. Sourcing overseas, often from different suppliers, it is probable that they persistently lose on the quantity of leather supplied. The manufacturer who had obtained equipment for leather measuring similar to that described above had done so in response to evidence that his supplier was chiselling on quantities. He had used the equipment to detect under supply but felt that its possession prompted the tanner to be more scrupulous.

Another producer of leather clothing was worried that he often did not get the number of garments out of a leather order that he had expected and was unsure whether this suggested excess waste or that the actual quantity of leather supplied was less than that invoiced. If Cypriot producers are undersupplied by the same percentage as their British counterparts detection of this would save the industry some £C762,000 at 1985 prices and cost structure. The equipment is not very expensive and there may be possibilities for small scale producers to buy in common.

The importance of new equipment which provides a rapid accurate reading of pattern area and which can be used with relevant software

to assess pattern interlock for maximum leather utilisation, as described above, is also clear. For a relatively small outlay substantial savings in materials are possible: 5 per cent on average according to British data, which would mean another £C762,000 economy for Cypriot producers and this is without counting the benefits from reduced rejects due to faulty materials and the easy detection of styles which are particularly extravagant in materials.

The equipment is also relevant to leather clothing production where the waste of raw materials is a significant cost and where better pattern interlock could provide a similar percentage saving. Producers of leather clothing could usefully be made aware of technological innovations in footwear many of which relate to their own production process.

Economising on the quantity of leather used in production also implies a reduction in stockholding. Note too the fortuitous coincidence that equipment whose primary function is to save on materials utilisation and hence cut costs, simultaneously facilitates an improvement in quality, another dimension of competitiveness.

The long supply lines between the manufacturers and their sources undoubtedly contribute to the lengthy lead times manufacturers require (see table 18) and directly inhibit competitiveness on response time and threaten competitiveness on delivery dates. Whether or not there should be state support for a domestic leather finishing plant was an issue that attracted widespread comment from manufacturers. There was general agreement that this would help with response times and would be a boon to the fashion end of the business. A leather clothing manufacturer explicitly said that he would have to carry bigger stocks of raw materials if he could not use local leather as a stop gap. The producer was contemplating investing in leather finishing to ease his supply problems. Increased domestic finishing capacity would also reduce the risks involved in the purchase of finished leather. Unfinished leather could be bought in and subsequently finished as fashion dictated. Cyprus currently exports

goat and kid skins for processing abroad.

Manufacturer's enthusiasm for a domestic finishing plant was tempered by doubts whether it could provide the same quality that they currently secure abroad: unfortunately a strategy to improve response times seems to infringe quality objectives. The clothing manufacturer, although he used domestic leather as a last resort expressed doubts over quality though he felt that there had been some improvement recently.

Expectations are adversely affected by the performance of other domestic component and service suppliers who are widely considered, with notable exceptions, to be inferior and high cost. There is a case for quality control of components when the small size of the domestic market means that only one or two suppliers exist. Quality control of components and service equipment is particularly important because of the dynamic and cumulative effect of poor performance on the manufacturers. We have already seen how sourcing leather overseas to secure appropriate quality inhibits manufacturers' ability to respond. The poor quality of other components not only drags down the standard of the final product but often involves compensations in design and production which also reverberate on quality. Heels which won't take pins although not disastrously unstable never sit as neatly as ones which are screwed in. Problems with the availability and cost of lasts compromise design as manufacturers press designers to rely on those in stock.

When materials are available domestically manufacturers reduce their 'just in case' stocks though perhaps without adequate flexibility to still make it 'just in time'! A local supplier of adhesive reported that firms often reorder only when supplies for a few hours operation remain, knowing that he can deliver almost immediately.

Technology and Competitvity

It is possible for small investments, to have important payoffs, for example better cement application could improve quality and save on production costs, as would the reorganisation of production flows which as other experts have noted are not always optimal (Gopa, 1982). Lasts can also be modified rather than replaced more frequently as in Britain although this practice inhibits design. But far and away the most significant opportunity lies in the utilisation of microprocessors, not in the context of CAD/CAM, but as described above, to provide management information. Most, though not all, of the firms which employ over 100 workers have made use of computer facilities, though almost always restricted to accounts and payroll with a significant minority using them also in stock control. But the benefits can easily extend beyond cutting administrative costs to helping with some of the most commonly encountered difficulties in footwear production: computerised management information facilitates the tailoring of production to orders, the integration of new orders into an ongoing production plan, the gearing of stocks to demand, and accuracy in costings.

Not only were these issues discussed many times during firm visits but other commentators have noted weaknesses in the industry on these points. All too often for example, long lead times were built into the system because production planning involved the manual pooling of orders over several months and the freezing of the production plan sometimes several weeks ahead. Costings were acknowledged to be amateurish. Retail stocks as well as material stocks could be better managed. One manufacturer/distributor whose stocks of finished products in his shops represented fifty per cent of sales acknowledged that his stocks of ready goods were too high but found it difficult to reduce them without running the risk of walk-outs because particular sizes or colours were not available. Automatic feedback from retail outlets to the factory and the programming of replacement orders is key to better management here.

Better management information will not only help cost competitiveness generally but is also crucial to further savings on materials supplies and more importantly to the efficient small batch production and short response time without which the industry will founder in the changing footwear market. To some extent the manufacturers recognise the potential benefits but diffusion is held up by the lack of a disinterested source of information on the options available, a role fulfilled by SAIRA in the UK as described above, and by difficulties in identifying appropriate software. A couple of firms have commissioned studies from companies providing software, and one firm assisted by its overseas parent, has capacity installed. But in the former cases doubts remain and in the latter case it is not clear that the system is fully operative. It is essential that appropriate software which can be run on relatively inexpensive equipment must be identified and publicised to the manufacturers. Help in the form of incentives to software development and customisation would also be beneficial to the sector.

Quality Competitvity

It is important to focus on quality as a separate dimension of competitiveness because although a great deal of lip service is paid to the idea in Cyprus, in practice little seems to be done in its pursuit. Quality only becomes an issue when there is some specific and usually acute threat to it. Standards are seldom built into an organisation and quality control routinised. This is illustrated by the fact that although almost all the firms that we visited had had recourse to the Leather and Footwear Testing Unit on some occasion, its use was usually prompted by a problem. No-one used it routinely to monitor the quality of raw materials, components, or finished products, despite the modest charges for its services. The availability of this service is a major advantage for producers who should be prompted to make more use of it. Indeed it could usefully be expanded. With an increase in its budget and staff it could function as a mini SATRA, providing information on computer software, helping avoid costly equipment mistakes, assisting the HTI with operative training, and contributing to sector identity. In the

longer term firms themselves can aspire to become members of SATRA with its associated benefits.

Similarly quality control within the firms is not routinised. The periodic attention of management is not quality control. Nor is dumping the responsibility for rejection on a worker whose prime job is to pack finished shoes. Quality control has to be more systematic and more extensive throughout the process of production.

Fortunately there is little tension between strategies to improve price competitiveness and efforts to improve quality control. As already noted more scientific materials management can improve quality. Similarly improvements in average skill levels will also pay a quality bonus. Multiskilling, by reducing errors associated with monotony, may also improve quality. The cumulative effects of the quality of components creates a prima facie case for their formal monitoring and one which is reinforced by the market power enjoyed by many component and equipment suppliers in Cyprus.

Design Competitiveness

Cypriot manufacturers take design more seriously than they do quality control at least as indicated by the resources devoted to it. Most of the larger firms employ a full time designer and usually an assistant too. The designer is usually also the pattern cutter. Unlike in Britain designers were clearly important people within Cypriot firms. We were often introduced to them and they clearly had the respect and attention of the management. In many of the medium sized firms the designers were partners and in a substantial minority of cases design had clearly been the key element provided by the founder. However when describing their design capacity there is considerable similarity between British and Cypriot manufacturers. Both see their primary role as imitation usually of Italian designs though in both cases with modifications to suit specific customers.

Both rationalise this strategy by their country's inability to lead fashion.

It is true that Cyprus cannot hope to lead fashion. But it is possible for well trained, talented and well connected designers to predict rather than merely follow fashion. Cypriot designers must be familiar with and aim their models at the particular market targeted rather than compromise on a design which might go in a variety of markets, which underlines the need to identify market niches with their specific characteristics. Remember that there is probably no such thing as European fashion, for what sells in Britain in a particular season, for example, may be very different from the strong lines elsewhere. Experience limited to the modification of Italian designs to suit the domestic market must be expanded by direct contact with targeted overseas markets, particularly as the Cypriot domestic market is not representative of overseas markets seeming to prefer higher heels and more formal styling (see also Incubon, 1986). Cyprus can reasonably aspire to lead the region by being the conduit of fashion from Europe.

But if the domestic market cannot be used as a testing ground for an assault on Europe perhaps more could be done on the basis of the tourist market. First, there are opportunities to expand sales to visitors. If every tourist took home a pair of shoes this would be an enormous boost to the local market. Advertising footwear as a Cypriot speciality which visitors cannot afford to ignore would help develop this market segment, as would improved presentation which, with one notable exception, is old fashioned and incoherent. Second, the tourist trade provides another opportunity: contact with customers from particular European countries and the chance to learn about their preferences. Tourist demand could be used as a testing ground for styles and a basis for market research. Information on the tourist market is desperately needed. At the moment neither manufacturers nor Ministry officials has a grasp even on the percentage of local sales that are actually disguised exports, let alone a more detailed profile of foreign consumers in Cyprus.

Several firms already subcontract design to Italy and other firms expressed interest in following this strategy which has definite advantages to firms which hope to export to Europe. The availability of computer aided design may promote specialisation by some firms which are then able to exploit the most modern technology. Design departments in Cypriot firms usually employ masking tape when translating designs into patterns and working out costings. One firm has improvised vacuum moulding equipment and used the plastic shells from moulded lasts as the basis of design and then pattern assessment. Putting out design to specialist firms may not only improve design itself but facilitate the use of modern equipment, described above, which facilitates the rapid and smooth translation of a design into production. But the drawbacks of subcontracting design, on an ad hoc rather than an ongoing basis, in terms of the dangers of dependence and resulting disasters of interpreted supply need to be remembered.

Even outside the high fashion sector design is important as was clearly understood by some producers for niche markets in Cyprus. One very successful producer of high quality children's shoes for the home market had very pretty and original designs on the basis of which the firm would be competitive in Britain at least. The problem here would be to produce the volumes required and to meet the orthopaedic standards required for children's shoes, an aspect of quality increasingly demanded in this segment of the European market. The shoes were not, for example, made in a variety of width fittings.

Competitiveness on Delivery Dates

The ability to meet short delivery dates is not only an increasingly important component of competitiveness but it is especially important in segments of the market in which the Cypriot manufacturers hope to have prospects, for example MTO and ladies' high fashion shoes. But Cyprus has some endogenous problems shortening response time. The length of supply lines, the indifferent quality of local materials and components supplies, imitative design involving copying fashion

leads established elsewhere, and design insecurity which promotes extensive collaboration with customers, all have adverse effects on the delivery dates which manufacturers can accommodate (see table 18). But strategies to improve price, quality and design competitiveness have positive spillovers here too. Scientific materials utilisation, the careful and selective encouragement of domestic materials and components supplies, multiskilling and improved training, and the systematisation of management information and production planning, all have obvious relevance to improved speed of response.

The importance of fast response worldwide is prompting investigation of factors which shorten or lengthen delivery dates. One such study in the UK by the Department of Trade and Industry is currently underway. Its findings should be of general interest.

III

CYPRUS FOOTWEAR STRATEGY FOR THE INDUSTRY

Cypriot footwear manufacturers cannot currently compete with European producers. Price is perhaps the dimension of competitiveness where the sector performs best. But Cypriot costs are not sufficiently low relative to those of European competitors, particularly Italy, that they provide a competitive advantage. Although domestic producers' position in the home market will continue to be helped by transport costs and distinctive Cypriot tastes in footwear, it is ominous that even with the existing tariff protection import penetration has reached 20 per cent in recent years. The price edge on the domestic market is not sufficient to compensate for Cypriot producers' lack of competitiveness in terms of quality and design. We predict that with entry into the customs union the share of imports will increase rapidly to 40 per cent and perhaps higher, though some of the initial sharp jump will represent the reintermediation of hitherto disguised imports into measured trade flows.

As things stand, the industry's export prospects are not sufficiently rosy to compensate for losses on the home front. Traditional markets in the region have been stagnant. COMECON markets are uncertain especially given the indirect threat of the customs union to the volume of bilateral trade between Cyprus and the Eastern bloc. Exports to Europe are basically non-starters as yet and it is hard to see the customs union alone unlocking the doors.

Two distinctive strategies can be compared: mass production involving the use of unskilled labour to produce standardized commodities which compete on the basis of price; and, flexible specialization involving the use of skilled labour to produce specialized products which

compete on the basis of quality, design, and speed of delivery. The first seeks long production runs to cover overhead costs and incorporates a tendency to vertical integration of firms. The second emphasizes flexibility in production and the minimisation of set-up times and work in progress, and incorporates a tendency to vertical disaggregation. Thus the choice of firm strategy is intertwined with both firm and industry organisation.

Three elements of a flexible specialization strategy emerge as guidelines to industrial progress. Firms must develop 1. a strategic orientation; 2. flexibility in production; and 3. interfirm cooperation. The specific recommendations which follow attempt to promote strategic thinking, flexibility and cooperation.

The flexible specialization strategy responds to known developments in footwear markets and employs known developments in footwear technology. It is feasible in the context of the structure and development of the industry in Cyprus although it will involve the establishment of new institutions and the reorientation of some old ones as well as a major effort on the part of the employers, the workers and the technical advisors. The aim is to improve the competitiveness of the industry in terms of quality, design and speed of response while simultaneously holding the line on costs. The details of the market developments and technological changes which have guided the design of the strategy and the links in the component elements have been discussed at length above. Here the key components are summarized.

Collective Organization

The linchpin of the proposed strategy is the establishment of associations of flexibly specialized firms, which, in concert with the Ministry of Commerce and Industry (MCI), can exploit economies of scale in marketing, technology and administration. Associations among firms do not just appear. Nor can they be dictated by the

authorities. It is essential that the industry itself evolve the institutions and procedures of cooperation if they are to be effective. But the hands of the government are not completely tied. They can promote association and cooperation by strategic interventions which encourage and even subsidize such activities.

Footwear manufacturing in Cyprus has characteristics which provide a foundation on which association can be built: the strength of the Footwear Manufacturers' Association and the Chamber of Commerce; the existence of institutions which already provide collective services; the proliferation of subcontracting arrangements; and family links between firms.

The scale and structure of Cypriot footwear production is very like the Italian. The latter's success as an exporter is based on the links between large scale distributors and associations of producing firms.

In fact, the importance of cooperation among firms goes beyond marketing considerations. Greater interfirm cooperation is essential to improve the response of manufacturers to the requirements of retailers and to reduce the long lead times caused by insufficient co-operation between manufacturers and their suppliers.

To encourage collective organization we recommend that:

- 1 Discussion of this Report be used to provide a forum for the employers to debate possible forms of cooperation.

- 2 The government, through the MCI, provide specific information about procedures and institutions which have elsewhere facilitated beneficial cooperation in footwear. It would be useful for a representative group of manufacturers to visit Italy and at first

hand investigate the nature and functioning of interfirm links. The suitability of specific forms of cooperation can then be debated in the context of their own industry, for only in this way will appropriate and trusted institutions emerge.

Market Orientation

Footwear producers must not neglect their traditional markets in the region but should modify their targets within these, fending off competition from low cost far eastern producers by improving the quality and styling of the products, and aiming to sell shoes as well as sandals in these markets. The evidence suggests that Cyprus's market share within major countries in the region could be increased and that there are opportunities in hitherto neglected parts of the area.

It is imperative that the new Export Promotion Council assists the industry in developing existing markets and identifying new ones within the Middle East and is not distracted by the novelty of the customs union so that a disproportionate amount of attention is spent on Europe.

Cyprus cannot hope to be a world leader in fashion but, as a bridge between Europe and the Middle East, she could aim to be the propagator of fashion within the region.

Producers should identify and explicitly target particular niches in all markets. This is not only important if they are trying to enter a European market but also relates to the consolidation and improvement of their position in their traditional export markets and even in the domestic market.

Examples of successful exploitation of market niches given in the text show the importance of building on technological, design or marketing strengths within the firm. A market niche is often located in existing but not yet exhausted opportunities such as those implicit in Cyprus's unique position linking Europe and the Middle East or the extension of the domestic market occasioned by the 900,000 tourists who visit Cyprus each year.

Selling in Europe will require marketing investments which are beyond the means of most firms and government help will be needed. The Export Promotion Council can play a key role in the promotion and, to some extent, financing of collective initiatives. But much depends on how this institution relates to the manufacturers themselves because detailed knowledge of local capacities and abilities is only available within the sector.

Some manufacturers have had experience with sector specific marketing efforts and there was limited enthusiasm for new initiatives here. The problem is that the industry's recent experiences have exacerbated tensions and hostilities among manufacturers making joint efforts more difficult to organize. But there are also characteristics of the industry and Cyprus which make such initiatives more feasible and the common experience of increasing import penetration may well in Cyprus, as elsewhere, promote interfirm cooperation.

Concretizing these points we recommend that:

- 1 The Export Promotion Council employ two full time agents to represent footwear manufacturers overseas, one agent to be based in the Middle East given that market's continued importance to the industry, and one to be based in Britain which seems more likely than other European countries to provide Cypriot footwear producers with a foothold in the EEC

2 The representative based in the Middle East be instructed to explore export possibilities in countries of the region which have hitherto been unresponsive to individual approaches.

3 Targets be established for the market share of Cypriot exports to individual countries within the Middle East. The Footwear Manufacturers' Association in concert with the Export Promotion Council provide a forum for the evolution of these targets which can then be employed to monitor the performance of the Export Promotion Council's representative in the Middle East.

4 The government and the employers together fund an investigation of the composition of the tourist market. Which tourists buy shoes? Which ones buy sandals? Where do they come from? What do they like about the shoes that they have bought? Walk-outs should also be surveyed to ascertain why some overseas visitors who were considering buying footwear failed to purchase. Market research, based on visitors to the island, will help manufacturers target the tourist market more effectively as well as provide useful information about particular markets in Europe.

5 Collective promotional activities and joint marketing activities abroad be subsidized via the Export Promotion Council.

6 The aesthetic appeal as well as economies of scale involved in the joint promotion and marketing of footwear and clothing must be learned in Cyprus and relevant activities should receive an additional financial encouragement administered by the Export Promotion Council.

Design

The strategy anticipates increased specialization and subcontracting of design with the importance of the most modern design technology resting not so much in the capacity to design on screen but in the speed and accuracy with which designs can be translated into patterns and the latter assessed.

Although CAD/CAM may not be sufficiently developed in the context of the footwear industry to offer the same immediate advantages to Cyprus as it can within apparel, developments in this area should be closely monitored. It is only a matter of time before it becomes appropriate to establish a CAD/CAM centre for footwear analogous to that recommended to service clothing. Such a computer aided design centre should be accessible to retail buyers and manufacturers' designers. It could be initiated by the Employers Association, financed partly by the MCI but with a CAD supplier hopefully playing a leading role in its operation. These CAD/CAM centres should become financially viable after an initial period of support. Again other countries' experience running such bureaux, although perhaps in different sectors, should be helpful in determining the precise operational details.

Cyprus's small size suggests combining the CAD bureau eventually contemplated for footwear with that more immediately planned for the clothing sector. In general, the links between these industries, the parallels in their production processes and the clear complementarities in design and marketing imply benefits to their integration through collective service provision where possible.

Specifically we recommend that:

- 1 The staff of the Leather and Footwear Testing Unit be expanded to include a Computer Officer whose remit should include monitoring

CAD developments in footwear and liaising with the personnel of the clothing CAD bureau.

2 The Ministry of Education establish two design scholarships per year to be held at accredited institutions overseas.

3 The British agent of the Export Promotion Council be charged to relay design information from Europe on a regular basis and this should be made generally available via the Footwear Manufacturers' Association.

4 Design intelligence for footwear be integrated with design intelligence for clothing as is common in Europe. In particular designers should be encouraged to develop 'whole looks' which can then be jointly promoted and produced by associations of footwear and clothing manufacturers.

Management and Industrial Relations

The dominance of the family firm and the constraints that it imposes on the industry's response and dynamics are acknowledged.

The emphasis on JIT manufacturing philosophy carries with it the promotion of a non-adversarial management strategy, a theme taken up in the specific proposals:

1 Childcare facilities, jointly funded by the employers and the government, with perhaps some contribution by the parents, are recommended as a way of increasing the stability of the female labour force which will also have long run positive educational implications.

2 Expenditures on improved facilities for workers should be included in the Capital Allowance Scheme.

3 The industrial estates provide a useful geographical basis for the provision of daycare and other facilities which can be shared by various firms.

4 The future allocation of space on the estates reflect the benefits from grouping firms whose employees have mutual needs or whose design and management teams could gain from association.

Training

The upgrading and generalization of skills is essential to a strategy based on flexible specialization and the pursuit of JIT manufacturing. Much depends also on improving the quality of management. Specifically we recommend that:

1 The Higher Technical Institute, drawing on the expanded personnel and technological resources of the Leather and Footwear Testing Unit, and investing in some of the latest training equipment described in the text, provide a course geared to the labour force needs of the footwear manufacturers.

2 The Management/Vocational Training Scheme operated by the Industrial Training Authority should be made more relevant to the footwear sector by the addition of an action learning component. The in-house training scheme, administered by the Industrial Training Authority (ITA), has the advantage of providing practical training on the job which was strongly favoured by the manufacturers. The administration of this programme has been exemplary. The ITA officials clearly understand the incentives to abuse in a scheme which encourages training by subsidizing the wages of trainees and

had developed measures to prevent misuse. All indications were that this scheme is successful and we recommend its expansion.

Technology Development

The ways in which recent technological developments facilitate flexible specialization while simultaneously helping to reduce costs and so improve price competitiveness have been outlined in the text. The derived recommendations include:

- 1 The role of the Leather and Footwear Testing Unit be expanded, and in particular, the capacity to provide information on and assistance with the purchase of both traditional equipment and relevant computer software should be developed. To this end a full time Computer Officer, some of whose responsibilities have already been detailed, should be seconded to the Unit.

- 2 Because it is better if manufacturers adopt standard Management Information System packages whenever possible the Computer Officer's first task must be the identification of a standard package close to the industry's requirements and which can be run on relatively inexpensive equipment. SATRASCOPE constitutes a possible model package.

- 3 Software and hardware needed to install Management Information Systems should be included in the Capital Allowance Scheme.

- 4 The Computer Officer is also responsible for the promotion of an awareness of the currently available Management Information Systems through local seminars, and should organize on-site demonstrations encouraging the vendors to join in collaborative projects.

5 More generally, the Leather and Footwear Testing Unit should function as a mini-Shoes and Allied Trades Research Association (SATRA), and consequently would require an expanded budget and staff.

6 There should be no charge for the services of the Leather and Footwear Testing Unit but 30 per cent of its budget should be provided by a tax on the value of footwear output.

7 If the staff of the Leather and Footwear Testing Unit are to provide up-to-date advice on equipment they must periodically attend technical courses and seminars overseas and attend footwear expositions, both at home and abroad on a regular basis.

8 In the longer run footwear firms in Cyprus, given the level of wages and unionisation in the industry, and in the context of customs union with the EEC, should aspire to become SATRA members in their own right. The United Nations can help to initiate an approach to SATRA.

Materials Management

Cypriot manufacturers can clearly gain from more scientific materials management. New and relatively inexpensive equipment, described in detail in the text, can help detect undersupply in leather and man-made materials, can provide a rapid and accurate reading of pattern area, and with relevant software, can assess pattern interlock for maximum leather utilization. Economising on the quantity of leather used in production implies a saving on stockholding. The ability to obtain leather domestically, if the quality can be guaranteed, would help manufacturers to respond more quickly to changes in fashion, to shorten the turnabout times between orders and despatch, and reduce raw materials inventories.

Thus we recommend that:

1 The Leather and Footwear Testing Unit organize a workshop on scientific materials management modelled on the 'Metrology for Quality' project conducted in Britain under the aegis of the Department of Trade and Industry. Vendors of relevant equipment should be involved in this project.

2 Both the software and hardware needed for more scientific materials management be included in the Capital Allowance Scheme.

3 The feasibility of a third domestic leather finishing plant be reconsidered in the light of the benefits to the industry as a whole from the efficient operation of such a plant, particularly in terms of its facilitation of improved speed of response and reduced stocks of raw materials, considerations which may not have been clear when the original feasibility study was undertaken.

4 The possibility of a consortium of leather using manufacturers themselves partly funding investment in a second leather finishing plant with the government matching the private sector funds be explored.

Quality Control

Quality control of components and service equipment is particularly important because of the dynamic and cumulative effect of poor performance on the final products. Sourcing leather overseas to secure the appropriate quality inhibits manufacturers' speed of response and promotes a 'just in case' approach to stockholding thus inflating the cost of working capital. The poor quality of other components not only drags down the standard of the final product but often involves compensations in design and production which

reverberate on quality. These considerations lead us to recommend that:

- 1 When a components' supplier enjoys market power (providing more than 20 per cent of domestic production) his/her output be subject to quality control by the MCI.

Finance

It is desirable that finance be available for investments which are particularly relevant to the pursuit of this strategy, for example, the purchase and installation of microprocessing equipment to improve management information, or the purchase of production away from the export of sandals towards a higher value added product. These criteria should be introduced informally into the banks' project evaluation procedures.

In addition we recommend that:

- 1 The Capital Allowance Scheme be extended to encompass certain types of investment which are not currently eligible for favourable tax treatment but which comprise integral components of the industrial strategy. Specific examples have already been provided.

FOOTWEAR

SUMMARY OF RECOMMENDATIONS

1. Collective Organization

- 1.1. Discussion of this Report be used to provide a forum for the employers to debate possible forms of cooperation.
- 1.2. The government, through the MCI, provide specific information about procedures and institutions which have elsewhere facilitated beneficial cooperation in footwear. It would be useful for a representative group of manufacturers to visit Italy and at first hand investigate the nature and functioning of interfirm links. The suitability of specific forms of cooperation can then be debated in the context of their own industry, for only in this way will appropriate and trusted institutions emerge.

2. Market Orientation

- 2.1. The Export Promotion Council employ two full time agents to represent footwear manufacturers overseas, one agent to be based in the Middle East given that market's continued importance to the industry, and one to be based in Britain which seems more likely than other European countries to provide Cypriot footwear producers with a toehold in the EEC
- 2.2. The representative based in the Middle East be instructed to explore export possibilities in countries of the region which have hitherto been unresponsive to individual approaches

2.3. Targets be established for the market share of Cypriot exports to individual countries within the Middle East. The Footwear Manufacturers' Association in concert with the Export Promotion Council provide a forum for the evolution of these targets which can then be employed to monitor the performance of the Export Promotion Council's representative in the Middle East

2.4. The government and the employers together fund an investigation of the composition of the tourist market. Which tourists buy shoes? Which ones buy sandals? Where do they come from? What do they like about the shoes that they have bought? Walk-outs should also be surveyed to ascertain why some overseas visitors who were considering buying footwear failed to purchase. Market research, based on visitors to the island, will help manufacturers target the tourist market more effectively as well as provide useful information about particular markets in Europe

2.5. Collective promotional activities and joint marketing activities abroad be subsidized via the Export Promotion Council

2.6. The aesthetic appeal as well as economies of scale involved in the joint promotion and marketing of footwear and clothing must be learned in Cyprus and relevant activities should receive an additional financial encouragement administered by the Export Promotion Council

3. Design

3.1. The staff of the Leather and Footwear Testing Unit be expanded to include a Computer Officer whose remit should include monitoring CAD developments in footwear and liaising

with the personnel of the clothing CAD bureau.

- 3.2. The Ministry of Education establish two design scholarships per year to be held at accredited institutions overseas.
- 3.3. The British agent of the Export Promotion Council be charged to relay design information from Europe on a regular basis and this should be made generally available via the Footwear Manufacturers' Association.
- 3.4. Design intelligence for footwear be integrated with design intelligence for clothing as is common in Europe. In particular designers should be encouraged to develop 'whole looks' which can then be jointly promoted and produced by associations of footwear and clothing manufacturers.

4. Management and Industrial Relations

- 4.1. Childcare facilities, jointly funded by the employers and the government, with perhaps some contribution by the parents, are recommended as a way of increasing the stability of the female labour force which will also have long run positive educational implications.
- 4.2. Expenditures on improved facilities for workers should be included in the Capital Allowance Scheme.
- 4.3. The industrial estates provide a useful geographical basis for the provision of daycare and other facilities which can be shared by various firms.

- 4.4. The future allocation of space on the estates reflect the benefits from grouping firms whose employees have mutual needs or whose design and management teams could gain from association.

5. Training

- 5.1. The Higher Technical Institute, drawing on the expanded personnel and technological resources of the Leather and Footwear Testing Unit, and investing in some of the latest training equipment described in the text, provide a course geared to the labour force needs of the footwear manufacturers.

- 5.2. The Management/Vocational Training Scheme operated by the Industrial Training Authority should be made more relevant to the footwear sector by the addition of an action learning component. The in-house training scheme, administered by the Industrial Training Authority (ITA), has the advantage of providing practical training on the job which was strongly favoured by the manufacturers. The administration of this programme has been exemplary. The ITA officials clearly understand the incentives to abuse in a scheme which encourages training by subsidizing the wages of trainees and had developed measures to prevent misuse. All indications were that this scheme is successful and we recommend its expansion.

6. Technology Development

- 6.1. The role of the Leather and Footwear Testing Unit be expanded, and in particular, the capacity to provide information on and assistance with the purchase of both traditional equipment and relevant computer software

should be developed. To this end a full time Computer Officer, some of whose responsibilities have already been detailed, should be seconded to the Unit.

- 6.2. Because it is better if manufacturers adopt standard Management Information System packages whenever possible the Computer Officer's first task must be the identification of a standard package close to the industry's requirements and which can be run on relatively inexpensive equipment. SATRASCOPE constitutes a possible model package.
- 6.3. Software and hardware needed to install Management Information Systems should be included in the Capital Allowance Scheme.
- 6.4. The Computer Officer is also responsible for the promotion of an awareness of the currently available Management Information Systems through local seminars, and should organize on-site demonstrations encouraging the vendors to join in collaborative projects.
- 6.5. More generally, the Leather and Footwear Testing Unit should function as a mini-Shoes and Allied Trades Research Association (SATRA), and consequently would require an expanded budget and staff.
- 6.6. There should be no charge for the services of the Leather and Footwear Testing Unit but 30 per cent of its budget should be provided by a tax on the value of footwear output.
- 6.7. If the staff of the Leather and Footwear Testing Unit are to provide up-to-date advice on equipment they must periodically attend technical courses and seminars overseas and attend

footwear expositions, both at home and abroad on a regular basis.

- 6.8. In the longer run footwear firms in Cyprus, given the level of wages and unionisation in the industry, and in the context of customs union with the EEC, should aspire to become SATRA members in their own right. The United Nations can help to initiate an approach to SATRA.

7. Materials Management

- 7.1. The Leather and Footwear Testing Unit organize a workshop on scientific materials management modelled on the 'Metrology for Quality' project conducted in Britain under the aegis of the Department of Trade and Industry. Vendors of relevant equipment should be involved in this project.
- 7.2. Both the software and hardware needed for more scientific materials management be included in the Capital Allowance Scheme.
- 7.3. The feasibility of a third domestic leather finishing plant be reconsidered in the light of the benefits to the industry as a whole from the efficient operation of such a plant, particularly in terms of its facilitation of improved speed of response and reduced stocks of raw materials, considerations which may not have been clear when the original feasibility study was undertaken.
- 7.4. The possibility of a consortium of leather using manufacturers themselves partly funding investment in a third leather finishing plant with the government matching the private sector funds be explored.

8. Quality Control

- 8.1. When a components' supplier enjoys market power (providing more than 20 per cent of domestic production) his/her output be subject to quality control by the MCI.

9. Finance

- 9.1. The Capital Allowance Scheme be extended to encompass certain types of investment which are not currently eligible for favourable tax treatment but which comprise integral components of the industrial strategy. Specific examples have already been provided.

TABLE 1

Summary of World Footwear Production and Trade, 1984

	<u>Production</u>	<u>Imports</u>	<u>Exports</u>	<u>Consumption</u>	<u>Apparent Per Capita Consumption (pairs/person)</u>	<u>Import Penetration (M/C %)</u>
EUROPE						
Western						
EEC						
Belgium	6	48	8	46	4.7	104
Denmark	7	18	4	21	4.2	86
France	202	147	60	289	5.2	51
Greece	22	4	6	20	2.0	20
Ireland	4	15	2	17	4.6	88
Italy	496	53	393	156	2.7	34
Netherlands	10	60	17	53	3.7	113
UK	129	163	18	273	4.8	60
W Germany	92	216	30	279	4.6	77
	---	---	---	---	---	---
	968	724	538	1 154		

Others

Austria	26	30	20	36	4.6	83
Finland	13	9	7	16	3.2	56
Malta	2	1	1	2	4.7	50
Norway	1	15	1	15	3.9	100
Portugal	48	-	31	17	1.6	-
Spain	202	6	105	103	2.7	6
Sweden	5	27	4	28	3.3	96
Switzerland	8	32	4	36	5.5	89
	---	---	---	---	---	---
	305	120	173	252		

Eastern

Bulgaria	29	1	2	28	3.2	4
Czechoslovakia	131	4	57	78	5.0	5
DDR	82	3	3	82	5.0	4
Hungary	52	6	22	36	2.2	17
Poland	124	6	16	114	3.1	5
Romania	115	1	21	95	3.8	1
USSR	981	131	3	1 109	4.0	12
Yugoslavia	107	1	34	74	3.2	1
	-----	---	---	-----	---	---
	1 621	153	158	1 616		

AMERICAS**North and Central**

Canada	45	61	3	103	4.2	68
Cuba	23	-	-	23	-	-
Mexico	200	-	17	183	2.4	-
USA	365	842	10	1 197	5.1	70
Other Central	26	11	-	37		30
	659	914	30	1 543		

South

Brazil	569	-	125	443	3.4	-
Chile	11	5	-	16	1.4	31
Colombia	60	-	1	59	2.1	-
Panama	1	2	1	2	1.3	100
Other South Americas	205	n/a	n/a	205		
	846	7	127	725		

AUSTRALASIA

Australia	37	41	-	78	5.1	53
New Zealand	8	1	-	9	2.9	11
	45	42	-	87		

ASIA AND MIDDLE EAST

China	1 220	-	200	1 020	1.0	-
Cyprus	7	-	5	2	3.7	-
Hong Kong	110	129	197	42	-	307
India	350	-	16	334	0.5	-
Indonesia	52	1	1	52	0.3	2

Israel	12	-	-	12	2.9	-
Japan	468	87	14	541	4.5	16
Malaysia	36	3	10	29	2.0	10
Pakistan	130	-	6	124	1.4	-
Philippines	45	1	20	25	0.5	-
Singapore	5	18	6	17	-	105
South Korea	307	-	263	44	-	-
Syria	15	-	-	15	1.6	-
Taiwan	637	-	605	32	-	-
Thailand	65	1	35	35	0.7	3
Others	206	n/a	-	206	-	-
	<u>3 665</u>	<u>240</u>	<u>1 378</u>	<u>2 527</u>	<u>---</u>	<u>---</u>

AFRICA

Egypt	60	-	1	59	-	-
South Africa	58	26	-	85	3.0	31
Tunisa	14	-	1	13	-	-
Others	189	7	5	191	-	4
	<u>321</u>	<u>33</u>	<u>7</u>	<u>347</u>	<u>---</u>	<u>---</u>

TOTAL

8 430 m pairs

SOURCE: SATRA 1985

TABLE 2

Relative shares of world output (%)

	<u>1984</u>	<u>1983</u>	<u>1982</u>	<u>1981</u>
Asia & Middle East	43.5	42.8	40.7	41.3
Eastern Europe	19.2	19.2	20.2	20.4
Western Europe	15.1	14.8	15.8	15.1
South Americas	10.0	9.7	10.1	10.0
North & Central Americas	7.8	9.1	9.1	8.8
Africa	3.8	3.7	3.6	3.6
Australasia	0.5	0.5	0.5	0.5

TABLE 3

Leading Traders, 1984 (1982 rank in parenthesis)

Production (m Pairs)		Exporters (m pairs)		Importers (m pairs)		
(1)	(2) China	1 220.0	(1) Taiwan	605.4	(1) USA	842.0
(2)	(1) USSR	969.0	(2) Italy	393.1	(2) W Germany	216.4
(3)	(6) Taiwan	637.0	(3) South Korea	263.4	(4) UK	163.3
(4)	(4) Brazil	510.0	(5) China	200.0	(3) France	147.0
(5)	(3) Italy	496.2	(4) Hong Kong	196.8	(5) USSR	130.7
(6)	(5) Japan	468.0	(8) Brazil	125.0	(6) Hong Kong	128.9
(7)	(7) USA	365.0	(6) Spain	105.2	(7) Japan	86.8
(8)	(8) India	350.0	(9) France	60.3	(9) Canada	61.4
(9)	(9) South Korea	307.0	(7) Czechoslovakia	57.1	(8) Netherlands	60.1
(10)	(10) France	202.0	(10) Thailand	35.2	(-) Italy	53.3

SOURCE: SATRA

+ mainly for re-exports

TABLE 4A

Major Export Destinations, (m pr)

Country to -	Italy	France	Germany	Belgium	UK	USA	Netherlands	Austria	Switzerland	Eire
From										
Italy	-	63.2	94.0	18.7	44.9	63.6				
France	4.2	-	12.6	7.9	6.7	4.2				
Germany			-	2.6			5.2	4.7	3.2	
U.K.						1.0	1.0			1.0

TABLE 4B

Major Import Origins, (m pr)

Country from

To	China	S. Korea	Taiwan	France	Italy	Spain	Austria	Hong Kong
Italy	23.2	8.6	5.6	4.3				
Germany			20.9	12.6	94.8	19.4	7.8	
France	27.0	8.7	5.5		66.3	8.4		
U K		11.1	22.0		46.9	14.6		19.7

SOURCE: SATRA 1984

TABLE 5

	SECTION: CONSUMER SPENDING											Retailing				
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
AUSTRIA	-	-	-	-	-	13.4	12.8	12.5	13.0	13.3	13.0	12.8	12.6	12.5	12.3	12.2
BELGIUM	-	-	-	-	-	7.6	7.5	7.5	7.4	7.4	7.3	7.3	7.2	7.0	7.0	6.8
DENMARK	-	-	-	-	-	8.2	8.6	9.0	8.0	7.6	7.5	7.2	7.0	7.0	6.9	6.8
FINLAND	-	-	-	-	-	8.8	8.5	8.0	7.8	7.6	7.5	7.3	7.2	7.0	7.0	7.0
FRANCE	-	-	-	-	-	10.9	10.8	10.6	11.0	11.3	11.2	11.2	11.0	10.9	10.8	10.8
GERMANY	-	-	-	-	-	9.1	8.6	8.4	8.0	7.6	7.5	7.5	7.3	7.3	7.2	7.0
GREECE	-	-	-	-	-	11.2	11.0	10.5	10.2	10.2	10.0	10.0	10.0	9.8	9.8	9.8
IRELAND	-	-	-	-	-	9.7	9.7	9.8	9.5	9.6	9.5	9.5	9.4	9.4	9.3	9.3
ITALY	-	-	-	-	-	9.1	9.1	8.8	8.4	8.2	8.2	8.0	8.0	8.0	7.8	7.8
NETHERLANDS	-	-	-	-	-	9.6	9.2	8.7	8.5	8.3	8.2	8.0	7.8	7.7	7.6	7.5
NORWAY	-	-	-	-	-	9.3	9.4	9.6	9.0	8.7	8.5	8.5	8.4	8.3	8.2	8.0
PORTUGAL	-	-	-	-	-	9.2	9.2	9.1	8.9	8.8	8.8	8.8	8.7	8.7	8.7	8.7
SPAIN	-	-	-	-	-	10.2	9.8	9.2	9.1	8.8	8.6	8.5	8.5	8.4	8.4	8.4
SWEDEN	-	-	-	-	-	7.4	7.1	6.9	6.6	6.4	6.3	6.2	6.0	6.0	6.0	6.0
SWITZERLAND	-	-	-	-	-	5.2	5.3	5.3	5.5	5.7	6.0	6.1	6.3	6.1	6.0	6.0
UNITED KINGDOM	-	-	-	-	-	8.1	7.8	7.6	7.7	7.7	7.6	8.1	7.5	7.4	7.4	7.3

SOURCE: Euromonitor, 1985

TABLE: 6

	SECTION: RETAILING											DATA COVERAGE: IMPL./VARIETY STORES				Retailing			
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985			
AUSTRIA ¹	-	-	-	-	11	11	13	13	14	14	15	15	15	16	16	16			
BELGIUM	-	-	-	-	6	6	6	6	6	6	6	6	6	6	6	6			
DENMARK	-	-	-	-	5	5	5	6	5	6	6	7	7	7	8	9			
FINLAND	-	-	-	-	11	11	11	11	11	11	11	11	11	11	11	11			
FRANCE	-	-	-	-	9	9	9	8	8	8	8	8	7	7	7	7			
GERMANY	-	-	-	-	10	10	10	10	9	9	9	9	8	8	7	7			
GREECE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
IRELAND	-	-	-	-	6	7	7	8	8	8	9	9	9	10	10	11			
ITALY	-	-	-	-	-	-	3	4	5	5	6	6	6	8	8	8			
NETHERLANDS	-	-	-	-	6	6	6	6	6	6	5	5	5	5	4	4			
NORWAY	-	-	-	-	3	3	3	3	3	3	3	3	3	3	3	3			
PORTUGAL	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1			
SPAIN	-	-	-	-	7	7	7	8	8	4	9	9	10	10	11	12			
SWEDEN	-	-	-	-	10	10	10	9	10	9	9	9	10	9	9	8			
SWITZERLAND	-	-	-	-	8	8	8	8	8	8	7	7	7	7	8	8			

UNITED KINGDOM

¹ Includes Mail Order

SOURCE: Euromonitor, 1985

TABLE 7

DATA COVERAGE: MAIL ORDER

	SECTION: RETAILING													Retailing		
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
AUSTRIA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BELGIUM	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1
DENMARK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FINLAND	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2
FRANCE	-	-	-	-	1	2	2	2	2	3	3	3	3	4	4	4
GERMANY	-	-	-	-	5	5	5	5	5	5	5	5	5	5	5	5
GREECE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IRELAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ITALY	-	-	-	-	-	-	-	-	1	1	2	2	2	3	3	4
NETHERLANDS	-	-	-	-	1	1	1	1	1	2	2	2	3	3	4	4
NORWAY	-	-	-	-	1	1	1	1	1	1	2	2	2	2	3	3
PORTUGAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SPAIN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWEDEN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWITZERLAND	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2
UNITED KINGDOM	-	-	-	-	5	5	5	5	5	5	5	5	5	5	5	6

*Includes in Dept./Variety Stores

SOURCE: Euromonitor, 1985

TABLE 8

	DATA COVERAGE: MULTIPLES																Retailing		
	SECTION:	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	UNIT:	% of Total Retail Sales
ALBANIA	-	-	-	-	2	4	5	5	5	8	8	10	12	12	13	15	17	-	-
BELGIUM	-	-	-	-	9	10	11	11	12	12	12	13	13	13	14	14	15	-	-
DENMARK	-	-	-	-	22	28	32	34	35	37	37	40	40	42	43	47	49	-	-
FINLAND	-	-	-	-	14	16	17	17	19	20	20	23	25	27	28	29	31	-	-
FRANCE	-	-	-	-	13	13	13	14	15	15	15	16	16	16	17	17	18	-	-
GERMANY	-	-	-	-	17	18	18	19	19	20	20	21	21	21	23	23	25	-	-
GREECE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IRELAND	-	-	-	-	9	9	9	10	10	11	11	12	12	12	13	14	14	-	-
ITALY	-	-	-	-	3	3	5	6	6	6	8	8	9	9	9	11	11	-	-
NETHERLANDS	-	-	-	-	25	25	25	26	26	26	26	27	27	27	28	28	29	-	-
NORWAY	-	-	-	-	6	8	10	10	11	12	12	17	13	14	14	15	16	-	-
PORTUGAL	-	-	-	-	-	-	2	4	5	5	5	7	8	10	10	12	14	-	-
SPAIN	-	-	-	-	2	4	5	6	7	7	7	9	10	10	11	12	13	-	-
SWEDEN	-	-	-	-	4	8	8	9	9	9	9	9	9	10	10	11	12	-	-
SWITZERLAND	-	-	-	-	6	8	9	10	10	10	10	12	12	13	15	15	17	-	-
UNITED KINGDOM	-	-	-	-	38	39	40	41	46	49	49	52	53	54	54	54	54	-	-

SOURCE: Euromonitor, 1985

TABLE 9

Structure of the Footwear Industry (1984)

Size of enterprise: Employees	No. of Firms (%) France		No. of Employers (%)	
1-50	219	(53.7)	6 365	(11.8)
51-100	82	(20.1)	6 952	(12.8)
101-200	50	(12.3)	8 717	(16.1)
201-300	21	(5.2)	6 056	(11.2)
301-500	21	(5.2)	9 336	(17.2)
>500	15	(3.7)	16 727	(30.9)
TOTAL	408	102	54 153	100
	<u>Italy</u>			
1-19	7 725	(80.9)	44 440	(33.1)
20-49	1 251	(13.1)	34 110	(25.4)
50-99	353	(3.7)	22 560	(16.8)
100-500	209	(2.2)	29 800	(22.2)
>500	6	(0.1)	3 360	(2.5)
TOTAL	9 549	100	134 317	100
	<u>U.K.</u>			
1-99	421	(81.1)	9 000	(18.0)
100-199	41	(7.9)	6 400	(12.8)
200-499	44	(8.5)	14 200	(28.3)
500-999	10	(1.9)	8 400	(16.8)
>1000	5	(0.6)	12 100	(24.2)
TOTAL	494²	100	50 100	100

¹ May not add up to 100 because of rounding

² The total number of firms in the size categories exceeds 494 because some firms control more than one factory.

SOURCE: Calculated from SATRA 1985; Pearson, 1983;

TABLE 10

Structure of Cypriot Footwear Industry

Size of enterprise:

Employees	No. of Firms(%)		Gross output, £000's (%)		No. of Employees (%)	
0	3	(1.8)	6	(-)	0	(-)
1-4	71	(42.0)	1 112	3.3	135	(4.7)
5-9	30	(17.8)	1 851	6.2	210	(7.4)
10-19	30	(17.8)	4 484	15.1	413	(14.5)
20-29	11	(6.5)	2 901	9.8	257	(9.0)
30-49	11	(6.5)	5 219	17.6	430	(15.1)
50-99	5	(3.0)	4 102	13.8	325	(11.4)
>100	8	(4.7)	10 031	33.8	1 079	(37.9)
TOTAL	169	100%	29 706	100%	2 848	100%

Average No. of employees per firm = 16.9

SOURCE: Ministry of Commerce and Industry (1986)

TABLE 11

Industry Characteristics

	No. of firms with >50 workers	% of sector Emp+ in firms with >50 workers	% output going to x	value added as % of value added in manufacturing
Leather, fur and footwear	18 (18)	51% (49%)	58% (60%)	7% (7%)
Footwear	13	49%	56%	5%

Murray Report figures in parenthesis

SOURCE: Ministry of Commerce and Industry, 1986

TABLE 12

Cyprus Exports of footwear by country groupings

Country Groupings	1 9 8 2		1 9 8 3		1 9 8 4		1 9 8 5		Jan.-Aug. 1 9 8 6	
	Cc'000	%	Cc'000	%	Cc'000	%	Cc'000	%	Cc'000	%
EEC	1,242	7.9	1,246	7.9	839	4.7	1,086	6.5	1,009	10.2
Arab Countries	12,167	76.2	11,807	74.9	14,515	82.0	13,153	78.9	7,812	78.8
Eastern Trading Area	2,364	14.9	2,672	16.9	1,905	10.7	1,663	10.0		5.9
Other Countries	68	0.4	45	0.3	454	2.6	778	4.6		5.1
TOTAL	15,841	100.0	15,770	100.0	17,713	100.0	16,680	100.0		100.0

SOURCE: Ministry of Commerce and Industry

TABLE 13

Structure of Cypriot Shoe Production:

	% shares of value			
	1982	1983	1984	1985
Leather uppers: men's	21	25	25	31
women's	12	13	17	20
children's	4	5	5	5
total	37	43	47	56
Plastic boots:	1	-	-	1
Sports: sneakers	1	1	1	1
athletic	3	3	3	3
total	4	4	4	4
Boots: men's	-	-	-	-
women's	8	7	5	3
army	1	1	1	1
Total	10	8	6	4
Slippers:	4	3	3	4
Sandals:	46	42	41	32
Other footwear:	-	1	-	-
Total ¹	101	100	101	100

¹ May not add up to 100 because of rounding

SOURCE: calculated from Industrial Statistics, MCI 1986

TABLE 14

Cypriot Relative Competitvity²

	Italy	U.K.	Cyprus
% of firms with less than 50 employees	93	67	92
% of employees in firms with less than 50 employees	55	8	51
average size of firm (employment/firms)	17	110	17
% of manual workers	93	83	87
% of leather uppers in total production	68	51	56
production per worker (pairs/employment)	3639	2147	2752
production per worker (value in ECU's/employment)	36300	27300	19435
Hourly wage rate	8258 lira	£2.79	£1.42

¹ Production data for Italy and the UK relate to 1981, for Cyprus to 1985; Wage data to relate to 1984.

SOURCE: Calculated from 120 1985, SATRA, 1985; Ministry of Commerce and Industry 1986.

TABLE 15

Output, Exports and Imports, of Footwear, 1982-6 (Current prices 1000's)

	1982	1983	1984	1985
1. Value of Industrial Production: footwear	23,036	24,960	28 964	29 093
2. Domestic Exports	15 878	15,850	17 851	16 767
3. Exports as % of Production	69	64	62	58

TABLE 16

Characteristics of Firms in Footwear

Company	No. of workers	Average wage £C	Labour as % of output	Output per worker £C	Value added		Closing stocks	
					per worker £C	% of output	to census value added	to sales
A	65	2 045	32.101	6 369	3 133	49.197	66.0	32.9
B	19	1 903	17.527	10 858	4 287	39.478	24.6	9.8
C	194	2 203	23.160	9 511	3 698	38.879	36.6	14.1
D	15	2 510	23.114	10 858	4 287	39.479	30.5	12.2
E	32	2 306	25.038	9 208	3 681	39.977	12.7	5.1
F	100	2 864	18.500	15 481	7 096	45.836	56.7	26.2
G	90	2 976	16.288	18 274	6 554	35.863	91.5	32.6
H	90	2 976	16.288	18 274	6 554	35.863	91.5	32.6
I	111	2 566	25.937	9 893	5 401	54.592	102.6	73.9
J	65	2 045	32.101	6 369	3 133	49.197	66	32.9
K	132	2 927	39.168	7 472	3 631	49.594	51.5	24.8
L	22	3 126	39.295	7 955	4 028	50.635	24.4	12.3
M	19	3 289	26.140	12 583	4 969	39.481	81.7	33.4
N	43	2 936	28.769	10 205	5 525	54.141	9.4	5.1
O	160	1 998	30.456	6 517	3 023	46.393	105.6	47.5
P	46	2 750	18.397	14 949	5 779	38.659	62.2	23.9
Q	173	3 649	32.48	11 231	6 137	54.649	42.0	22.8
Q	101	2 235	39.726	7 618	3 026	39.726	52.4	20.8
Footwear Average	16.9	2 632	25.8	10 431	4 438	42.55	40.48	18-21
Manufacturing Average	6.6	2 860	20.1	15 741	5 849	37.250	46.54	17-20

TABLE 17

Stocks of raw materials, finished goods and work in progress to sales, estimates from interviews (7.)

	<u>Firm Date</u>	Raw materials & finished goods in factory & work in progress to sales	raw materials & all finished goods & work in progress to sales
A	18	19	n. a.
B	n. a.	n. a.	n. a.
C	11-13	26 max	-
D	17	23	-
E	14-17	15-21	-
F	n. a.	n. a.	-
G	30-40	32-42	-
H	80	140	-
I	29	50	39
J	20	24	-
K	3-5	4-6	-
L	15	27	42
M	10	12	64
N	14	-	-
		25	-
O	n. a.	n. a.	n. a.
P	5-8	6-12	12-20
Q	12-4	18-21	-
R	10-11	17-20	-

SOURCE: Ministry of Commerce and Industry, 1986

TABLE 18

Response Times of Firms: Firm Data

	Order to despatch	In Factory
A	1 month min/3 months ^β	5 days
B	in stock*	n. a.
C	3 months	10 days
D	3-4 months**	5 days ^{††}
E	2-3 months/2-3 weeks*	2-3 days
F	n. a.	2-4 days
G	3-4 months	n. a.
H	n. a.	n. a.
I	15 days	5-7 days
J	3 months ^β /1 month	5 days
K	2 weeks*	5 days
L	Several months ^β	2 days
M	2 weeks*	2-4 days
N	in stock*/3 weeks min [†]	5 days
O	1 month min.	3 weeks
P	15 days ^{††} /1 month min ^α	3 days
Q	2 months min	4-5 days
R	40 days	15 days

* existing range for domestic market

† MTO

** handmade men's shoes

†† arabic sandals

α closed shoes

β If no patterns or materials
small factory often doing repeat orders

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≡ CYPRUS ≡

INDUSTRIAL

STRATEGY

Report of the UNDP/UNIDO Mission

SUPPLEMENTARY REPORT

FURNITURE

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**THE CYPRUS FURNITURE INDUSTRY : THE CHALLENGE OF EUROPE
AND A STRATEGY FOR COMPETITIVENESS**

Michael H. Best

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FURNITURE

SUMMARY

The ten years ending in 1984 were good years for the Cyprus furniture industry. A sellers market was created by the Middle Eastern import surge and the tourist industry construction boom. It was not a time when furniture makers felt a need to reorganise their production facilities. Output was expanded by simply proliferating workshops using traditional production and distribution methods. The industry grew in size but did not change organisationally.

The 1970's were eventful ones for furniture industries elsewhere as well. Two models of success emerged: flexible specialisation as exemplified by the decentralised Italian furniture industry which enjoyed a tenfold increase in turnover during the decade and, second, the integration of mass production and mass distribution coordinated by the retailing giants such as IKEA in Western Europe and MFI in Britain.

The winners in the new competition were firms that pursued strategies of permanent innovation and created flexible organisations with a built in capacity to learn. Increased productivity and competitiveness did not require or even mean, in most cases, large scale producing units but it did require increased specialization as small firms became interdependent members of productive associations.

Italy emerged from the decade as the leading force in the world furniture industry. Italian furniture exports increased fivefold between 1973 and 1981 and from less than one half to more than double

that of Germany, the other major furniture exporter in the world. By 1985, Italy enjoyed a nearly \$2 billion furniture trade surplus.

The secret of the success of the Italian furniture makers was that the industry came to be viewed as an association of specialists, each with a distinctive competence and flexibility in a particular phase or type of production. Individualised consortia in marketing and finance and the National Confederation of Artisans helped articulate, shape and maintain the association of specialists. But Italy was not alone in developing collective associations. In Germany, specialisation cartels regulated competition to ensure that market niches would not be invaded during downturns and government officials founded the Rosenheim technical institute for furniture research and education. In Scandinavia, trade associations act as forums for setting industrial standards and fostering cooperation particularly to facilitate exports.

Each of these sectoral institutions promotes the self-reinforcement of the division of production amongst individual firms. The result is a notion of a furniture sector not as a collection of autonomous, competing units but as a set of interrelated firms and interfirm institutions that enhances the distinctive competence of each unit.

Marketing and financial consortia and industrial parks do not exhaust the forms of sector infrastructure institutions that have been developed in Italy, but they illustrate the principle that such institutions allow the coordination of the six business functions required by the new competition. What is most significant about these developments is that they provide an alternative path to productive efficiency from that of mass production coordinated within giant enterprises. In fact, in the case of furniture production, as opposed to retailing, they may well be the only path. The provision of collective services within a single firm generates large overhead expenses which require volume production. This big enterprise organisational form inhibits the production flexibility and design

responsiveness that have become trademarks of the most successful furniture producing regions.

Today the Cyprus furniture industry faces a stern challenge. Given the developments elsewhere it is a high costs industry by international standards. The sources of the problem are organisational as firms are not specialised, they lack production efficiency and the capacity to innovate. The result is wasteful production and low performance standards measured in terms of productivity and financial ratios.

The Cyprus furniture industry must be reorganised or substantial sections will wither under the impact of European competition. The most appropriate strategy for guiding reorganisation is flexible specialisation. Three characteristics stand out as guidelines to a restructuring vision based on flexible specialisation: a strategic orientation, integration of planning and doing in work organisation and interfirm cooperation combined with firm specialisation.

The role of interfirm cooperation is to restrict price competition and promote competition over quality and innovation. Firms that are restricted from price cutting to expand sales must be encouraged instead to improve their productive capability by specialising their product line. Progress by one firm puts pressure on firms producing complementary products or components in the product chain. Firms can rely upon an educational and research infrastructure as well as skilled workers to seek innovations. The goal is to create an association of specialised producers with the capacity to seize and promote opportunities and, most importantly, to learn. In contrast, a furniture district without the institutions of collective association is static and brittle.

Nine components of a furniture industry development programme are described. They are as follows:

1. A strategic orientation.
2. Joint retailing and marketing.
3. Specialised production.
4. Flexible production.
5. Wastefree production.
6. Consultative interaction with Cyprus Forestry Industries.
7. Administrative Guidance by the MCI.
8. Public Sector Intrastructural Services.
9. Private Collective Action.

Before a development programme can be carried out the task is to create first, a consensus around the characteristics of the challenge and second, a sector strategy as a vision for shaping individual firm strategies and actions. The specific sector strategy must be shaped by ongoing dialogue amongst individuals in the industry including representatives from management, workplace, government agencies and banks.

THE EUROPEAN FURNITURE INDUSTRY**1.1. Increasing Internationalization**

The 1970's began a period of increased international trade in wood products particularly downstream products. As shown in Table 1.A, while worldwide exports of secondary wood products, namely sawnwood and panel products, nearly doubled between 1973 and 1981, mouldings and joinery products more than tripled and furniture increased nearly two and a half times.

The overwhelming single fact is the emergence of Italy as the leading force in the world furniture industry. Italian exports increased fivefold between 1973 and 1981. Over the same period, Italian furniture exports went from less than one half to more than double that of Germany, the other major furniture exporter in the world.

Western Europe was the geographical centre of expanded furniture trade following reduced trade barriers and the development of containerised transportation and flatpack construction techniques. In 1983, the seven largest Western European markets imported about \$4 billion (U.S. currency) out of total furniture sales of nearly \$30 billion (see Table 1). The annual value of imports by the ten largest European countries peaked at \$6 billion in 1979 and 1980 and retreated to about \$4.5 billion in the 1982 to 1984 recession years (see Table 2). Much of the decline was in Holland and Belgium, where the recession has been especially severe.

As a group the ten European countries in Tables 2, 3 and 4 shifted from being net importers of furniture in 1979 and 1980 to net exporters between 1981 and 1984. The export surplus increased from one half billion dollars in 1981 to three quarter billion dollars in 1983 and over .8 billion dollars for 1984. The growing export surplus to the rest of the world reflected heightened competition amongst European furniture firms and export promotion campaigns (see Table 3).

Within the European community import penetration varies from 2.1% of furniture sales in Italy to 36.1% in Holland. Italy and Germany stand out as the major exporters with nearly two thirds of total furniture exports over the 1978 to 1984 period. But whereas Germany is also the major furniture importer, Italy imports less than all but Spain and Belgium. Italy's nearly 2 billion dollar furniture trade surplus in 1980 is further evidence of her leading role in the European and world furniture industry.

1.2. The Decline of the Old Competition

Internationalization of the furniture market meant that furniture firms were less insulated from competition by geographical boundaries. National or local customer loyalty could no longer be taken for granted as the retail shops were offering products from firms located throughout Europe. Local firms that failed to adapt with strategic and organisational adjustments suffered from declining sales. The collapse of the North London furniture industry demonstrates how rapidly fortunes can change. Today, only B. and I. Nathan and Stonehill remain out of the 25 furniture firms listed in Table 5. Together Nathan and Stonehill employ roughly 550 people in a furniture district that employed over 16,000 in the 1960s. The demise of the North London furniture firms provides a lesson on how not to respond to the new competition.

Faced with shrinking sales, the North London firms sought to maintain market share by cutting prices and costs. The result was a worsening in labour relations, slimmer margins and, eventually, insufficient financial capacity to survive. Unfortunately, the North London furniture manufacturers failed to identify the roots of the problem until it was too late. They perceived the problem in terms of excessive wages and competition from their neighbours in the same or nearby industrial estates. So they reacted to the perceived excessive wage rates by hiring less skilled workers, increasing the intensity of work and substituting machines for labour. And they reacted against their perceived competitors by cutting prices in order to drive them out of business after which they could pick up their order books. In fact, both responses left the North London firms less able to respond to the real problem.

The real problem was neither their labour force nor their local competitors but the emergence of foreign competitors organised around new principles. Consequently, each round of cost reductions and bankruptcies did not result in the expected expansion in orders. Instead it merely sealed the fate of the survivors as it had the losers in the previous round. The eventual winners were first, firms promoting product development, mainly foreign, who were expanding the supply of specialized, design oriented furniture for selling in the quality market and second, discount retailers who were getting subsidised cheap furniture and selling it in the commodity market. While the English furniture firms were cutting costs and seeking volume sales by selling to discount retailers, import penetration rose from 3.5% in 1968 to 7% in 1973 and to 15% in 1978. Most of the increased imports were from high wage Western European countries, particularly Italy.

1.3. The New Competition

The manufacturing winners in the new competition competed less on price than on product development. They shared two common organisational features. First, the successful firms rely upon a

business system that co-ordinates product development across six functions, namely:

- technology
- design
- manufacturing
- distribution
- marketing and
- sales.

Effective product development depends upon consultative coordination across each of these functions. This does not mean that a furniture firm has to internalize each business function within its business entity, although some do, but that a successful furniture firm must have consultative, not simply market, access to each business function. Simple market coordination is insufficient. Consultative coordination enhances the capability of coordinating the six functions under the guidance of an enterprise strategy for gaining competitive advantage.

Two principal strategies are discernible. The first is the pursuit of global products that can be marketed in homogeneous market segments across all the high income nations. The second is the market niche, flexible specialization strategy that pursues market segments too heterogeneous or small for the mass producers.

Both strategic orientations emphasise product development, international marketing, market segmentation, flexible production and the importance of design. Enterprises that cling to the old standardized product, price led competition have been retarded in such consultative coordination and have been unable to engage in product development. Some of them have survived by introducing flowline principles of production and seeking just-in-time supplier relations but they remain dependent upon retailing giants both for sales and design. The purely market mode of coordination means that the mass retailer is constantly sourcing the world seeking the lowest cost producer of homogeneous products. It is usually only a matter

of time before a low wage country sets up a turnkey factory and threatens to drive sales levels below the break even point for the pre-existing firms, whose highly dedicated machinery is suddenly threatened by obsolescence in the fast moving commodity producing segment of the industry.

The new competitors shared another organisational feature: networked interfirm coordination. The new competitors are members of furniture industrial districts in which individual firms specialize on particular products, parts, processes or services. Together the district supplies the whole range of furniture. The advantage to an individual firm is that it has access to all of the requisite business services as demanded and in a quantity that is appropriate at the time. To gain the same business services by engaging a specialist in an employee relation inhibits flexibility both of quantity and adaptability to changing conditions. The disadvantage is that the autonomy of the firm is reduced; each firm is mutually interdependent with a network of suppliers and buyers.

The accomplishment of a successful industrial district is to establish the links of association amongst firms so that the inevitable tension between the opposite poles of internalisation and externalisation of enterprise functions is negotiated in the direction of externalisation. Only with such links of association do firms have the confidence to specialize, a prerequisite to increased productive efficiency in a small firm.

The North London furniture firms were never able to make the transition to an interdependent and networked furniture district. Instead, they remained locked within a mutually destructive system producing the same products, unable to benefit from a supplier network of specialized products and parts.

The price competition strategy and the lack of links of inter-firm association are intertwined. An individual North London firm could

not pursue a strategy of specialization because it, alone, could not create the networks that constitute a vibrant industrial district. Thus a firm strategy is contingent upon the form of inter-firm coordination and the greater the networking, the more opportunities for pursuing a strategy of specialization.

1.4. Mass Production, Retailer Led Strategies

Mass production came late to the furniture industry. It is an industry in which bigness did not lead to success. In the United States, for example, no furniture firm has entered and remained on the Fortune 500 list. In both the United States and the United Kingdom ambitious furniture manufacturing enterprises unsuccessfully sought to gain commanding market shares by vertical integration. Internationally, the furniture industry has remained highly disaggregated as well. However, two retailing giants emerged in the 1970s Europe that have altered the dynamics of the industry.

The Swedish transnational retailer, IKEA, is the biggest furniture retailer in Europe and the most dynamic in the world. IKEA pioneered the combination showroom/warehouse concept which relies upon substituting consumer participation for dealer expertise in the sales process. In effect they eliminated the salesperson much as interchangeable parts had eliminated the fitter in the metal working industry a century before.

The previously mentioned technological developments in flatpack and containerisation plus the application of flowline principles to wood materials were preconditions for the successful penetration of foreign markets. IKEA, which opened its first showroom in 1953, opened its first foreign store in 1963 when it accounted for only 6% of Swedish furniture sales. By 1979 IKEA had 10 megastores (over 200,000 square feet, not counting the space for huge parking lots) in Germany, 2 in Switzerland, 1 in Austria and the Netherlands and franchising outlets in Australia, Canada, Hong Kong, Singapore and

Japan. By 1984 IKEA was printing 44 million catalogues per year and demanding that all suppliers produce homogeneous products for its worldwide system of outlets. IKEA's great strength is value for money as retailing overheads and manufacturing costs have been driven down by unprecedented rates of stockturn and throughput. But costs are also driven down by the leverage that IKEA has over its suppliers.

IKEA is a discount retailer that sells 'designed' commodities. IKEA has a large and active designer staff which will send the same specifications to a range of manufacturers throughout the world who will bid for the contract. Thus IKEA relies upon the market, not for product ideas but as a monitoring device. A firm that cannot meet both the cost and volume requirements is dropped for one that does. The market tie gives IKEA responsiveness to shifts in demand but at the expense of the manufacturer. Since IKEA has forsaken vertical integration, shifts in sales can be translated into orders without consideration for paying for plant and equipment geared to last year's products. Thus IKEA enjoys flexibility and efficiency but at the expense of mass producers whose products are no longer in demand in the volume required to finance the large fixed costs.

MFI is a United Kingdom follower of IKEA's showroom/warehouse strategy. Both have recently opened outlets in Philadelphia, Pennsylvania in the United States where, for the first time, they are competing in the same city.

In the early 1970's MFI was a small mail order firm. But a change in strategy to an edge-of-town, self-delivery showroom/warehouse concept led to rapid growth fueled by trade credit. MFI successfully used the finance generating formula of opening new outlets, selling for cash and paying on 60 to 90 days credit. By 1983 MFI had 13% of the United Kingdom market, followed by Harris Queensway with 4%. The strategy worked as MFI reached the volume required to become self-sustaining discount retailers. MFI's success was not only at the expense of traditional retailers; MFI also captured profits at the

expense of manufacturers. This is indicated by a comparison of the profit margins of MFI and a group of 'successful' United Kingdom furniture manufacturers surveyed by Keynote, the British market research firm:

Profit Margin (Year Ending)			
	May 1982	May 1983	May 1984
Manufacturers	2.2	2.5	4.0
MFI	8.1	12.3	13.0

MFI's strengths are low price and immediate delivery; its weakness is the requirement of huge volume sales for every item. The pursuit of a mass market in the United Kingdom dictates that MFI must produce a low cost commodity that can be purchased by low income families.

In fact, MFI has brought furniture to many families that could not afford traditional retailers. At the same time, satisfying this market has led to a corporate image and supplier relations that would make it difficult for MFI to supply, for example, specialist, assembled, solid or otherwise upmarket furniture. MFI's options are further constrained by investment in a high volume panel producing plant.

The subordination of design by the domination of powerful mass market retailers has turned United Kingdom manufacturers into subcontractors with little product development capability. Partly for this reason and partly due to squeezed margins and lack of investable funds, suppliers to the retailing giants have not made the necessary investment in information technology to effect a changeover from mass production to flexible specialization. As long as manufacturers compete as subcontractors, such firms will be threatened by both Eastern European and Third World, low wage commodity producers and high wage producers of specialized products.

The market dominating retailing chains in the United Kingdom are seductively appealing to manufacturers in developing countries. It means that a Cyprus furniture manufacturer, for example, can gain access to a sizeable portion of the United Kingdom furniture market by establishing a relationship with the purchasing agents of a half dozen retailing giants. But once a manufacturer has installed high volume, dedicated equipment for producing products defined by a Harris Queensway or MFI, its future is at risk by the retailer's incessant worldwide search for lower costs producers.

Terence Conran's Habitat, another United Kingdom retail chain, has a product range similar to IKEA but its retailing strategy is to counter the trend to edge-of-town megastores with 'galleries' or small, speciality shops along the lines of Mothercare, also run by Terence Conran. This 'localism' counter trend seeks to offer greater product specialization. Habitat's share of the United Kingdom market is only 1-2% of sales which offers greater opportunity for medium-sized manufacturers. But even Habitat seeks the market oriented supplier relationship. One Cyprus manufacturer was offered a joint venture with Habitat but only on the understanding that the Cyprus plant would only produce designs specified by Habitat. Thus Habitat insisted that an independent design capability not be developed.

1.5. Mass Production, Manufacturer Led Strategies

Poggenpohl, the large German kitchen manufacturer has an annual turnover exceeding \$120 million. It specializes in kitchens and utilizes a large franchise dealer network staffed by people trained in a facility shared with several other German kitchen manufacturers. The franchisee offers a customized, fitted out kitchen according to the specifications of the customer's kitchen. Poggenpohl sub-contracts the doors for the panels to enhance the range of door designs and minimize the commitment to any one design. Companies such as Poggenpohl are a formidable opponent as they have pursued the principles of modularisation and flowline production. Within six years of entering the United Kingdom market, mainly German mass

producers controlled nearly 50% of the kitchen market. But again the very strength of Poggenpohl is also a weakness. The firm can produce at low cost only at a volume which threatens market saturation and thereby the need to continuously seek new markets.

German firms are unparalleled in the production of panel based units. Firms can draw upon world class production engineering in the form of hired personnel or consultants. The consultants Gerhard Schuler, for example, have layouts for 2200 plants around the world. The Rosenheim Woodworking School is also the world leader in the teaching of furniture production engineering. The German craft tradition and leadership in the machine tool industry also contribute to a highly competitive furniture industry. German firms subject themselves to performance tests such as work-in-process turns, capital utilization rates and quality testing that are highly advanced by conventional furniture industry standards.

But the powerful German furniture industry has not stopped imports of over \$1 billion in furniture annually. To understand why we must turn to flexible specialization as an alternative to mass production. The best example is Italy.

1.6. Flexible Specialization and the Italian Furniture Industry

Italy's economy has performed comparatively well in recent years. In real terms Italian industrial output increased by 16% between 1978 and 1984. But in that same period the Italian furniture industry expanded by over 50%. Between 1967 and 1981, value added per employee, fixed investment per employee and pay all increased by roughly ten times for furniture firms with over 20 employees Silvestrelli, 1985. (Note that such data does not exist for firms with less than 20 employees as they are not required to report such information). Annual changes in turnover, value added, fixed investment, wages and employees are shown in Table 6.

Growth Indices of Italian Furniture Industry, 1967-1981
(Firms employing over 20 employees)

Year	Output/ Employee	Value Added/ Employee	Fixed Investment/ Employee	Pay/Employee
1967	100	100	100	100
1981	1675	1178	914	1089

Source: Silvestrelli, 1985.

The second feature of the Italian furniture industry is the prevalence of small scale producers. In 1981 over 86% of the furniture firms employ less than 10 workers and only 2 employed more than 500 workers (see Table 7.)

The average number of employees per firm increased from 4.7 in 1961 to 5.8 in 1981 (see Table 8). The employment share of artisanal producers (between 1 and 9 employees) did drop sharply from 53.4% in 1961 to 37.2% in 1971, but was still 35.8% in 1981 (see Table 8). But the shift of employment has never been to firms with greater than 100 employees. In fact, firms with between 10 and 49 employees increased their share from 27.8% in 1961 to 33.8% in 1971 and to 38.3% in 1981. And the category of firms with 99 and less employees included 86.3% of all furniture workers in 1971 and 86.8% in 1981.

The important implication to draw from these empirical details is that the enormous growth and improvement in competitiveness of the Italian furniture industry was not associated with an expansion in the size of firms. The increase in productive efficiency came primarily from increased specialization which, in turn, was a consequence of improved organisation. As noted earlier, success in the European furniture industry in the 1970s depended upon the development of industrial districts. Such industrial districts allowed small, flexible firms to specialize and have ready access to the full range of requisite business services. Activities of firms

within such industrial districts are coordinated through mutually dependent networks that facilitate tailorized consortia.

The Italian 'consorzio' is one institution that facilitates interfirm networking. The structure of the 'consorzio' is fixed by law. It is an association of enterprises designed to provide a common service which cannot be profit seeking and must be accountable, to its members. Joint marketing and financial 'consorzi' are the most prevalent form. The number of cooperative marketing ventures in Italy increased from 48,000 in 1970 to 79,000 in 1979 (Economists Advisory Group, 1983).

An example of such a cooperative marketing venture in the furniture sector is the Consorzio Poggibonsi, established in 1965. In 1983 it had a staff of 6 and 85 member firms which together employed about 2000 people. Total turnover of the consortium was about \$150 million: with 30% coming from exports. Sixty-three of the member firms were in furniture with the other 22 distributed across a broad range of ancillary products and services, including interior decoration, lamps and lighting fixtures, doors and windows, glassware, marble, shipping, paints and varnishes, metallurgic products, printing and graphic arts, building construction, woodworking machines and ceiling tiles.

Membership in the consortium cost about \$6000 per year. The services provided included the following:

- * export promotion
- * fair and exhibit organisation
- * sales missions to foreign markets
- * maintain contact with governmental bodies that promote trade
- * conduct market research
- * maintain an export office with translation facilities in Florence
- * promote domestic and export catalogues. Twice a year the consortium publishes a glossy review

- * keep files on financial soundness of existing and potential customers
- * organise bulk buying of raw material and other inputs. These materials are often stored in the consortium's warehouse
- * provide a range of business services including computer and telex facilities, advice on compiling budgets and tax returns, a weekly newsletter, job advertisements and exchange rate movements
- * provide training facilities

Federal and regional government subsidise the consortium's expenses. The members' fees cover about 25% of the costs of the consortium's expenses. The rest is covered by grants and loans from the Italian Foreign Affairs Ministry, the Tuscany Regional Administration and banks (Economists Advisory Group 1983). Thus the government provides a crucial input into the marketing cooperative. The effect is to reward private collective action as opposed to subsidising individual firms.

Marketing consortia are an alternative to coordination by either managerial hierarchy within a big business or by prices in the market. They allow small firms to gain access to collective services but are provided to divisions within multidivisional firms but without sacrificing entrepreneurial activity and organisational flexibility, both of which are crucial to the furniture industry. They also allow firms to coordinate product lines and thereby specialize but without common ownership. Thus without forming a multidivisional organisation, production units can avoid the tendency to produce the same products and compete over price as was done by the North London furniture firms.

Finance can also be the subject of a consortium's activities. Loan guarantee consortia are cooperative associations created to provide credit guarantees for members to borrow from banks. Borrowings are guaranteed by the consortium which collects contributions from members and federal, regional and local governments. For example,

the regional government contributes 3% of the negotiated interest rate of the 'Consorti Fide' of Emilia-Romagna.

Any member enterprise that desires a loan must go first to the local branch of the National Confederation of Artisans (NCA) which is an association of firms with 20 or less employees. The NCA secretary "asks for detailed information on the overall situation of the firm, it's long and short term credit exposure, it's main customers and suppliers, receipt and payment periods. He then sends a report to the Board of Directors adding his own opinion on the personal characteristics of the applicant, his trustworthiness and his professional standing" (Sebastiano Brusco, "Local Government, Industrial policy and Social Consensus in the Experience of Modena, Italy", University of Modena).

What the loan guarantee consortium supplies to the bank is an assessment of the enterprise's prospects based upon intimate knowledge of fellow artisans and a loan guarantee. These additional inputs open up the credit market for small firms, a market that depends upon trust, a non-commercial input. In the case of the Credit Cooperative of Madera, founded in 1976, a total of about \$6 million in loan guarantees by 1985 had resulted in only about \$45,000 of unrecovered loans. The reason according to Brusco is "...the person who receives a loan from the cooperative will stay up at night thinking up ways of repaying his loan. Whereas the person who receives a bank loan will stay awake at night thinking up ways of not repaying his loan".

Municipal governments also actively promote industrial districts amongst small networked firms with land planning programmes. The passage of the "Plan for Industrial Parks" in 1972 gave municipalities the power to expropriate and plan large areas for industrial parks for artisanal and medium/small firms. In 1974 the municipality of Modena passed the "Plan for Small Firm Areas" which focused on the following objectives (Brusco, 1985):

- * assist the interrelationships of manufacturing districts by means of carefully planned location within the territory of those companies which are in a condition to be moved.
- * increase the range of the availability of areas less than 800-1000 square meters.
- * support and create incentives for the development of artisan consortia as an alternative to big companies.

Thus the industrial parks foster joint private/public organisation to promote cooperation and competition. A group of small firms, in conjunction with the government can effect land use arrangements in ways that only large firms could in most countries.

Marketing and financial consortia and industrial parks do not exhaust the forms of sector infrastructure institutions that have been developed in Italy, but they illustrate the principle that such institutions allow the coordination of the six business functions required by the new competition. What is most significant about these developments is that they provide an alternative path to productive efficiency. In fact, in the case of furniture, they may well be the only path. The provision of collective services through a large managerial enterprise has only been successful in the case of furniture retailers, not to date, in the case of furniture manufacturers.

THE CYPRUS FURNITURE INDUSTRY

2.1. Aggregate Performance

2.1.1. Size and Growth.

The sector Wood and Wood Products Including Furniture (Industry Code 33 shown in Table 9) accounted for nearly 8 percent of manufacturing output and 6.6 percent of manufacturing employment (see Table 10). The Wood and Wood Products Including Furniture expanded by 2.5 times over the 1976-1984 period while manufacturing as a whole expanded by less than 2 times (see Table 11).

The rapid growth was linked to three powerful demand generating forces. the domestic construction industry which rehoused the 40 percent of the Greek Cypriot population displaced by the events of 1974; the tourist industry which relocated hotels and hotel/apartments on the south coast and the Cypriot international construction industry which expanded rapidly throughout the Gulf States with the rise in income of the OPEC states and the decline of Lebanon.

As these demand forces have subsided the furniture sector has gone into recession. Furniture output in constant prices declined in 1984 by 2 percent and regained its 1983 level in 1985 (see Table 12).

2.1.2 Firm Size and Productivity.

The Wood and Wood Products Including Furniture sector is dominated by small firms. In 1984, the 1552 firms in the whole sector comprised over one quarter of all Cyprus manufacturing firms (see Table 10). The Wood and Wood Products Including Furniture sector is divided into two subsectors of similar size. The first is the Wood and Cork Products Except Furniture subsector with 816 firms, 2,755 employees and C£26.6 million turnover. 686 or nearly 85 percent of the firms in this subsector makes doors and windows. The sub-sector has one large firm, Cyprus Forest Industries, Ltd., which will be examined later.

The other subsector is the Furniture and Fixtures (Wooden) sector with 736 firms, 2,828 employees and C£23.3 million turnover (see Table 9). For purposes of this Report the wood and Cork Products Except Furniture subsector (industry code 331 in Table 9) will be referred to as the wooden, non-furniture subsector and Furniture and Fixtures (Wooden) subsector will be referred to as the furniture or wooden furniture sector (code 332 in Table 9). The primary focus of this Report is on the furniture sector so defined.

The 736 furniture sector firms are predominately small with roughly 85 percent in the 1-4 employee category (see Table 13). Only 21 of 736 furniture firms in 1984 employed twenty or more employees (see Table 13). These 21 'big' units produced over one third of total value-added of the sector. Since 1980 the share of output produced by firms with between 5 and 10 employees has declined from 18.5 percent to 11.3 percent and firms with over 50 employees increased their share from 29 percent in 1980 to 41.1 percent in 1985 (see Table 14).

It is a conventional view that small size is the cause of production inefficiency. But as indicated in Table 13, the value-added per employee does not neatly increase with firm size. The average value-

added per employee is the same for firms with between 1 and 4 employees and with those between 50 and 90 and roughly the same for firms with between 10 and 19 and between 30 and 49. This implies that increasingly the size of furniture firms may or may not increase productivity and that the sources of low productivity are not to be found in firm size. This conclusion is hardly surprising in light of the structure of the Italian furniture industry.

2.1.3. Labour and Capital Productivities.

Labour productivity in the Wood and Wood Products Including Furniture sector is low by Cyprus manufacturing standards. In 1984 the entire sector employed 13.1 percent of the manufacturing labour force to produce only 7.7 percent of manufacturing output; the furniture sector employed 6.6 percent of the manufacturing labour force to produce only 3.6 percent of manufacturing output.

The capital output ratio for furniture in 1984 was nearly a quarter below the average for manufacturing as a whole: Furniture used 4.4 percent of manufacturing capital formation to produce 3.6 percent of manufacturing output (see Table 10).

2.1.4 Export Markets and Trade Balance.

Less than 5 percent of furniture output is exported. Small firms (5-10 employees) do not export at all, medium sized firms (11-50 employees) export only to Arab countries and large firms (over 50 employees) export almost entirely to the United Kingdom in the form of Cyprus pine chairs (see Table 15). In the 1980 to 1985 period, exports hovered between 2 and 3 percent of the value of furniture production compared to imports which averaged over 8 percent (see Table 12). For the 1980-1985 period imports have more than trebled with respect to exports.

The negative trade balance exists even though the furniture industry is highly protected. The tariff on furniture imported from the EEC is currently 69.9 percent and the tariff on non-EEC furniture imports is 80.2 percent.

Wood Industry Protection

<u>Product</u>	<u>Cyprus Tariff</u>		<u>Other</u>
	<u>EEC</u>	<u>General</u>	
Wooden Furniture	69.9%	80.2%	
Doors and Windows	5.2%	8%	
Chipboard	Nil	Nil	Banned
Plywood	Nil	Nil	Quota
Medium Density Fibre Board	Nil	Nil	

Source: Sean Murray, 1985

2.1.5 Vertical Integration.

Perhaps the most distinctive feature of the Cyprus furniture industry is the near universal vertical integration of production and selling. Except for a minority of firms in the 11-50 employee category virtually all Cyprus furniture firms sell directly from the factory or from their own retail shops. A sample of firms examined by the Industrial Training Authority (1987) indicates the magnitudes involved:

Sales Outlet Forms: Frequency Mention

Form of Sale:	Size of Firm			Total
	5-10	11-50	over 50	
Other Retailers	1	12	0	13
Own Retail Shops	13	27	7	47
Direct From Factory	18	22	4	44
Total	32	61	11	104

2.2. Inside the Firm

In January 1987, fifteen Cyprus furniture firms were visited. Together these firms employed 681 persons or about one quarter of the furniture sector total. The following observations are based upon these visits.

2.2.1 Market Orientation and Comparative Production Costs.

The primary market orientations of the 15 visited firms were as follows:

Domestic

household	8
hotel	2

Foreign

pine chairs to U.K.	3
construction	2

During the economic boom Cyprus firms were able to make money by supplying the expanding domestic household and hotel markets. But since 1984 furniture firms have been caught between two depressive forces; slackening growth in demand and rising foreign competition. Higher per capita income has attracted foreign suppliers which has belatedly forced furniture firms to focus attention on the high costs of domestic production. One owner/manager believes that production costs in Cyprus are roughly two times the Italian level and that the quality is inferior. He bases this conclusion on a comparison of products that his company continues to import (C£40,000 annually) with his company's own production costs.

The owner/manager of the most productive large furniture firm visited estimates that his firm's costs are only 10 percent above what would be required to supply IKEA. This firm presently specializes on one

product most of which is exported. The owner/manager believes that domestic margins are three times foreign margins but this firm's supply capacity is too great for the domestic market given the fragmentation of the distribution system.

If this firm were to supply IKEA, a substantial expansion in output capacity would be necessary and perhaps C£80,000 in new equipment. The major constraint on supplying mass retailers like IKEA may not be productive organization but an adequate supply of knot free Cyprus pine of the quality demanded. From interviews with Cyprus Forest Industries Ltd. (CFI) it appears that the supplies of such wood are limited to present production levels. Furthermore it appears that CFI is pricing solid wood below production costs. If this is true it suggests that purchasers of CFI chipboard are subsidizing purchasers of CFI solid wood. It also suggests the retail costs to Cyprus of supplying IKEA with solid wood furniture would be more than 10 percent above the current (subsidized) costs. The social return of firms utilizing CFI solid wood for export to mass retailers like IKEA might drop even more if calculations accounted for the costs of resource depletion that are not captured by the market.

The conclusion is that the costs of production in Cyprus furniture firms are considerably above the international standard. The reasons for the high costs of production will be examined in the sections that follow. Each points to elements of a strategy for making the furniture sector internationally competitive in the coming years.

2.2.2 Production Specialization.

Production specialization within each category was minimal. As noted above most domestic household furniture firms maintain their own showroom which each alone supplies. The effect of vertical integration is product proliferation within each furniture firm. It is common for a domestic household firm to produce hundreds of products. As one manufacturer lamented, he must produce 10 bedroom

ranges even though only 3 sell because the customer will invariably ask "Is that all you have?"

The lack of product specialization is a major deterrent to investment in modern methods. One owner explained that he had considered investing in a flowline operation but has been put off by the C£1 million price tag. The owner estimates that if his company was part of a group of specialized firms he could develop a flowline for a single product for C£200,000. Presently the company does not plan to invest in either; the C£1 million investment is 'too small for Europe and too big for Cyprus' and the C£200,000 investment depends upon inter-firm cooperation which does not now exist.

2.2.3. Work-In-Process and Asset Turns.

None of the firms keeps records on the utilization of working and fixed capital. Work-in-process turns (value of furniture sold divided by work in process) are exceedingly high by international standards. Unfortunately, most manufacturers lack the cost accounting techniques to reveal the high costs of excessive inventories. For example, one firm with a turnover of about C£1 million was seeking, without success, to get a working capital loan from the bank for C£40 thousand. As we walked around the shop floor the owner pointed out approximately C£1 million in work-in-process and inventory.

This low productivity of working capital is a hidden cost of the failure to specialize built into the structure of self-retailing. Since every manufacturer attempts to supply the whole furniture range of each customer, he/she must match inputs and outputs for a diverse range of products per each individual customer. (Sometimes several orders can be grouped but usually the orders are for different products.) Specialization in one product only demands matching input requirements with total flow of demand instead of matching product with demand for each of the hundreds of products that the firms are

now supplying. Specialization would facilitate coordinating material inputs with outputs by reducing the variety of inputs requirements and stabilizing the input demands over time.

One firm stood out as an exemplar in working capital productivity. The firm produces C£80,000 annual with 8 workers, five of whom are highly skilled. By producing to order the company keeps stocks of only C£1000, work-in-process of C£3000 and inventories (in the showroom) of C£8000. If the numbers are correct, the resulting work-in-process turn of over 25 is in a class by itself amongst Cyprus furniture manufacturers.

The same company is also extremely productive with fixed capital. It has 9 stationary machines which were purchased for a total of C£20,000 and a large number of portable tools. The owner/manager plans to purchase an additional C£35,000 in equipment for the new factory. Again, if these numbers are correct, this company is a model of high fixed capital productivity.

The high productivity of the company is reflected in the growth of net assets in the balance sheet from C£1.5 thousand when it started four years ago to C£50,000 today. (When interviewed the owner/manager was applying to a bank for a long term loan. He had been recently turned down by one bank with the explanation that "the furniture sector is not a priority sector for development". The commonly held view within the industry that banks are unfavourable to furniture firms will be commented upon in a later section.)

Unfortunately this firm was the exception. The asset turn ratio of only two Cyprus furniture firms was around 3, most were 1 or less. This reflects in part, a high level of underutilized machinery and equipment. In many firms modern, expensive, electro-mechanical equipment designed for large batch production was idle for most of the time. (Often owner/managers referred to such equipment as 'computerized' but there are no CNC or electronically controlled

machines in the Cyprus wooden furniture machinery. This may not be bad, but the failure to distinguish between electro-mechanical and electronic equipment reflected a lack of awareness of the new possibilities for flexible small batch production being created by the information technology revolution.)

One company has a largely idle mass production spraying line that could supply the entire Cyprus furniture industry. Another has an electro-mechanical mass production panel saw (worth probably \$300,000 new) that could easily supply the entire Cyprus furniture industry. In an ideal situation such a machine could be kept fully employed by the Cyprus Furniture Industries Ltd. or a separate firm that specialized in sawing panels. The costs for the whole industry could be driven down in the process. (Ironically, this particular machine was purchased from a North London firm that was shutting down. We must hope that the Cyprus furniture industry does not go the way of the North London furniture industry and become a source of machinery sales by distressed or bankrupt firms.)

2.2.4 Product Quality.

The quality and finish of Cyprus furniture products have improved in recent years but, with some notable exceptions, they remain well below the standard demanded by EEC consumers. The advance in quality realized in Italy and elsewhere is attributed in important part to the employment of skilled labor who have a commitment to the enterprise. Scientific management (Taylorism) seeks to establish competitive advantage by worker deskilling, which is not conducive to high quality and this is a major reason that big furniture firms have not dominated the European furniture industry. Certainly Cyprus furniture firms are not now organized by Taylorist principles but neither, on the whole, are they organized in ways that emphasise high quality.

2.2.5. Design.

Many firms cited design imitation as a serious problem in the Cyprus furniture industry. Managers argue that little is spent on design because success leads to imitation before costs are recouped.

Two of the more successful Cyprus furniture firms are owned by designers trained in England. One puts his designer skills to work in collaboration with architects to design furniture and fittings for the most luxurious homes and offices in Cyprus. (The General Secretary of Cyprus Building, Wood and General Workers Trade Union cited this company as the most preferred employer in the Cyprus furniture industry.) The other designer led company is in the process of upgrading its manufacturing capabilities and its human resources so that its design strengths can be better realized.

Perhaps the fastest growing Cyprus furniture company over the past 10 years has pursued a strategy of imitating Italian designs using medium density fibreboard. But unlike the Italian firms, this company does not do product innovation. This would require alterations in the organization of work.

2.2.6. Labour Costs and Work Organization.

Wage cost average about C£60 to C£65 per week with unskilled receiving C£30-40 and skilled receiving C£70-80 per week. These are low wages by EEC standards. The relevant figure is not wage per week but wage cost per unit products and here Cyprus is high. This problem is caused by poor organisation of production.

Traditional workshop methods of production predominate. Large firms are simply a multiple of small firms placed under a common roof. The result is low productivity. Direct labour costs as a percentage of

output varied from a low of 20 percent to a high of 43 percent. Alone, labour costs as a proportion of output can not indicate a lack of efficiency. But particularly in the case of firms producing commodity as opposed to custom or specially designed products, ratios in the 30's are high. They do not reflect high wages per hour, compared to European furniture firms, but high wages per product. This is due to organizational deficiencies. Direct labour costs in high wage furniture making countries run around 15 percent of total costs.

The most productive Cyprus furniture firm has a unique work organization. Here management has introduced a bonus system geared to modifications in the uses of plant and equipment and organization of production. Operators can earn bonuses if they design machine modifications that reduce setup times. If the foreman can make organizational changes that result in output increases then he gets a bonus. A labor committee assesses all proposals and changes. The owner/manager states that the result was a 25 percent reduction in per unit labor costs and a 20 percent increase in wages in the first year. Any reductions in employment in the main plant does not lead to unemployed workers. The displaced worker goes into a speciality department that produces a variety of products on a workshop basis.

The owner/manager believes that the worker involved system is leading to machine innovations, one of which he is convinced will revolutionize a standard operation. He was not willing to divulge the details but did tell a compelling story.

Unfortunately, this firm is the exception in the Cyprus furniture industry where advanced machinery is deployed. Most firms pursue a traditional division of labor in which machine set ups and modification are the responsibility of plant managers alone. Workers are given neither the responsibility nor the authority to seek modifications in the design and use of machines to concentrate their attention of reducing set up times or seeking organizational changes to improve product quality or product flow.

2.2.7 Management Organization.

In the days that demand for furniture was rocketing upward, it was sufficient for a proprietor to buy or rent a warehouse, buy machinery and employ people using traditional workshop methods. Success for Cyprus enterprise in European market will require the development of business acumen across the range of activities listed in Table 18. Developing business acumen in each of these activities does not require sufficient scale of output to afford hiring full time managers for each position; numerous alternative business service delivery systems are possible; examples include private consultancy, joint ventures, cooperative associations and government extension services.

Management organization in the Cyprus furniture industry is lacking in the sense that these alternative forms of business service delivery systems are not available. The provision of expertise in each of the distinct business activities is instead provided by the same individuals within each firm. Rather than looking outward and sharing the provision of common services, Cyprus furniture owner/managers seek self-sufficiency in the provision of the whole range of business activities.

It is far superior for an expert to divide his or her time across a range of enterprises than for a manager to attempt to divide his or her time across the range of business services. The result of the current system is that the owner/manager can not develop a distinctive competence that will provide the basis for a competitive edge for his/her firm or a specialist expertise required by the furniture industry as a whole. Instead managements collective energies are dissipated as they each simultaneously engage in strategic planning, marketing, production, accounting design, labor relations, product development, etc.

In principle, management organization can be developed either by specialization based upon the creations of large managerial enterprises or networked associations of small firms. For Cyprus and for the furniture industry, the networked association approach is the most promising. Without networked associations the economies of size that characterize many of these business services will preclude their availability; with such associations the expenses become overhead to the whole group of manufacturing units.

2.2.8 Finance.

Many managers stated that finance was a major constraint. This, however, was belied by two facts. One is the excessive amount of both working and fixed capital, in evidence in the production plants. Work-in-process is waste particularly in the sense that banks will not accept it as collateral and for good reason. Both raw material and final inventory can be sold but work-in-process is junk. At the same time many firms had work-in-process in amounts that compared to several months turnover and in at least one case more than a years production. All of the work-in-process is tying up working capital at market rates of interest which is doubly costly: the firms pays interest on it and it can not use the money for more productive purposes. Bankers should insist that work-in-process turns be pushed into the double digit area before working capital loans are made.

It was noted that asset turns are also low. Pushing asset turns up from less than 1 to 2 or 3 could result in substantial reductions in finance needs. It would require production reorganization.

The second reason that it is doubtful that finance is a constraint is that in the one case in which I am aware that firms approached the Cyprus Development Bank with a strategy to restructure and promote specialization, (fuller comments on this case follow) the Bank stood ready to provide long term finance.

This does not mean to suggest that banks have been especially helpful in promoting reorganization of the Cyprus furniture industry. In fact, with the exception of the Cyprus Development Bank, no banks offered a strategic orientation to furniture firms seeking finance. Furthermore, the two firms visited that did have high capital productivity ratios and strong balance sheets also complained that banks told them that "furniture is a no loan industry".

2.2.9. Government Services to Industry.

The industrial estate program of the Ministry of Commerce and Industry (MCI) has been a success in providing low cost facilities and physical infrastructures to furniture firms. Most of those firms visited were in industrial estates and few complaints were registered. The MCI's loan guarantee program for facilitating the reestablishment of firms by entrepreneurs that had lost their properties in 1974 has also been a developmental success although financial figures were not readily available.

The MCI implements tariff policy, dispenses import licenses, runs the export promotion agencies located in London, Frankfurt and Paris and conducts an extension service to promote the industry. Furthermore, MCI officials sit on the boards of the Cyprus Development Bank and Cyprus Furniture Industries Ltd. In each of the areas manufacturers had a number of criticisms.

The basic weakness is that the MCI does not have a sector strategy with respect to the furniture industry that would provide a vision as to where the industry was going and give coherence to each of its activities that impact upon the industry. Often different activities are working at cross purposes.

The first requirement of developing a sector strategy is some form of deliberation council that acts as a vehicle for group discussions of

the challenges facing the industry and for shaping a consensus around the way ahead. The employers associations and the unions are consulted but there does not presently exist an ongoing forum for deliberation. In fact, the extension agent is highly respected in the industry but, unfortunately, he has a number of duties to perform within the Ministry that limit the time that he can commit to it.

2.2.10. Raw Materials and Cyprus Forest Industries, Ltd.

The largest cost item in wooden furniture is wood product materials. The supply of high quality, competitively priced raw materials is critical to the success of any furniture industry. What follows is a description and analysis of Cyprus Forest Industries Limited (CFI) which supplied chipboard and wood products that are used by Cyprus furniture firms.

CFI is a registered public company which was established by the Government of Cyprus with the objective of planning the rates of harvest and reforestation in the national interest. The Government owns 51 percent of the Company shares, the Cyprus Development Bank owns 9 percent and the rest is owned by private shareholders. Policy is controlled by the board of which four of the seven members are appointed by the Government.

Unfortunately, Cyprus has very limited supplies of solid wood. Roughly 20 percent of the land area is forested but much is of low quality. Most of the trees are 200 years old and trees take a very long time to grow in Cyprus. According to CFI officials, 30 percent of the existing forests were destroyed by bombing in 1964. CFI had to cut enormous amounts of trees to salvage the wood before it rotted and became infected with termites.

In the post 1974 period the production of solid wood by CFI has dropped from a peak of 12 to 6 thousand cubic meters. The Cyprus

Pine is a hard but knotty wood and over 50 percent of their quality solid wood goes to one solid pine furniture manufacturer. The furniture manufacturer converts it into chairs most of which are exported to the United Kingdom and sold through a UK company that specializes in manufacturing and importing pine furniture. The UK Company sub-contracts the production of chairs, a solid wood and labor intensive product, to a variety of producers around the world. CFI cannot expand solid wood production of the quality required for furniture making but CFI officials argue that they are presently subsidizing its production. If this is true it could mean that the highest quality Cyprus pine is being utilized unwisely. It is immediately evident that an enormous amount of waste is involved in cutting away all of the knots to supply the foreign chair market.

Fortunately, solid wood resources are not required for an internationally successful furniture industry. Italian industry experts argue that the lack of solid wood in Italy forced the Italian furniture manufacturer to innovate in particle board products, which is today the dominant material in furniture making.

CFI believes that sufficient wood exists to cover the requirements for the furniture and construction industries for particle board from annual growth if the rate of reforestation started in the last few years continues and if the timber felling is carefully controlled. CFI's growth has been based upon developing these materials. Today, CFI has the following production capabilities.

- (a) A sawmill with an output capacity of 13,000 cubic meters per year. It does not run to full capacity as supplies of timber are somewhat erratic.
- (b) Kilndrying units with an output potential of 5,000 cubic meters per year. Output levels are approximately 50 per cent of capacity.
- (c) A wood chipboard factory that runs at full three shift capacity producing 20,000 cubic meters annually out of a total national demand of 35,000 cubic meters.

- (d) A wood veneering plant that produces 6,000 cubic meters per year. Presently CFI is importing about 8000 cubic meters of wood veneered chipboard to meet demand.

CFI expanded total output from 42,250 cubic meters in 1980 to 55,619 in 1984 before a drop to 53,315 in 1985. The value of sales climbed from C£4.5 million in 1984 to C£4.9 million in 1985. The level of employment has dropped from 185 in 1980 to 148 in 1985 as productivity increased.

The plant and equipment appears to be of high quality. The sawmill was designed by a Swedish firm and started operations in late 1974. The kilndrying units were set up by an Austrian firm and commenced operations in 1975. The chipboard and wood veneering plants were purchased as turnkey projects from an Austrian engineering company. The technology and machinery were made by German and Austrian firms. The plants were commissioned in November, 1975 and machinery has been updated since then.

As a secondary wood processing enterprise, CFI has been diversifying its product range. In 1982, CFI began the production of melamine and output has expanded from 1204 cubic meters in the first year to 6703 cubic meters in 1984. Recently CFI purchased a large plywood plant which to date has not been profitably operated in Cyprus. Currently, CFI is examining the feasibility of vinetwigs as a base material for particle boards. Management is confident that vinetwigs will be economically and technically feasible which would expand the Company's particle board potential to 10,000 meters per year. Also, CFI is considering the production of medium density fibreboard, a product that is rapidly becoming an important furniture industry material.

Internationally, technical progress has been substantial in the panel products industry. It is an industry that is susceptible to continuous flow processes and electronic technology. For example,

European panel producers use computerized machines to cut panels to special sizes. As shown in Table 1.A, Finland, Germany, Korea, the USA and Malaysia were the leading exporters of panel products. Recently Indonesia has pursued a priority development program in panel production and will play a major role in the future of the industry.

Sawmills are also utilizing automatic handling machines. Microelectronics can be applied to timber sorting, materials handling and determining optimal sawing patterns. These technological applications may not be economically feasible in the Cyprus context today but must be watched carefully.

RESTRUCTURING THE CYPRUS FURNITURE INDUSTRY

3.1. Age of Change.

The ten years ending 1984 were good years for the Cyprus furniture industry. A sellers market was created by the conjunction of the resettlement housing projects, the Middle Eastern import surge and the tourist industry construction boom. It was not a time when furniture makers felt a need to reorganize their production facilities. Output was expanded simply by proliferating workshops using traditional production and distribution methods. The industry grew in size but did not change organizationally. Instead of using high margins to finance restructuring, the furniture manufacturers "ate while they cooked" in the words of a prominent industry spokesman.

The 1970's were eventful ones for furniture industries elsewhere as well. Sales of Italian furniture increased tenfold in current lira in the decade (see Table 6) and IKEA revolutionized the European furniture market. The European furniture industry was undergoing both extensive and intensive growth. The winners in the new competition were firms that pursued strategies of permanent innovation and created flexible organisations with a built in capacity to learn. Increased productivity and competitiveness did not require or even mean, in most cases, large scale producing units but it did require increased specialization as small firms became interdependent members of productive associations.

Today the Cyprus furniture industry faces a stern challenge. Unless it is reorganized substantial sections will wither under the impact of European competition. Two broad strategies are available as a vision for guiding reorganization.

3.2. Exporting to Mass Retailers: A Limited Strategy.

One strategy is to join forces with foreign mass retailers such as IKEA, MFI and Habitat. Cyprus manufacturers would sub-contract to retailer determined designs that were tendered internationally. This approach may work for some firms but it has at least two serious drawbacks for the Cyprus furniture industry as a whole.

1) Insufficient solid wood resources. The main interest that foreign mass retailers have shown in the Cyprus furniture industry to date is as a cheap source of hard pine manufactured into chairs. It would be unfortunate if the limited supplies of solid pine were depleted to supply low margin chairs to discount retailers. Cyprus pine stocks are small and have a very slow replacement cycle. It is the island's traditional wood and may play an important role, if used judiciously, in defining a distinctive Cyprus style of furniture.

2) Dependence on foreign design. Habitat, the design orientated British retailer, proposed a joint venture with the most design orientated Cyprus furniture manufacturer. But the contract called for 100 percent Habitat designs. The end result of yielding control of design to foreign retailers will be the conversion of manufacturers' independence into subservience in the form of dependent sub-contractor status. Design subservience will be followed by vulnerability to low wage competitors in poor countries. For once the dependent relationship is established the retailer can and will squeeze margins ever further. This is the story of the North London furniture industry described above.

The dependence on foreign design has a second twist to it. Increasingly, successful retailers are sourcing closer to home as the role of design and the importance of flexibility have both increased. In other sectors, retailers are finding that long distance communication between designers and producers has problems when specifications are changing constantly and with quality control. It

is not yet clear if this tendency to local sourcing will be as powerful in furniture as it has been in industries as disparate as clothing and cars but it creates another source of vulnerability to a strategy that depends upon producing furniture to the design specifications of foreign mass retailers.

The importance of integrating design and production within Cyprus can not be exaggerated. The Cyprus furniture industry is at a turning point. It must either restructure the industry around a vision that integrates design and production or it will be caught up in forces over which it has little control. To minimize subservience to mass retailers abroad but, at the same time, to become more internationally competitive it is imperative that a version of flexible specialization vision be adopted.

3.3. Flexible Specialization: A Strategy of Establishing Competitiveness.

The second strategy is flexible specialization. Three characteristics stand out as guidelines to a restructuring vision based on flexible specialization.

3.3.1. Strategic Orientation.

All firms must choose the basis upon which a competitive advantage is sought. A firm can not pursue two strategies at the same time. It loses focus if, for example, it seeks to be both the lowest cost producer and the leading innovator.

Firms pursuing a generic strategy of flexible specialization seek to establish a market niche based upon designing new products or processes for identifiable market segments. Identifying and establishing a specific market niche is one way of developing the

firm's concept or strategic orientation which, in turn, gives purpose and coherence to the organisation.

The idea of a firm's concept (the term concept and strategic orientations will be used interchangeably) is not the same as strategy. A firm's concept defines its distinctive competence. Success demand that a firm seek a unique position in the market and concentrate its collective energies on doing the one thing that it does best. To do something best requires concentrating on a specific technology, process product or service until a level of quality is achieved that users can ill afford to do it themselves and competitors cannot imitate. It is refinement of a distinctive competence that emanates from experience and teamwork that competitors cannot match and that gives a firm breathing space in the marketplace. Many firms can pursue a strategy of flexible specialization but each will have a distinctive concept.

A firm can modify its concept but it is like a person altering his or her personality; it doesn't happen often or easily. Consequently, a firm's concept is adjustable but only with a concentrated and sustained effort and within a sector context. Getting the strategy and the concept right involves redefining work organization, management structure and interfirm relations to seek coherence with the firm's concept; in the process the concept will likely be refined.

3.3.2. Integration of Planning and Doing in Work Organization.

A strategy of permanent innovation requires that skilled workers be involved in continuous improvement of shopfloor methods and organization. Workers that understand the machines are in a position to modify them and to implement new product designs. The integration of planning and doing is the opposite of 'scientific management' which sought to concentrate all of the planning functions in the managers and leave the workers to simply perform detail actions pre-

defined by managerial instructions. A comparison of the two models of work organisation is shown in Table 17.

Elsewhere 'Scientific management' and the separation of work into managers who plan and workers who do, has led to elaborate piece rate schemes, narrow job classifications, detail labor and a rule governed work organization. It may be efficient for the production of a given and unchanging product, but it is death to product and process innovation. Each product change requires renegotiating the established piece rates and job classifications. The separation of planning from doing inhibits the capacity and the incentive for machine operators to seek process and product improvements or to minimize waste. The segmented division of labor means the machine operators tend not to operate many machines or to engage in maintenance or setups. Being responsible for operating, maintaining and setting up is a considerable enhancement to developing and applying human resources as a basis for competitive advantage. This is the lesson that is currently being learned by Japanese competitors. It would be a mistake for Cyprus furniture firms to go down a path of 'scientific management' precisely when it was being abandoned elsewhere.

Small firms that pursue a strategy of flexible specialization must have skilled workers capable of setting up machines and it must give high priority to an organizational form that promotes the minimization of changeover costs. Only then can the firm adjust rapidly to shifts in consumer demands. Producing to order relieves the contradictory purposes placed upon inventories: inventories are kept high for customer service but low for cash flow. Flexibility means less work-in-process and more rapid delivery times.

The flexible specialization strategy depends upon high skills and effective training. It will require the Industrial Training Authority to develop programs with firms that are committed to advancing worker skills. It will also require the development of

team-oriented work organization and the associated skills in management and the workforce.

Union involvement will be crucial both in promoting the importance of a skilled labor force and in setting a floor on wages so that non-participating employers do not seek to undercut firms that are investing in training and education programs.

3.3.3. Interfirm Cooperation and Firm Specialization.

The secret to the success of the Italian furniture makers was that the industry came to be viewed as an association of specialists, each with a distinctive competence and flexibility in a particular phase or type of production. Individualized consortia in marketing and finance and the National Confederation of Artisans helped articulate, shape and maintain the association of specialists. In Germany, specialization cartels regulated competition to ensure that market niches would not be invaded during downturns and State officials founded the Rosenheim technical institute for furniture research and education. In Scandanavia, trade associations act as forums for setting industrial standards and fostering cooperations particularly to facilitate exports.

Each of these sectoral institutions promotes the self-reinforcement of the divisions of production amongst individual firms. The result is a notion of a furniture sector not as a collection of autonomous, competing units but as a set of interrelated firms and interfirm institutions that enhances the distinctive competence of each unit.

The existence of collective associations restricts price competition and promotes quality competition and innovation. Firms are restricted from price cutting to expand sales and instead seek to improve or further specialize their product line. Progress by one firm puts pressure on firms producing complementary products or

components in the products chain. Firms can rely upon an educational and research infrastructure as well as skilled workers to seek innovations. The result is an industrial district with the capacity to seize and promote opportunities and, most importantly, to learn. In contrast, a furniture district without the institutions of collective association is static and brittle. It is little wonder that the North London furniture district did not survive.

3.4. A Promising but Limited Cyprus Initiative: The Limassol 12

The Limassol group is creating a joint marketing venture in the form of a private company. Each participating firm will have one seat on the board of directors of the new company. The Company plans to open two common showrooms. Affiliation with the joint marketing company carries two stipulations: a company can not sell the same product in both its private showroom and the common showroom, and the company can supply to the common showroom only those product lines that have been agreed within the rules of the joint marketing company. These rules are designed to force specialization on the participating companies.

Ten of the participating companies have applied for and received loans for building up their productive capacity from the Cyprus Development Bank.. This coordination of investment plans is attractive to the bank and reduces the chance that their loans will be used by fragmented companies to promote price competition over similar products in the same markets. The Cyprus Development Bank had previously carried out a feasibility study for the project and has made the loans contingent upon certain developments, such as the hiring of an expert general manager for the joint marketing company. It is crucial that finance be used to promote specialization so that the individual firms have economic rationale for maintaining a commitment to cooperation.

Cooperation amongst the Limassol firms to break down the existing retailing system is a crucial first step in creating the conditions for specialization. But it is only the first step. History is full of examples of joint action amongst employers that has not led to production restructuring. Each firm will be vulnerable as it moves to specialize and will be fearful that other firms are not making the same commitment. Success for each firm will depend upon complementary moves of other firms. Once and if a successful transition is made, individual firms will be mutually interdependent and then specialization will be self-reinforcing. The transition is the most difficult time and it will require considerable skillful negotiation. The Limassol 12 is not yet at that stage.

Product specialization is not a sufficient condition for long term survival. Each firm must develop a distinctive competence, deploy a flexible production process and have access to a range of shared business services. The fact that a group of furniture firms has joined together is a promising first step. But it will not free them from the painful processes of adjustment that must be addressed if the Cyprus furniture industry is to continue growing.

3.5. Nine Components of a Furniture Development Program.

The future health of the furniture industry requires programmatic actions in 9 areas.

1. A Strategic Orientation.

Each firm must develop a competitive advantage based upon a distinctive competence. The first step is to become acutely aware of the European competition. In October of 1986 a group of furniture makers travelled to Sweden. This should be followed with trips to German and Italian enterprises and sector institutions such as the Gerhard Schuler consultancy in Baden Wuerttemberg, the Rosenheim

technical institute in Germany, the Centro Studi Industria Leggera in Milan and marketing cooperatives elsewhere in Italy. A careful analysis of the principles of production and organization of leading European furniture firms and furniture districts will move forward the discussions on both the specific challenges and opportunities facing Cyprus firms and the shape of a Cypriot sector strategy and specific firm strategies within it.

2. Joint Retailing and Marketing.

The current lack of joint retailing outlets has a double edge. The positive side is that it acts as a barrier to the entry of foreign manufacturers into the Cyprus market. But it is also a barrier to production specialization within Cyprus. It is crucial that the manufacturers themselves establish joint marketing and do it effectively so that they can maintain some degree of control over the domestic market. Otherwise the present vacuum in large, specialist furniture retailing will be filled by individuals seeking to distribute foreign furniture who do not have commitment to the long term development of the Cyprus furniture industry.

3. Specialized Production.

It is crucial that production specialization not be simply bargained for amongst producers but that cooperation be promoted within a competitive framework. A lazy production cartel that enforces production specialization by fiat will not be in anyone's long run interest. Competition over technical skills, production organization and quality must be promoted to ensure that specialization is accompanied by enhanced productive effectiveness.

The provision of kiln drying may be one example of how specialization can increase the productivity of the sector as a whole. Currently many Cyprus furniture manufacturers have underutilized and outdated

kiln-drying equipment. Cyprus Furniture Industries Ltd. could provide the latest technologies as well as specialized expertise in what is a deceptively complex activity. This would both reduce the fixed costs requirements of furniture production and enhance the quality of the inputs.

4. Flexible Production.

Shifting markets and demand must be met with flexibility which, in turn, requires the treatment of labor as the critical productive asset. Both the Industrial Training Authority and the Cyprus Productivity Center must be integrated into training and education programmes if firms are to become flexible and capable of pursuing a strategy of permanent innovation. Both worker and manager skills will have to be continuously upgraded if firms are to seize the opportunities offered by new markets. Firms, in a sense, are producing both products and learning. But firms can not be expected to finance the total costs of education and training in a free market system. The government must play a leading role in the provision of training, as it is a public good. In the free market firms will underinvest in training unless there are enforceable rules constraining firms that do not invest in training from undercutting those that do. The best approach for government is to pursue the positive approach of subsidizing a portion of training than the negative one of price setting. The unions are in the best position to enforce a sector-wide training system and to counter the problem of free-riding employers.

5. Waste Free Production.

Excessive work-in-process as well as inventories are waste. We have noted the excessively high work-in-process levels and the extent of idle productive machinery. Presently furniture companies do not measure work-in-process or compare their performance with an international standard. In fact most companies do not make cash flow

projections. The Small Business Department of the Cyprus Development Bank is working on an accounting package that could be introduced into a firm in two days. With upgrading the same or a similar package could be customized to fit furniture companies and compare each company with a standard based upon a well organized firm.

Once the ratio measurements were in place, the firm could concentrate attention on increasing work-in-process and asset turns. Japanese companies have become world leaders in both categories by involving workers in production in a way that they become committed to reducing waste by the promotion of just-in-time methods. It worked because machine operators have more knowledge about how to reduce waste than anyone else. One Cyprus furniture firm presently gives the authority to work teams to make changes and rewards them as a group for expanding throughput and reducing setup times. Generalization of this practice could have a profound effect on enhancing productivity of Cyprus furniture firms.

6. Consultative Interaction with CFI.

The furniture and wood products subsectors are mutually interdependent. However, a number of disputes between the furniture makers and Cyprus Forestry Industries Ltd. (CFI) have created poor relations. The major dispute involves the quality of CFI chipboard. Many furniture makers argue that it is not up to the quality of European standards yet they can not import chipboard because CFI has a monopoly on the sale of chipboard. Furthermore, furniture makers contend that costs are unnecessarily high because of the middleman system which requires furniture makers to purchase from one of the 70 middlemen merchants rather than directly from CFI. The appeal by CFI for exemption from the Customs Union has worsened relations.

CFI counters that they are scapegoats for improper production techniques by the furniture makers. Sanding and planing, in particular, require precise machine tolerance adjustments and highly

skilled operators to ensure that veneers and melamine are not damaged. Furthermore, CFI argues that free trade in the wood materials industry would result in dumping and destruction of a chipboard supply capacity in Cyprus which would be followed by higher prices and poor service.

Other problems in raw material supply are on the horizon. Presently imported medium density fibre board is being substituted for chipboard at considerable expense in foreign exchange. This may reflect low production efficiency in the use of chipboard. It certainly results in a higher cost of production than can be maintained when tariffs are reduced.

Competition is intense in the industry and it could be a big mistake to subject the wood supply industry to the vagaries of cutthroat international competition at a time of international excess capacity. The arguments for free trade of manufactured goods do not apply with the same force to commodity products. Destruction of the Cyprus industry could find the Cyprus furniture industry a future victim of international cartel prices. At the same time, protection can only be justified if it provides in principle and practice long term benefits to the nation, particularly the furniture industry.

The existence of these disputes demonstrates the need for improved communications so that a consensus on a sector strategic orientation can be shaped for the wood and furniture industry as a whole. Both sub-sectors are dependent upon continuing improvements in the quality of materials and the effectiveness of their utilization.

It does not appear that the wood product industry is inherently inefficient by international standards. It can certainly play a dominant role in supplying the local market. But it is necessary that effective institutional means of both identifying and attacking problems and of improving supplier/buyer informational flows be

developed. It is a necessary condition for the long term survival of both industries under the New Competition.

7. Administrative Guidance by the Ministry of Commerce and Industry.

A strategy of flexible production requires that cooperation and competition be promoted. Firms in a sector must be competitive but the form of competition must be regulated. Atomistic price competition can undercut the margins required to finance long term development, whereas competition over design promotes both specialization and flexibility. A major role for industrial policy is promote a sector strategy that leads individual firms to reorient their strategies for competitive advantages in ways that contribute to the long run development of the industry.

Cooperation amongst firms in a sector must be negotiated both amongst the firms but also between the firms and government. The reason is that for private associations of firms to be effective they must be legitimized and consistent with the legal system. But as private governance structures they must also be accountable. Thus the task of MCI as the main instrument for implementing industrial policy is both to promote the development of the industry and to ensure its accountability within the political process.

The extension service of the MCI currently provides limited technical and organization assistance. This will have to be bolstered considerably. The model in Cyprus may be the agricultural extension service. Another model is the role of the officers of the Japanese Ministry of International Trade and Industry particularly as catalysts in shaping sector strategies. The extension agent must also be a source of qualitative and quantitative data, both domestic and international, and a coordinator of governmental services.

8. Public Sector Infrastructural Services.

Fortunately a number of specialist governmental and quasi-public services now exist in Cyprus. These services have to be mobilized around a common vision of the industry's future. The strategy of flexible specialization calls for active roles from each of the following:

- a) The Industrial Training Authority. The ITA's matching funds program are ideally suited for upgrading the skills of furniture workers so that a flexibility can be realised.
- b) The Cyprus Productivity Centre. The new roles for management will also require considerable educational upgrading. It is crucial that such educational programs be made consistent with the sector strategy as promoted by the MCI.
- c) The Export Promotion Organisation. Joint marketing ventures in foreign countries can now be facilitated by marketing expertise. To make it effective furniture companies must become actively involved.
- d) The Cyprus Development Bank. The CDB is ready to consider long term loans to furniture companies if they are strategically aware. The CDB can facilitate this process but the development of firm strategies must come from within the industry itself.

9. Private Collective Action.

The emergencies of flexible specialization will not just happen. It will require the creation of institutions of collective association for which there is no formula. Each successful furniture district has shaped distinctive means of cooperation. A common element in each case is the establishment of a forum for deliberation. The major problem is to learn how to cooperate in a way that promotes both entrepreneurial dynamism and production specialism as opposed to fixing prices.

Under certain circumstances private individual action can undermine the health of an industry. Sourcing raw materials may provide an example in Cyprus. If each individual supplier seeks a foreign supplier the domestic wood products industry could be destroyed. Individual action can not get the furniture makers what they need: a ready supply of high quality material inputs. It is a collective service that must be achieved by collective action.

Seeking advantage by undercutting wages is another example in which the failure to coordinate private actions can undercut a resource needed for the long term survival of the industry, in this case a skilled and educated labour force.

Underlying each of these activities is a common theme: success in the New Competition involves redesigning institutions so that they enhance learning. The job is to learn to cooperate through a series of individualized consortia, now in education, now in marketing, now in design, now in production, etc. The job is never done. Learning to cooperate is a social accomplishment. The task is to create institutions that develop peoples capacities to cooperate within the firm, across firms and between firms and government. Success will go to those who learn to learn.

There is no blueprint, only a commitment to succeed and a will to work together to make it work.

3.6 The Change Process

The Cyprus furniture industry must adapt to the principles of flexible specialization if it is to meet the challenge of the new competition.

The first barrier to adaptation is denial of the problem. Hopefully this report will contribute to reducing this barrier by providing an analysis of the challenge itself.

The second barrier is the belief that the challenge can be confronted by individual action alone. An essential feature of flexible specialization is the formation of inter-firm networks.

Before such networks can be created or expanded, the task is to create first, a consensus around the characteristics of the challenge and second, a sector strategy as a vision for shaping individual firm responses and, eventually, firm concepts. The shaping of such a strategy can not be done by an individual or group of individuals outside the industry. Such people can only act as a catalyst. The specific sector strategy must be shaped by ongoing dialogue amongst the individuals in the industry whether in the management, workplace, bank or governmental agency.

A necessary step to develop the dialogue is to create an action group committed to the future of the industry which could be called something like The Furniture Industry Working Group. It is crucial that such a group be both large enough to provide a basis for developing an industry consensus with respect to strategy and small enough to be workable. As to the starting point of such a group, several points can be made on the basis of this report.

In Cyprus, association links amongst firms are a prerequisite to specialization and productive efficiency. Today the Cyprus furniture industry is trapped in a self-destructive binding of manufacturing and selling. Breaking this bind will require collective action amongst self-selecting groups of manufacturers.

A pathway of voluntary collective action is as difficult as it is necessary. Successful passage will require commitment to

cooperation, a commitment that can be sustained only if success can be realized. Thus the initial step for a furniture industry working group is to identify areas of cooperation in which positive results can be most easily achieved. In the process, individuals in the industry from firms, governments and unions can learn the skills of cooperative association.

Candidates for cooperative success are many. First, the study of and visit to the highly successful Italian furniture marketing cooperatives could follow the successful visit to the Swedish firms organized by the Employers Federation last year. This will underscore the first lesson of the New Competition: success depends upon an acute awareness of the competition. This study and visit could be followed or preceded by visits to Greece where the government and trade associations have pursued a variety of collective initiatives to restructure the furniture industry.

Second, the furniture industry working party could engage in the dialogue of shaping a sector strategy with the already existing extra-firm institutions that do or could impact on the viability of the Cyprus furniture industry. Obvious candidates include the Industrial Training Authority, which is completing an excellent survey of the industry, the newly formed Export Promotion Board, which could greatly facilitate a joint assessment of the opportunities in European furniture markets, the Cyprus Development Bank, whose involvement in long term finance of restructuring projects is necessary, the Higher Technological Institute, which is developing expertise and educating students in the new microelectronic technologies, and the Cyprus Productivity Center, that can facilitate the upgrading of professional expertise required by the industry.

The obvious importance of the Ministry of Commerce and Industry and the Planning Bureau in shaping and implementing a sector strategy and coordinating a governmental response suggests that both agencies play an active role in any furniture working party. Since governmental

policies of wide variety presently affect the furniture industry, it is crucial that these be made consistent with a strategic orientation designed to enhance the competitiveness of the industry. That the government can play a positive role in promoting competitiveness has been made clear in the cases of Japan and, for the furniture industry, Italy (see Part One for details).

Third, the furniture industry working group may seek to enhance the financial literacy of the industry. It is fundamental that firms gain better controls over both working and fixed capital to exploit the economies of time. The most appropriate financial systems may not be those developed in the textbooks but it is certain that those used in traditional workshops are not adequate. The lack of cost accounting information in Cyprus firms is perhaps a reflection of the barrier of denial described earlier.

Fourth, the working party could seek a formal link to Cyprus Forest Industry Ltd. through, for example, stock purchases or participation on a sub-committee of the Board of Directors. The important point is to open dialogue so that superficial and real problems can be distinguished and the wood suppliers and wood users can work together in a constructive relationship with an eye to adaptation to the new principles of competition.

This list of candidates for potential collective action demonstrates that the specific form of inter-firm networks can not be decided by economic principles. It also demonstrates that many resources exist in Cyprus for restructuring the furniture industry. It is crucial that these institutions and resources be combined under strategic orientation that has widespread consensus.

The challenge is real. It can be met. To do so will be an accomplishment. It is worthy of commitment.

Table 1A
World Export of Wood Products by major Countries

US\$ '000	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Sources										
World	4,893,948	5,147,591	3,853,706	5,747,213	6,728,526	7,871,243	10,618,409	11,364,567	9,188,792	N.A.
Canada	1,616,126	1,338,047	970,573	1,687,518	2,257,866	2,740,922	3,363,159	2,898,604	2,554,012	N.A.
Sweden	765,089	942,884	637,661	833,463	855,790	974,524	1,197,378	1,287,419	1,031,770	N.A.
U.S.A.	475,404	470,353	415,927	566,114	553,787	623,467	1,020,707	1,064,689	941,434	N.A.
Finland	371,476	573,513	324,401	442,195	588,477	712,086	1,005,475	1,330,434	915,250	N.A.
Korea	28,746	26,370	15,880	35,517	56,685	80,430	114,229	82,539	N.A.	N.A.
Malaysia	237,619	211,405	183,592	331,201	344,648	372,546	457,482	556,525	428,948	463,236
Panel Products										
World	2,212,039	2,163,098	2,089,114	2,861,114	3,196,116	3,592,337	4,494,911	4,323,326	4,177,555	N.A.
Korea	281,493	168,294	208,123	339,003	393,133	414,686	450,342	353,742	N.A.	N.A.
Finland	192,460	186,587	158,978	183,551	198,071	254,000	334,508	405,044	352,220	N.A.
U.S.A.	224,414	299,462	362,649	412,200	345,099	183,480	242,328	288,604	N.A.	N.A.
Federal Republic of Germany	102,838	182,720	159,151	201,896	216,132	266,304	334,673	370,803	N.A.	N.A.
Sweden	56,193	64,605	69,883	74,428	71,978	86,123	96,657	98,232	99,167	N.A.
Malaysia	102,114	89,240	75,264	114,881	110,410	145,166	248,065	144,793	155,465	140,352
Mouldings and Joinery										
World	933,552	1,097,355	1,151,607	1,678,725	2,089,335	2,590,119	3,088,854	2,989,565	3,138,612	N.A.
Canada	133,457	96,434	95,892	152,588	209,675	302,960	354,763	331,102	339,394	N.A.
U.S.A.	75,946	124,815	121,345	144,620	193,577	176,678	209,497	280,584	N.A.	N.A.
Federal Republic of Germany	83,678	113,354	127,447	186,355	238,578	304,960	317,427	333,744	N.A.	N.A.
Sweden	88,264	91,339	100,346	114,620	117,768	141,764	177,884	198,757	196,292	N.A.
Korea	23,617	31,084	19,278	26,635	30,635	42,802	46,352	49,406	N.A.	N.A.
Malaysia	10,555	14,742	13,197	14,998	20,862	52,160	92,176	97,607	89,055	78,822
Furniture										
World	2,547,068	3,152,951	N.A.	271,774	2,095,259	3,149,033	3,869,644	4,511,271	6,275,655	N.A.
Federal Republic of Germany	615,880	772,896	853,166	N.A.	685,543	886,178	987,745	1,061,014	881,067	N.A.
Italy	275,247	370,716	481,630	N.A.	447,151	673,737	1,009,648	1,187,984	1,672,383	N.A.
Belgium	347,196	384,284	396,771	N.A.	232,488	284,337	302,010	366,789	480,533	N.A.
Sweden	N.A.	N.A.	N.A.	N.A.	196,448	230,900	293,449	342,648	302,336	N.A.
Korea	15,117	12,834	10,813	21,632	31,151	42,539	33,718	33,780	N.A.	N.A.
Malaysia	932	1,308	2,606	5,996	5,627	9,559	13,359	13,381	13,180	6,500

Note: 1973 - 1975 export of furniture includes metal and other material

* Includes all types of furniture

Source: (1) External Trade, Department of Statistics
(2) Yearbook of International Trade Statistics,
United Nations

Table 1

Furniture Consumption and Imports in Various European Countries for the Year
1983 (millions of U.S. \$)

	Furniture Consumption	Imports of Wooden Furniture	Imports Consumption (%)
Belgium	1,490	315	21.1
France	8,700	1,048	12.0
Italy	4,130	86	2.1
Holland	1,400	506	36.1
Sweden	1,380	170	12.3
United Kingdom	4,180	653	15.6
West Germany	8,320	1,132	13.6

Note: The table is only indicative. The data for imports includes only wooden furniture but also includes office furniture; the data for internal consumption includes furniture made from all materials but excludes office furniture.

Source: L'industria del Legno e del Mobile, September/October 1986, a publication of the Centro Studi Industria Leggera, Via Gesu, 17, 20121 Milano

Table 2

Total Furniture Imports at Current Dollar Prices (millions of U.S. \$)

	1978	1979	1980	1981	1982	1983	1984
Austria	222.8	258.7	301.7	238.0	235.6	249.9	245.7
Belgium	475.7	548.0	607.5	464.3	376.2	315.0	294.4
France	785.5	993.1	1,178.0	1,074.7	1,135.7	1,047.6	968.2
Germany	1,011.7	1,241.9	1,506.2	1,246.2	1,082.1	1,131.8	1,109.8
Italy	59.0	82.8	111.9	98.8	91.4	86.1	98.9
Holland	780.9	860.7	881.7	636.7	510.2	505.9	467.2
Spain	n.d.	n.d.	54.3	38.4	43.3	37.0	33.8
Sweden	172.9	230.8	278.5	230.1	189.3	170.2	192.0
Switzerland	294.2	380.5	458.5	400.8	394.8	397.4	407.4
United Kingdom	315.1	465.7	560.6	619.3	616.2	653.4	695.7
Total	4,090.7	5,062.2	5,939.0	5,047.2	4,674.8	4,594.3	4,513.0

Source: See Table 1

Table 3

Furniture Trade Balance, 1980 and 1984 (millions of current U.S. \$)

	1978	1979	1980	1981	1982	1983	1984
Austria	74.3	103.8	142.0	131.0	115.7	124.7	118.4
Belgium	506.5	551.7	635.9	532.0	491.1	495.7	467.3
France	339.1	429.6	505.9	463.1	448.8	472.3	449.0
Germany	1,382.7	1,569.7	1,671.5	1,436.4	1,418.6	1,368.4	1,362.3
Italy	1,234.0	1,766.3	1,929.0	1,835.2	1,770.9	1,774.1	1,782.6
Holland	201.1	238.9	264.0	226.7	227.0	215.9	221.3
Spain	0	0	151.4	154.3	152.2	140.6	166.8
Sweden	272.9	359.1	436.4	389.8	330.3	349.7	395.6
Switzerland	73.2	76.0	89.3	77.7	75.0	82.1	83.3
United Kingdom	352.3	387.3	431.9	334.5	324.9	311.2	302.3
Total	4,436.1	5,482.4	6,257.3	5,580.7	5,354.6	5,334.7	5,348.9

Source: See Table 1

Table 4

Furniture Trade Balance, 1980 and 1984 (millions of current U.S. \$)

	1980			1984		
	Export	Import	E-I	Export	Import	E-I
Austria	142	302	-160	118	246	-128
Belgium	636	608	28	467	249	218
France	506	1,178	-672	449	968	-519
Germany	1,672	1,506	166	1,362	1,109	253
Italy	1,929	112	1,817	1,783	99	1,684
Holland	264	882	-618	221	467	-246
Spain*	151	54	97	167	34	133
Sweden	436	279	157	396	192	204
Switzerland	89	458	-369	83	407	-324
United Kingdom	432	561	-129	302	696	-394

*Spanish data in 1980 columns is for 1978.

Source: See Table 1

Table 5

Losers and Survivors in the North London Furniture Industry

<u>Firms closing down before 1983</u>	<u>Workforce</u>	<u>Firms closing down, 1983-1986</u>	<u>Workforce</u>		<u>Survivors</u>	<u>Workforce</u>	
			1970	1984		1970	1986
<u>Angel Colony</u>							
Great Eastern Cabinet Co.	300	Carasell	130	30	B & I Nathan	400	150
Sparrow & Simmons	130						
Coller	200						
Supasuite	200						
Beautility	1,000						
<u>Ely's Estate</u>							
Homeworthy	500	Howard	130	100	Stonehill	900	400
Cabinet Industry	1,000	Wellsell	300	130			
Wrighton	500	Uniflex	400	100			
John Citizen	100						
<u>Lea Bridge</u>							
Berrys	100	Bluestone	300	150			
Henry Wilkes	100	Austin	400	200			
Grant	100						
Liden (Whitewood)	300						
<u>Others in North London</u>							
Lebus	3,000						
Eyelock	400						
Summers	300						
Schreiber (Harlow) (Hoddesdon)	1,000						
TOTALS	<u>13,430</u>	lost jobs (1970-86):	<u>750</u>	<u>550</u>	(remaining jobs)		

Source: Michael H. Best, interviews with North London furniture manufacturers, past and present, and workers.

Table 6

Macro Economic Data for Italian Furniture Firms with Over 20 Employees,
1967-1981

Year	Turnover		Value Added		Fixed Investment		Personnel Expense		Number Employ	
	billions of current lira	annual change in %	billions of current lira	annual change in %	billions of current lira	annual change in %	billions of current lira	annual change in %	thousands	annual change in %
1967	196	--	97.4	--	--	--	72.6	--	58.8	--
1968	242.2	+23.6	117.5	+20.6	20.1	+61.1	86.9	+19.6	64.2	+9.2
1969	290.9	+20.1	137.4	+17.0	21.0	+ 4.0	102.4	+17.8	68.6	+6.8
1970	336.8	+15.8	155.7	+13.4	20.1	- 4.3	119.9	+17.1	69.4	+1.2
1971	387.4	+15.0	187.6	+20.5	24.1	+20.4	148.8	+24.1	71.1	+2.4
1972	499.6	+29.0	223.7	+19.2	41.6	+72.3	171.3	+15.2	80.9	+13.8
1973	707.9	+41.7	304.3	+36.1	61.5	+47.9	225.1	+31.4	83.8	+ 3.5
1974	1,001.1	+41.4	406.4	+33.5	89.3	+45.2	296.1	+31.5	85.5	+ 2.1
1975	929.8	- 7.1	421.1	+ 3.6	47.3	-47.1	327.5	+10.6	79.0	- 7.6
1976	1,408.1	+51.4	570.2	+35.5	79.9	+69.0	416.9	+27.3	78.7	- 0.3
1977	1,651.5	+17.2	674.0	+ 0.1	101.3	+26.7	501.1	+20.2	77.5	- 1.5
1978	1,922.4	+16.4	764.4	+13.4	86.5	-14.6	575.4	+14.8	76.3	- 1.6
1979	2,661.9	+38.4	940.2	+22.9	108.7	+25.6	686.2	+19.2	74.5	- 2.3
1980	3,674.5	+38.0	1,226.9	+30.5	147.1	+35.3	820.8	+19.6	73.8	- 0.9
1981	3,881.9	+ 5.6	1,365.2	+11.2	135.1	- 8.1	925.8	+12.7	70.2	- 4.8

Source: Sergio Silvestrelli, *Progresso Technico E Rapporti Tra Imprese Nel Settore Del Mobile in Italia E Nelle Marche*, Economic Marche, June 1985.

Table 7

Composition of Italian Furniture and Wood Furnishings
Business Units by Number of Employees by Number of Employees
1961 - 1981

Class Size (number of employees)	Typology of Business Unit	1961		1971		1981		Variation 1961-71 in %	Variati 1971-81 in %
		bus. units	%	bus. units	%	bus. units	%		
1	2	3	4	5	6	7	8	9	10
57 1-0	artisanal	26,689	92.8	25,517	88.6	29,207	86.3	+ 3	+ 6
10-49	small	1,815	6.3	3,013	9.7	3,954	11.68	+ 66	+31
50-99	medium	195	0.7	393	1.25	364	1.1	+101	- 7
100-499	medium-large	69	0.2	132	0.4	149	0.4	+ 91	+13
500 and over	large	1	0.003	4	0.01	2	0.006	+300	-50
Total industrial units	10 and over	2,080	7,200	3,542	11.4	4,469	13.2	+ 70	+26
Units without employees		—	—	13	0.04	182	0.54	+ 8	—
Total business units		28,769	100.0	31,072	100.0	33,858	100.00	+ 8	+ 9

Source: See Table 6.

Table 8

Composition of the Workforce by Italian Furniture Firm, 1961-1981

Class Size (number of employees)	Typology of Business Unit	1961			1971			1981			Variation 1961-71 in %	Variation 1971-81 in %
		Number Employed	%	Average Number Employed	Number Employed	%	Average Number Employed	Number Employed	%	Average Number Employed		
1	2	3	4	5	6	7	8	9	10	11	12	13
1-9	artisanal	72,179	53.4	2.7	65,393	37.2	2.4	70,122	35.8	2.4	- 9	+ 7
10-49	small	37,480	27.8	20.6	59,342	33.8	19.7	75,046	38.3	19	+ 58	+26
50-99	medium	13,325	9.9	68.3	26,885	15.3	68.4	24,468	12.5	67.2	+102	- 9
100-499	medium-large	11,455	8.5	166.0	20,966	11.9	158.8	24,635	12.6	165.3	+ 83	+17
500 and over	large	592	0.4	592	2,946	1.7	736.5	1,470	0.7	735	+398	-50
Total industrial units (10 and over)		62,852	46.5	30.2	110,139	62.7	31.1	125,619	64.2	28.1	+ 75	+14
Total industrial units		135,031	100	4.7	175,532	100	5.6	195,741	100	5.8	+ 30	+11

Source: See Table 5

Table 9

Enterprises and Employment by Wood and Wood Products
Sector, 1984

Industry Code	Sub-Sector	No. of Firms	No. of Employees	Gross Output (€000's)
33	<u>WOOD AND WOOD PRODUCTS INCLUDING FURNITURE</u> total	1,152	5,583	50,097.5
331	Wood and Cork Products Except Furniture total	816	2,755	26,627.3
3311	Sawmills and Planing total	725	2,608	25,528.2
3311.1	Forest Industries	1	170	4,717.6
3311.2	Sawmills	35	174	1,526.1
3311.3	Sliding doors, Wooden Flooring & Plywood	3	72	1,260.8
3311.4	Doors and Windows	686	2,192	18,023.7
3312	Wooden and Cane Containers total	1	4	9.9
3319	Wood and Cork Products n.e.c. total	90	143	1,089.4
332	Furniture and Fixtures (Wooden) total	736	2,828	23,470.2
3320	Furniture and Fixtures (Wooden) total	693	2,733	22,638.0
3320.1	Wooden Furniture (Production, Repairs and Uphols.)	507	2,579	21,212.2
3320.2	Chairs and Other Seats	66	79	536.5
3320.4	Venetian Blinds	4	40	604.6
3320.9	Other Furniture and Fixtures	16	35	284.7
3321	Other Furniture and Fixtures total	43	95	832.2
3321.1	Upholstery (Cars)	43	95	832.2

Source: Industrial Statistics, 1984, Department of Statistics and Research, Ministry of Finance

Table 10

Enterprises, Gross Output and Capital Formation by Wood Products Industry, 1984

	ISIC Code	Number of Enterprises	Number Employed	Gross Output	Capital Formation
(1) Manufacturing Total	3	5865	42,612	650,686,898	30,926,353
(2) Wood & Wood Products Including Furniture (Total)	33	1552	5,583	50,097,546	2,428,946
Row 2	Row 1	26.5%	13.1%	7.7%	7.9%
(3) Wood & Cork Products Except Furniture (Total)	331	816	2,755	26,627,337	1,067,557
Row 3	Row 1	13.9%	6.5%	4.1%	3.4%
Sawmills-Planning	3311	725			
Forest Industries	3311.1	1	170	4,717,561	125,765
Sawmills	3311.2	35			
(4) Doors and Windows	3311.4	686	2,192	18,023,685	751,449
Row 1	Row 4	11.7%	5.1%	2.8%	2.4%
(5) Wooden Furniture and Fixtures (Total)	332	736	2,828	23,370,209	1,361,389
Row 5	Row 1	12.5%	6.6%	3.6%	4.4%

Source: Industrial Statistics 1984, Department of Statistics and Research, Ministry of Finance.

Table 11

Indices of Output Growth, 1976-1984

1980 = 100

	1976	1977	1978	1979	1980	1981	1982	1983	1984
Wood & Wood Products including furniture	53.1	60.9	80.0	90.4	100.0	103.5	116.2	130.7	133.7
Manufacturing Total	65.0	76.1	84.9	92.7	100.0	107.4	110.1	113.5	120.5

Source: Industrial Statistics, 1984, Department of Statistics and Research Ministry of Finance.

Table 12 - Time Series of Basic Economic Magnitudes of the Wooden Furniture and Fixture Industry (1980-1985)
(Industry Code 332)

	1980	1981	1982	1983	1984	1985 (preliminary)
Value of Production (current prices)	11,012,392 28.1%	14,106,523 23.6%	17,432,067 18.3%	20,616,138 5.5%	21,748,700 6.8%	23,228,000
Value of Production (constant prices)	10,639,992 14.1%	12,139,865 14.3%	13,879,034 9.7%	15,237,353 -2%	14,927,042 2.4%	15,291,639
Value Added (current prices)	5,279,480 28%	6,755,044 18%	7,969,690 15.8%	9,229,783 9.5%	10,112,904 6.7%	10,794,000
Value Added (constant prices)	5,100,946 14%	5,813,979 9.1%	6,345,135 7.5%	6,821,716 1.7%	6,940,908 2.4%	7,105,990
Value of Production per Employee (current prices)	5,348 12.8%	6,036 17.6%	7,100 13.1%	8,028 1.9%	8,192 4.9%	8,534
Value of Production per Employee (constant prices)	5,167 0.5%	5,195 8.8%	5,653 4.9%	5,933 -5.3%	5,616 0.6%	5,651
Capital Expenditures (current prices)	622,953 46%	908,487 -8.9%	827,848 7%	1,451,155 -14.4%	1,241,824 -2%	918,000
Capital Expenditures (constant prices)	601,886 30%	781,830 -15.9%	659,114 62.7%	1,072,546 -20.5%	852,315 -29%	604,344
Exports (current prices)	363,585 29.6%	471,284 -43.6%	265,462 63%	432,598 21.4%	525,063 46.6%	753,973
Imports (current prices)	1,048,109	1,049,245	1,886,916	1,773,943	1,944,104	1,414,308
Exports-Imports	-684,524	-577,961	-1,621,454	-1,341,345	-1,419,041	-660,335
Furniture Expenditures	10,648,807	13,635,239	17,166,605	20,183,540	21,223,637	22,474,027
Imports as % of Expenditures	9%	7%	11%	8%	8%	6%
Exports as % of Expenditures	3%	3%	1.52%	2%	2%	3%
Exports (constant prices)	353,995 14.2%	403,151 -50.2%	200,500 57.7%	316,226 13.8%	359,878 42.6%	513,255
Number of Employees	2,059 13.5%	2,337 0.5%	2,455 4.6%	2,568 3.5%	2,658 1.8%	2,706
Number of Firms	652 1.4%	661 1.6%	672 -0.3%	670 0.4%	673	—
Average Number	3.16	3.54	3.65	3.83	3.95	

Source: Industrial Training Authority and Department of Research and Statistics: Industrial Production Survey, 1984

Table 13

Size Distribution of furniture Firms, 1984 (ISIC Code 332)

Firm Size by Number of Employees	Number of Firms	Number of Engaged Persons	Gross Output (000's)	Census Value Added (000's)	Value Added per Employee*
0	14	—	48	25	
1-4	622	1,147	8,529	4,529	3.950
5-9	49	328	2,399	1,211	3.700
10-19	30	410	3,743	1,776	4.330
20-29	9	225	2,542	1,159	5.150
30-49	7	306	2,679	1,354	4.420
50-99	4	310	2,704	1,226	3.950
100 and over	1	102	826	548	5.370
	—	—	—	—	—
Total	736	2,828	23,470	11,828	4,180

* Rounded to three significant numbers.

Source: Industrial Statistics, 1984, Department of Statistics and Research
Ministry of Finance

Table 14

Distribution of Employees by Firm Size, 1980 - 1985

	<u>1980</u>		<u>1981</u>		<u>1982</u>		<u>1983</u>		<u>1984</u>		<u>1985</u>	
	Number of Employees	%	Number of Employees	%	Number of Employees	%	Number of Employees	%	Number of Employees	%	Number of Employees	%
5-10	222	18.5	226	17.1	229	16.0	242	15.4	219	13.2	189	11.3
11-50	632	52.5	667	50.6	723	50.4	742	47.4	791	47.9	794	47.5
Over 50	349	29.0	425	32.2	482	33.6	583	37.2	643	38.9	687	41.1
Total	1,203	100.0	1,318	100.0	1,434	100.0	1,567	100.0	1,653	100.0	1,670	100.0

Source: Cyprus Industrial Training Authority.

Table 15

The Distribution of Total Production by Final Market
(in percentage of total output)

Market	Firm Size			Total
	5-10	11-50	over 50	
Cyprus	100	95.9	93.9	95.6
Europe	0	0.0	5.8	2.8
Arab	0	3.1	0.4	1.6
Total	100	100	100	100

Source: Industrial Training Authority

Table 16

Management Decisionmaking Activities

- A. SALES AND MARKETING
 - 1. Market research
 - 2. Knowledge of market segments
 - 3. Choice of distribution channels
 - 4. Sales promotion
 - 5. Product image

- B. TECHNICAL PRODUCTION EXPERTISE
 - 1. Technical know-how
 - 2. Production planning
 - 3. Plant layout
 - 4. Organization of material/product flows
 - 5. Quality control
 - 6. Finishing
 - 7. Structure of product

- C. PRODUCT DEVELOPMENT
 - 1. Market research
 - 2. Design
 - 3. Materials

- D. PLANNING
 - 1. Enterprise concept
 - 2. Product range
 - 3. Distribution channels
 - 4. Vertical integration

- E. SOCIAL RELATIONS
 - 1. Work organization
 - 2. Payment schemes
 - 3. Skills

- F. ACCOUNTING/FINANCE
 - 1. Cost accounting
 - 2. Financial planning
 - 3. Preparation of accounts

- G. RAW MATERIALS
 - 1. Quality and quantity of local wood products
 - 2. Imported woods

Table 17

The Changing Approach to Organizing Work

WHAT MANAGEMENT ASSUMES ABOUT WORKERS

OLD WAY Worker wants nothing from the job except pay, avoids responsibility, and must be controlled and coerced

NEW WAY Worker desires challenging job and will seek responsibility and autonomy if management permits

HOW THE JOB IS DESIGNED

OLD WAY Work is fragmented and deskilled. Worker is confined to narrow job. Doing and thinking are separated

NEW WAY Work is multiskilled and performed by teamwork where possible. Worker can upgrade whole system. Doing and thinking are combined

MANAGEMENT'S ORGANIZATION AND STYLE

OLD WAY Top-down military command with worker at bottom of many supervisory layers; worker is expected to obey orders and has no power

NEW WAY Relatively flat structure with few layers; worker makes suggestions and has power to implement changes

JOB TRAINING AND SECURITY

OLD WAY Worker is regarded as a replaceable part and is given little initial training or re-training for new jobs. Layoffs are routine when business declines

NEW WAY Worker is considered a valuable resource and is constantly retrained in new skills. Layoffs are avoided if possible in a downturn

HOW WAGES ARE DETERMINED

OLD WAY is geared to the job, not the person, and is determined by evaluation and job classification systems

NEW WAY Pay is linked to skills acquired. Group incentive and profit-sharing plans are used to enhance commitment

LABOUR RELATIONS

OLD WAY Labour and management interests are considered incompatible. Conflict arises on the shop floor and in bargaining

NEW WAY Mutual interests are emphasized. Management shares information about the business. Labour shares responsibility for making it succeed

DATA: RICHARD E. WALTON, HARVARD UNIVERSITY; BUSINESS WEEK

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CYPRUS INDUSTRIAL POLICY

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THE METAL WORKING SECTOR IN CYPRUS

Jim Rafferty

June 1987

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METAL

SUMMARY

Over the last fifteen years, the computer revolution has transformed the international engineering industry. With batch production constituting 80% of engineering output, the industry had traditionally been unable to benefit from the volume economies of mass production. Tools had to be constantly re-set. Each part might go through 5-30 operations, with lengthy gaps between each. The average component manufacturing cycle time in the early 1970's was 100 days. The ratio of processing time to total cycle time was rarely above 1%.

The introduction of numerically controlled (NC) and computer numerically controlled (CNC) machine tools changed this. Tools could now be programmed to perform different operations with a minimum of downtime and queuing between operations. Group technology arranged components into families which could be processed as if they were a uniform product by the CNC machine. Computers were introduced to optimise the routing of parts within the factory, as well as their automatic transport. Computer Aided Design (CAD) not only greatly extended the scope of the designers, it also allowed the design to be directly fed into the manufacturing system as the programme to govern the production process (CAD became integrated with CAM - Computer Aided Manufacturing). More recently, the various design and machine systems, robots, and automatic transfer and materials handling equipment have been further integrated into Flexible Manufacturing Systems. By 1984 there were 200 FMS operations throughout the world, the majority of them in Japan. They were achieving a capacity utilisation rate of 92% on a three shift basis, with many running unattended throughout the night. The scope of this engineering

industrial revolution is now approaching that of the original 18th century textile revolution.

The countries to have gained in world competition - Japan, Italy and West Germany - have done so partly through the effective adoption of these systems, and partly through specialisation and the adaptation of products to customer needs. The niche market producers of the Baden Wuerttemberg region of West Germany and of the Third Italy extending from the Appenines to the Adriatic have been outcompeting standardised producers from the United States. Even when US engineering firms have adopted Flexible Manufacturing Systems they have done so as would-be volume producers rather than to automate their flexibility. The results have been much lower productivity, and less variety, than their competitors in Japan.

Cyprus still stands largely outside this revolution. Four fifths of its demand for metal and engineering products is imported. Domestic production is concerned primarily with the manufacture of light industrial products, and with servicing functions (repair and maintenance, and one off job shop work). Four fifths of its production is concerned with sheet metal work, the bulk of it geared to the construction industry and the agricultural machinery sector. It is predominately small scale and labour intensive, with only three firms employing more than 50 people within the metal products sector itself. It is thus a flexible sector, but one with almost no automation. We found only three firms with computer aided manufacturing, using a total of nine CNC and computer controlled machines in all.

A survey of 23 firms covering 50% of sectoral output, and 27% of employment, highlighted a number of problems; a declining level of skill in the workforce, and inadequate in-firm training; little specialisation or automation; problems of financial structure and control, quality control and job shop estimating. With Middle East markets and the domestic construction industry declining, metal working firms had tended to turn inwards, aiming to extend market

share through price cutting. This was threatening a number of firms in an industry which was already facing falling production (down 8% in volume terms in 1986) falling employment (down 13% between 1982 and 1986) and falling profitability. One consolation is that entry into the Customs Union would only marginally effect the sector - because of its small scale job shopping and light industrial nature. But the sector faces severe difficulties nonetheless.

Many of the current weaknesses of the Cypriot metal products industry are linked to the fact that Cyprus is an island with a small internal market and long supply lines. These characteristics pose difficulties to a restructuring strategy which aims to achieve improved competitiveness through standardised products, volume production, and cheap labour costs. There is an inadequate domestic market to cover fixed costs. Labour costs have been rising with the level of development and in tight labour markets, and are unlikely to return to the levels of low income Third World countries. Furthermore, demand still favours tailor made products rather than standard ones. We do not think the volume production strategy is a promising route.

Rather we recommend a policy of upgrading the industry, encouraging specialisation within it, and the automation of its existing small scale flexibility. This would require increased levels of skills - both traditional engineering craft skills and the new computer related ones. It would need a greater emphasis on product design, and adaptive research and development. The industry would have to undertake a programme of investment in the new technology, and expand its marketing capacity. Firms need to re-organise themselves around niche markets, serviced with automated flexible machinery.

Because of the small size of firms in the industry, the first precondition for such a strategy of 'flexible specialisation' is that firms co-operate so that they can afford those things normally associated with scale: strategic planning; a common computer aided design facility; research and development; training; and an overseas

two way marketing network. The second precondition is that the Government should co-ordinate the many departments which have dealings with metal working firms. Central to the task of co-ordination is the development of an agreed medium term strategy for the sector, which the Government should produce jointly with the industrialists and unions. With such private and public co-ordination coming into effect, the necessary joint action on raw material sourcing, training, design and research and development, can be taken within an agreed framework.

Cypriot metal producers have been responsible for a decade of rapid growth. This growth has now slowed. If it is to be resumed, a re-orientation of the industry is needed. A small number of firms have been moving in the proposed direction. Others need to follow. But it will only be possible if firms co-operate in creating new structures within which they can compete on product design and quality rather than on price. The government can support initiatives, and provide pump priming resources. But it is the industrialists who will determine whether metal working can take on board the new industrial revolution in engineering or whether the sector will be cut back to a restricted role of low productivity service engineering.

THE INTERNATIONAL INDUSTRY

1.1 Industry Characteristics

The metal working sector involves the cutting, trimming, shaping, moulding and assembling of metals. It consists of four main subsectors, as shown in Figure 1.

These sub sectors share a number of common features. First they are predominantly producer goods, and depend for their market on the level of investment. The reduction in the world wide level of investment since 1973 has therefore hit these industries directly. Thus for example, the construction industry - which determines the demand for the structural steel sector - showed a negative rate of growth between 1975 and 1985 in major European markets, with the UK averaging -3% per annum, and only Italy showing a marginal increase over the period. Conversely, the growth of investment in the Middle East has meant a strong demand for metal working, particularly in structural steel. In spite of the recent decline in the Middle East market, in the long term this is likely to remain an important area of investment demand, particularly in the event of a third oil price rise.

Figure 1

The Metal Working Industry

Heavy Engineering	Metal Forming	Precision Engineering	Structural Steel
Power station equipment	Heating & ventilating equipment	Shafts	Industrial & Commercial building & plant
Heavy Plating	Refrigeration & airconditioning	Valves	Farm building
Large bearings	Cabinets & casings	Empellers & propellers	Electricity
Shipbuilding	Closures & partitioning	Ball bearings	Transmission towers
Locomotives	Water tanks	Pumps	Dock gates & industrial doors
Centrifugal fans for power stations and mining	Pipes	Precision foundries	Bridges & other infrastructure
Pipelines	Metal containers	Milling cutters	
Foundries	Foundries	Bevil gears	
Boilers & pressure vessels	Aluminium extrusions	Spiral milling	
		Helical gears	
		Compressors	

Heavy Engineering involves the use of giant tools to cut, shape, and join steel for the large scale equipment indicated in Figure 1: large hydraulic presses, heavy rollers and electric arc welding.

Metal forming is concerned primarily with lighter sheet metal work, as well as aluminium extrusions where the metal is moulded by high pressure machinery rather than being cut.

Precision engineering requires that the metal forming and shaping be carried out to fine tolerances, through the use of such tools as lathes and milling machines for precision production.

Structural steelwork is centred on the construction industry. 15% of the steelwork fabrication market in Europe is involved in the construction of industrial buildings - factories and warehouses. The remainder is principally directed to the construction of offices, hospitals, schools and universities, and the other items indicated in Figure 1. The work involves sawing and drilling rolled steel joists then welding them together.

Secondly, the industry is characterised by small and medium batch production. For engineering as a whole it estimated that 75% of output consists of batches of 50 or less, in some cases being one off items, particularly in the heavy engineering and structural steel sectors. In part this is the result of the producer good characteristic of the industry. Whereas many consumer goods industries were developed along the lines of mass production of standardised commodities, it was a feature of mass production that many investment goods were specific to a particular model. Mass production in the consumer goods industries and batch production in the engineering industries were complementary.

The batch character of metal working output has a number of consequences. It puts a premium on skilled craft work rather than the semi-skilled fragmented tasks of mass production industries. In heavy engineering it is the boilermakers; in metal forming, the sheet metal workers; in precision engineering the tool-makers; in structural steel, the thick plate welders. The skills of the turners, and fitters and the skilled designers have been the backbone of industry, and are reflected in a pattern of industrial relations quite distinct from those of mass production manufacturing.

Because production could not benefit from economies of scale, competitiveness depended on the level of design and skill. At one end of the industry, this meant small two and three person companies offering labour intensive sub contract jobbing shop services. These businesses operated from small workshops using mechanically operated equipment (presses, sheers, rollers) combined with metal working skills to meet the demand for one-off fabrications and assemblies. At the higher levels firms produced batches of products from designs in modern factories, supported by sales and marketing activities. At both ends, the industry was offering flexibility, but faced the cost problems of batch as against volume production. Design, materials lay-out, cutting, assembling, finishing, all had to be developed afresh. The specialization and mechanisation of tasks characteristic of mass production was much more limited in the engineering industries.

As a result, the industry had a reputation of backwardness. It was difficult to increase labour productivity. Capital productivity was also low, with considerable down-time of machinery between jobs, and working capital tied up in work in progress. For individual manufacturers it was, therefore, difficult to offset declining markets by improvements in factor productivity.

What unites the industry, therefore, is its common orientation to the demand for investment goods; its use of common raw materials, particularly steel; its dependence on a pool of craft labour and the batch nature of its production. Though the type of equipment may differ between sub-sectors, the types of process and the functions of the equipment are similar. For whether the task is the construction of pipelines in heavy engineering, or of ventilating equipment in the sheet metal sector, similar processes are involved: cutting, trimming, shaping, moulding, and assembling of metals. In structural steel, the RSJ's are cut with large electric saws; in sheet metal, gas cutters were traditionally used. The functions were similar, while the tools differed either in size, or by virtue of the thickness of the steel, and the precision required for the product in question.

Since the early 1970's, and particularly during the last decade, the industry has been transformed. In some cases, this was the result of applying mass production techniques to former batch products. This has been the basis for the revolution in shipbuilding in the post war period. Japan, followed by Sweden, and more recently South Korea, began making ships as if they were cars: standardised, produced on a flowline, with common parts and specialized tasks. Japan's share of the world shipbuilding rose from 5% in 1945 to 50% by the 1970's, while the British - still locked into building one-off bespoke ships - declined from 50% to 5% over the same period.

More far reaching, however, has been the application of new technology to the industry, notably that based on the computer. Electronics has transformed all sections of the industry, bringing

many of the advantages formally confined to mass production to small batch manufacturing. Both labor and capital productivity has been increased to an extent way beyond what had been possible before. As a result, metal working, like engineering more generally, has moved from being seen as a 'sunset' industry to being a 'sunrise' (or as the Americans put it, a 'dematuring') one.

1.2 New Technology

1.2.1 The principle technological changes have been the following:

1. Computer Aided Design (CAD)
2. Numerically controlled (NC) and computer numerically controlled machines, (CNC) and other forms of electronic machinery, including robots.
3. Group technology.
4. Automatic transport and storage systems.
5. CAD linked into computer aided manufacturing (CAD/CAM).
6. Flexible Manufacturing Systems.
7. New processes, such as laser cutting and aluminium extrusion.

Computer Aided Design meant the replacement of paper and pencil with computers and terminals in the design process. All data about the products - shapes, dimensions, tolerances, assembly and finish - are inputs to the computer allowing for stress analysis, weight, configuration and graphics to be displayed almost instantly. Previously the analysis of stress in the design of products had to be calculated manually. Now this could be done by computer, saving not only time, but reducing the cost of materials through design optimisation. The same was true of the layout of parts to be cut from, say, a sheet of steel. As in clothing and footwear, this used to be a highly skilled job, but is now amenable to computer estimation, with considerable material savings. CAD systems have

also allowed more rapid and accurate quotations for new or adapted products.

NC and CNC machines and other electronic equipment. NC and CNC machines are those which are programmed to operate in particular ways. Effectively, this has automated the skilled tasks of setting and re-setting, of sheet metal cutting, turning, milling, burring and so forth. Not only does it speed up the particular operation, it reduces the down time between operations, and it is this which allows the scale economies of volume production to be enjoyed even for small batches. For the fine tolerance work of precision engineering NC and CNC tools have been particularly important, but they were also introduced early on in heavy engineering in the production process of large vehicles like ships and locomotives which required the use of massive machine tools. Similarly, in structural steel, the large metal saws are programmed, as are the drills and the burring machines to cut and trim the holes in the RSJ's.

With the development of microprocessor techniques, machines now have a sensory capability and artificial intelligence, through electronic whiskers measuring vibration, temperature, location of parts, dimensions and tolerances. Robots are an extension of this, being able to grasp, move and work with various tools to perform tasks automatically. Computer controlled, they are used for a large number of machine operations: drilling, trimming, automatic assembly, welding, grinding and polishing, glueing and painting.

Group technology consists of grouping like components in relation to production and dividing them into families. The workshop is fitted with precisely the machines which are necessary for producing these families. From the "point of view" of a computer numerically controlled machine (CNC) components in a family are uniform. This allows the production of a large and comprehensive batch as opposed to producing many small batches with variable set-up times

Automatic transport and storage systems; material handling. Many smaller to medium sized firms in Europe have been able to greatly increase the flexibility of advanced manufacturing technology through new automated transport systems within the factory. Hitherto, the assembly line in mass production has been the only means of organising the efficient transport of parts to be carried around the factory. New systems automate the transport of parts and tools in factories which do not carry on mass production. The systems are flexible, consisting of transport belts which are computer controlled, unmanned trucks "robot vehicles" and facilitate automatic storage of raw materials and finished products.

Being computer controlled, they provide data inputs for production planning and materials requirements in the factory. Automatic writing of orders for replacement materials reduces inventory costs and speeds work in progress, producing substantial savings.

CAD/CAM and Flexible Manufacturing Systems. CAD-CAM links up Computer Aided Design with Computer Aided Manufacturing, enabling the programme developed by the designer to be transferred as the programme which determines the operation of the machinery. The flexible manufacturing systems takes this link up a step further, uniting the processes of production and transportation within the factory in a single automatically co-ordinated flow.

In medium to small scale enterprise, the application of FMS is developing in three distinct ways. The first of these is in the provision for handling rational as well as prismatic components. Most FMS at present handle prismatic components, gearboxes, cylinder heads, etc., because although complex, they can be handled easily by automated systems and machined on machinery centres. Rotational parts such as axles, although relatively simpler in shape and cheaper in value are more difficult to handle and require lathes or cylinder grinding machinery. There are a growing number of this type of FMS, particularly in Germany and Italy and in Japan. The pattern of future developments will be towards systems which are capable of

handling both types of components, thereby considerably increasing flexibility.

Second, in sheet metal work most FMS's are presently concerned with cutting metal from billets or bass. There is considerable demand in Europe for sheet metalworking FMS. A number of projects are underway to develop systems which utilise techniques like computer aided parts nesting and which form the basis of sheet metal cells. Manufacturers in West Germany, including Tromf and Behrens, and in the US, Strippit and Wiedemann are rapidly advancing the capabilities of FMS in metalworking. The main difficulty in sheet metal work is that it is far less easy to handle and has traditionally been a labour intensive operation.

Third, the provision of FMS in assembly work is by far the most significant development area in Europe, since assembly operations account for the bulk of engineering work. By inventory, the split is about 60 per cent assembly, 30 per cent machinery and 10 per cent materials. Systems most prominently in operation in Europe are those of Olivetti in Italy, Westinghouse in the USA, and Hitachi in Japan. While these are large organisations, the systems offer the flexibility to the smaller manufacturer examples of which are Salvatore Grimaldi in Sweden and Cranfield Precision Engineering in the UK. Considerable R&D effort is going into fields such as robot vision and sensory systems which will be essential for many of the assembly tasks associated with the integration of discreet activities.

Cutting and welding techniques. The transformation of the design and production systems have been linked into improvements in cutting and welding techniques. In some instances the CNC machines have changed the process directly. Thus for example, steel metal cutting was largely done by gas burning. The resulting high temperatures limited the use of alloys in preference to steel. Now computerised machines can punch out the shapes. This has not only done away with the task

of cleaning the edges and burring. It has also allowed a much wider use of alloys.

For other materials, laser techniques have been introduced, for cutting, drilling, engraving, facing and welding. Laser beams consist of concentrated light which travels at a velocity of 300,000km per second. Thus the temperature at the focus point of the material reaches many thousand degrees celsius, causing the metal simply to vaporise. The beam can cut metals, ceramics, plastics, wood and even cloth.

The laser replaces a number of machines, for example, punching and nibbling machines, and can produce at lower cost with small batches. The machine is computer numerically controlled and does not require special tools with the additional benefit of reducing tooling and stockholding costs.

Moulding processes

New machinery has also been developed in the moulding of metals. One example is aluminium extrusion, where the pliability of the metal allows it to be passed through a machine at high pressure to form products such as metal windows, previously made from the cutting, shaping, and welding of the metal.

Another is in the foundry industry, where new electronic foundry systems have allowed for increased speed flexibility and quality of production.

1.2.2 Development and diffusion

These processes taken together constitute an industrial revolution for the metal working industry. Many of the applications are still in their early stages. They are more advanced in some sectors than others, and in some countries more than others. The pace of their application has been greatly increased by the fall in the price of electronic components. The systems themselves are coming down in price as original machinery is tried, tested, modified and then produced in volume. It is one of the features of this new production that automated general purpose machines are replacing specific ones. For example, lathes now have multi-purpose heads rather than having to have special heads made by tool-makers for one particular purpose. This means that the flexible tools and machinery can be produced in volume thus reducing their prices. This is already happening with robots, as well as CNC machines themselves.

The question about the diffusion of these techniques is therefore one of not of whether but when. For if we consider the advantages they offer:

- better design and value engineering
- simpler production planning
- shorter throughput-time
- improved materials usage
- new cheaper materials
- less materials handling
- lower unit costs of production
- lower inventory and work in progress levels
- improved quality
- faster and more accurate costing and quoting
- more rapid response times

in short, greatly increased labour and capital productivity, then it is clear that it is only a matter of time before new machinery and

software allows these principles to be applied in an ever greater part of the sector.

Japan has taken the lead in the adoption of this new technology. Table A shows the pace of Japanese adoption of NC machines tools in the late 1970's. Similarly of all the CNC machines installed world wide since 1975, 40% are in Japan. During the 1980's 55% of machine tools installed in Japan were computer numerically controlled. In the US the figure was 18%. But in the US as in other industrial countries the figure is rising, and by the second half of the 80's was also nearly 50%. In the Newly Industrialising Countries (NICs) of the Third World there is also a growing adoption of NC and CNC machines. By 1983 Mexico had 350 such machines, and Brazil 843. CNC lathes made up over a third of South Korean new lathe investment by 1982, and one fifth of lathe investment in Taiwan.

Table A

Percentage of metal cutting and forming production
which is numerically controlled, 1967-81

	US	Japan	UK	France
1967	15	1	6	5
1972	14	14	8	10
1977	28	26	8	25
1981	29	51	19	23

Source: OECD

International Marketing Data and Statistics.

CAD systems in engineering have likewise been growing. By the early 1980's CAD was only found in 5% of the engineering firms in the US, but is forecast to reach 30% by 1989. Adoption has been slower in the Third World, with their engineering use largely limited to the design of cars and car components.

The trend now is to the adoption of whole Flexible Manufacturing Systems. By 1984 there were just under two hundred in operation in Japan and the US, with Japan running ahead by nearly 2:1. A recent

study shows average processing time per part being cut by two thirds, employment by four fifths, and capacity utilisation rates up by 50% (Jaikumar 1986).

These changes together represent the automation of flexibility.

1.3 Sub-sectors

The above developments have affected most of the sub-sectors which are of relevance to Cyprus. Below is a brief discussion of the most important of these.

1.3.1 valves and pumps

One of the fastest growing areas in the European valve market is in hygienic valves for applications in the food, pharmaceutical and biotechnology industries. The main criteria of a hygienic valve is that it needs to be crevice-free. The most suitable valve types for hygienic application are diaphragm and butterfly valves, as they normally feature a crevice-free design. However, while the butterfly and diaphragm formats form the basis of the design the need to adopt producer specification for the different requirements of the food pharmacy and biotechnology industries lends itself to computer aided designs linked to flexible manufacturing systems offering small, batch, fast turnaround, precision products.

In the UK alone, the market for hygienic valves has grown rapidly with an estimated growth from a few hundred thousand pounds two years ago to around £6m in 1987.

Similarly, pumps for food and hygienic applications is a growing sector in Europe whose four important design criteria must be met; 1)

non-corrosive materials; 2) no retaining pockets or crevices; 3) ability to withstand cleaning-in-place temperatures and 4) rapid strip down for inspection and cleaning. Many different types of pumps are being designed and constructed to meet these requirements, but the comparative advantage in this sub-sector is being gained from the use of investment castings in construction. These castings are of a high quality and offer advantages over conventional units fabricated from stainless steel: walls can be thicker, lengthening life and allowing higher pressures; no internal welding results in better hygiene; and an improved involute shape can be achieved which gives optimum efficiencies up to 75 per cent with an open impeller (closed impellers give higher efficiency but impede cleaning in place). The advantage of investment casting linked to computer aided design and manufacturing machine centres enables the producer to provide a much wider range of products of higher quality at competitive prices. The ability to offer a wide range of casting designs with a variety of rotor formats is also enhancing the traditionally neglected area of product marketing in this sub-sector. Pumping systems and ranges being offered from individual manufacturers as a result of FMS include rotary or positive displacement pumps, lobe pumps, peristaltic pumps, progressive cavity pumps, helical rotor pumps, rotary vane pumps and various design formats of the traditional industry workhorse, the centrifugal pump.

1.3.2 sheet metalworking

In the sheet metalwork sub-sectors, manufacturing trends resulting from the developments in electronics technology, have shifted in favour of the production of lightweight units. Technological advances in the electronics sector have resulted in industrial and consumer products becoming smaller and more compact. For example, the information displays previously housed in metalwork cabinets have become digital as opposed to mechanical; control switches have been replaced by touch sensitive membranes; and heavy gauge mild steel sheet by lightweight alloys.

The reductions in the scale of the product the chassis for goods such as video recorders, television and hi-fi equipment or freezers has placed greater emphasis on machinery capable of working to close tolerances and minimizing stress on the lighter gauge materials. Hole-boring, punching, bending and shaping can be carried out by CNC machines working at higher speeds, producing uniformed output with minimum scrap levels. The use of alloys provides both strength and durability while accommodating more efficient materials handling operations. CNC slotting/punching machines also overcome the traditional problems of working with alloys under heat.

Typical expansion areas in the sheet metalwork sector include all varieties of consumer goods, display racks and cabinets, shop merchandising, computer chassis, printer cases, panels etc. All of these products require an attractive 'modern' finish and here the effects on the metalworking sector are also evident.

Paint spraying as a method of applying the finish to metalwork products is unlikely to advance in the future. Spraying is increasingly being undertaken by the use of electrostatic Dry Powdered dust paints. The use of alloys in the production of new 'high tech' products requires a more sophisticated finishing process for metalwork.

The high quality finishes produced by dry painting allows greater flexibility in the application of 'phase' painting - i.e. shading. Phase painting can be applied more precisely producing an overall finish which complements the desired market image for 'ultra modern' and 'high tech' visual attractiveness. Anodising has also become increasingly popular as more and more alloys are used in metalworking.

New techniques involving the use of 'stick on' materials are also emerging as an important finishing process in the sheet metalwork industry. The use of these materials (applied like sticky labels)

negates the need for anodising, painting and silk screening. Where this process can be applied, production and final assembly times are being substantially reduced.

Demand in the electronics sector for light aluminium fabrications is buoyant in the European markets. However, quality standards in the form of tight tolerance and precision manufacturing, are vigorous. In this respect the use of CNC machines is becoming increasingly important in sustaining competitiveness.

1.3.3 structural steel

Following the 1980/81 depression when sales fell by 13% and many steelwork companies went out of business, the fabricators who survived have substantially improved their productivity. Many have invested in new capital equipment, both in their fabrication workshops with computer design, and drawing offices with computer aided design and draughting equipment.

To achieve greater economy in metalworking the design procedures for steel structures are becoming more complex. New standards based on limit state design principals are being developed which are suited to computer applications (eg BS5400 and BS5950). The use of computers for scan and column structure design and estimating modules has been greatly encouraged by the provision of joint industry/government funds to develop suites of programmes. For example, in the UK collaboration between the Independent Steelwork Committee, the Department of the Environment, the British Steel Corporation, the Engineering Industry Training Board and leading contracting firms has resulted in steps to help the metalworking and steelwork fabrication industry to adapt to computer technology.

A contributing factor to the competitiveness of the sector stems from the standstill in steel prices for more than two years from 1983/84.

Despite recent increases throughout Europe, there has been a cost shift in favour of steel relative to concrete; while the construction market as a whole has declined, recent evidence suggests that steel has increased its market share for multi-storey buildings, which has remained reasonably steady, and for the declining bridges market.

1.3.4 heating, ventilating, air conditioning and refrigeration (HVACR)

Prior to the microprocessor, HVACR product design of main equipment matched the much wider tolerances which had been established as the most efficient for running systems. In many respects the problems of the European industry hinge on this question of design and the acceptance of a higher efficiency rating specification emerging from the R&D in microprocessor technology.

In general, the advent of new technologies - microprocessors, automation, robotics, information technologies - presents few special problems to the HVACR industry. Certain parts of the industry in Europe have invested substantially in the automation of their processes. The industry, in its boiler and radiator sector for example, has some of the largest and most modern automated plants in Europe. Similar examples can be found in the ventilating sector. The strategic need is for firms to develop an awareness of the benefits of robotics, which are already being supplied to the hot metal trades on the periphery of the industry. These benefits are: increased flexibility, improved quality, continuous unbroken runs and reductions in energy and waste.

In spite of the European industries capability and know-how to supply the most advanced product technology, it suffers from certain strategic disadvantages compared with some global competitors, particularly the USA. The European sector lacks domestic sources for many microelectronic devices which are needed for the more advanced products. To some degree this reflects the close links which exist

between US microelectronic companies and certain HVACR manufacturers operating in Europe. Europe also lacks domestic sources for some important types of compressor.

Previously these factors would have been of little concern to the European industry, since supplies would be fully available from a number of competitive sources on the world market. However, in times of strong demand for the industry's products, it is unlikely that European competitors would be as well placed as other competitors with a domestic source of supply and locations close to sources of the latest microelectronic components. A further strategic weakness is that US companies represent an appreciable part of the air conditioning and controls sectors. While the European manufacturing activities of American and other multinational companies transfer technology to Europe, it is reasonable to expect that their home activities would handle most product development and would be the chosen source of world-wide exports of certain of their products.

In terms of markets, the most important factor for the prospects of the sub-sector is the growth of concern for energy conservation. During the 1980's the industry has substantially improved its products and the building environment control systems on offer. There have been shown to have short pay back periods for users investing in them and economic rates of return have also been demonstrated for combined heat and power systems. The benefits of energy conservation investment have thus provided a framework for marketing and product development for the industry.

Government support for, and private investment in, energy conservation equipment has, however, been patchy. France has instituted a substantial programme for what has become known as the 'fifth energy source'. Denmark has for long been in the lead in the development of Combined Heat and Power systems. In the UK, however, investment remains low. As with the Middle East investment market, the potential for the energy conservation market will depend significantly on the future price of oil.

1.4 Implications of the new technology

There are three consequences of particular relevance to Cyprus which have resulted from technical change in the metal working industry. First, small firms have been able to automate and compete with larger competitors. For example, machine shops using computer controlled machine tools have fought back against the mass production oriented component manufacturers in the automobile industry by offering specialist services on the basis of high quality, fast turnaround, small batch production of high value added components. In these cases we can speak of automated flexible specialisation.

Secondly, many of the most successful regional areas of machinery production have exhibited not only a flexible industrial structure - networks of smaller firms linked into a number of larger client firms, or linked by federated consorzia. They have also been able to adapt machinery to customer needs rather than offering more standardised products. Baden Wuerttemberg in Germany, for example, has strengthened its international position in the textile machinery industry for these reasons and outcompeted the traditionally stronger volume textile machine producers in Massachussetts (see Sable, 1986). Similarly, in Italy, the success of the engineering industry has owed a great deal to closeness of the engineering firms to their client industries. As in other sectors, success is being built on adapting products to meet specific needs linked into automated flexible production systems. In some segments of the metal working market design and finish are also important, particularly in office machinery, metal cladding, household construction materials, and components and materials which are open to general view.

Thirdly, these regions have maintained a high level of skill within their engineering industries. In some applications there has been a tendency for the new techniques to 'deskill' the traditional craft workers, shifting that skill to the programmers. This has happened also to the product designers themselves, with design skills being shifted to those programmers who develop the CAD software systems.

But there have been found to be dangers in this route. A generation of programmers has come into being who lack the tacit knowledge of the traditional skilled craft workers. German and British evidence suggests that CNC machines are more effective if operated by skilled craft workers, and new types of CNC machines are being developed which allow these craft workers to reprogramme the tools by manual operations which are then 'read' into the programme and can be automatically reproduced (and adjusted). A major project is now underway - financed by the EEC's Esprit Programme - to develop a complete Flexible Manufacturing System based on the same principles. It is noticeable that both the Germans and Japanese have maintained a heavy investment in engineering craft skills (in sharp contrast to Britain), while the small Italian engineering industry has been built round skilled workers formerly employed in large engineering firms.

1.5 National experience in Europe

The impact of these changes is reflected in figures of national performance and in particular with the decline of the UK metal working sector relative to that of its three major European competitors, West Germany, France and Italy.

1.5.1 The UK

In Figures 2-6, the UK can be seen to have clearly underperformed, with declining value added over the decade 1975-85, the lowest growth of productivity, the lowest investment per employee, the greatest loss of employment and the lowest increase in exports.

Traditionally, the UK metalworking industry had been a sector of many small, inefficient, broad product range companies, unlike the more specialised German firms. During the post war era this fragmentation disguised many weaknesses in the structure of the industry. Firms could escape with the minimum of marketing and service and exported

only when home demand was slack. The business favoured a small organisation easily within the management span of one man which enabled family ownership, of what were comparatively small firms, to continue (particularly as no large R&D programmes were financed). The sector also supported the curious system of acting as sales agents for foreign firms with firms gaining reputations for selling foreign, rather than their own, products.

Attempts to rationalise the various sub-sectors met with limited success in the late 1960's and 1970's, so that the depression between 1979-82 hit the industry particularly hard. With many of the client industries in serious decline including construction (Figure 2), the automobile industry, as well as many other investment goods industries from power plant to office machinery, demand was too low to justify large scale investment, when it was large scale investment in the new technology which was needed.

Government strategy has traditionally emphasised rationalisation through increasing size. The Industrial Reorganisation Corporation in the late 1960's encouraged a series of mergers and takeovers which changed the whole structure of the industry. But size was confused with efficiency and the 1970's showed that beneath the surface the large conglomerates were in fact composed of the traditional and only barely reformed companies. Many of these conglomerates have now been broken up, and the least efficient plants closed. In the foundry and wire drawing industry the British government attempted to organise a rationalisation programme via merchant banks during the 1980's with only limited success. More effective have been incentive schemes to encourage investment in CNC machines and FMS, as well as to modernise small engineering firms through the SEFIS programme. Local Authorities have also taken initiatives in the West Midlands, Yorkshire, and London to re-equip and rationalise traditional metal working firms.

1.5.2 France

Whereas Britain had emphasised size, the French put their resources into high technology, launching a number of schemes in their 1976 Industrial Plan based on large scale technological investment. As can be seen from Figures 2-6, France had the second highest annual growth rate of investment, and the highest rate of growth of value added in the metal work and engineering sector, but they also have seen the highest rate of import penetration.

1.5.3 Italy

Italy exemplifies a successful strategy for the metalworking industry of a developed country. In the 1950s Italy was a typical low labour cost country, selling low priced engineering products - standard drills and boring machines - and was at this time the number two exporter to the USA. As the domestic standard of living rose and new low labour cost countries emerged, the Italian industry was compelled to seek a new role. This was to become an industry composed of a great many small and medium sized companies which operate on a highly individual basis. The industry now specialises in the production of tailor-made, high technology products, and although highly fragmented, prospers because it too has developed an appropriate structure.

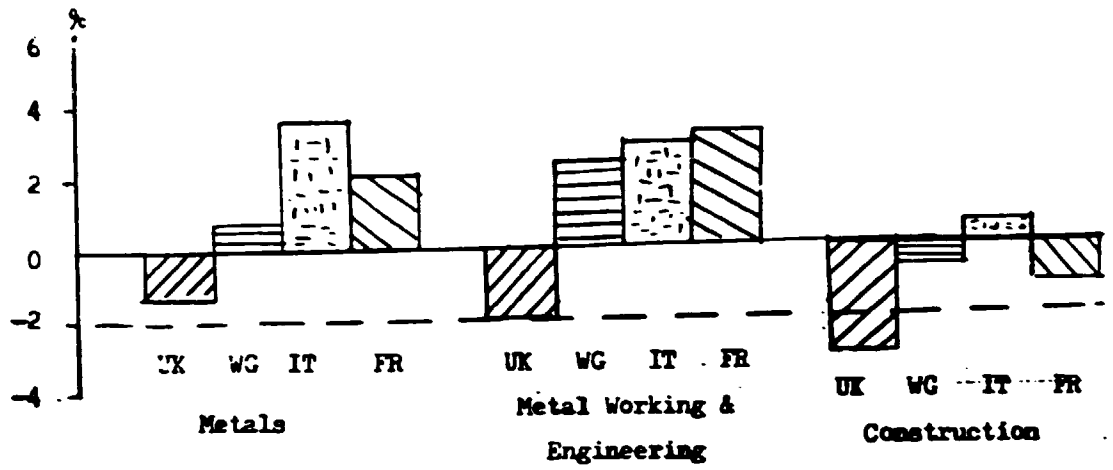


Figure 3 Productivity - Value Added Per Employee (1975-85) Metal Working & Engineering

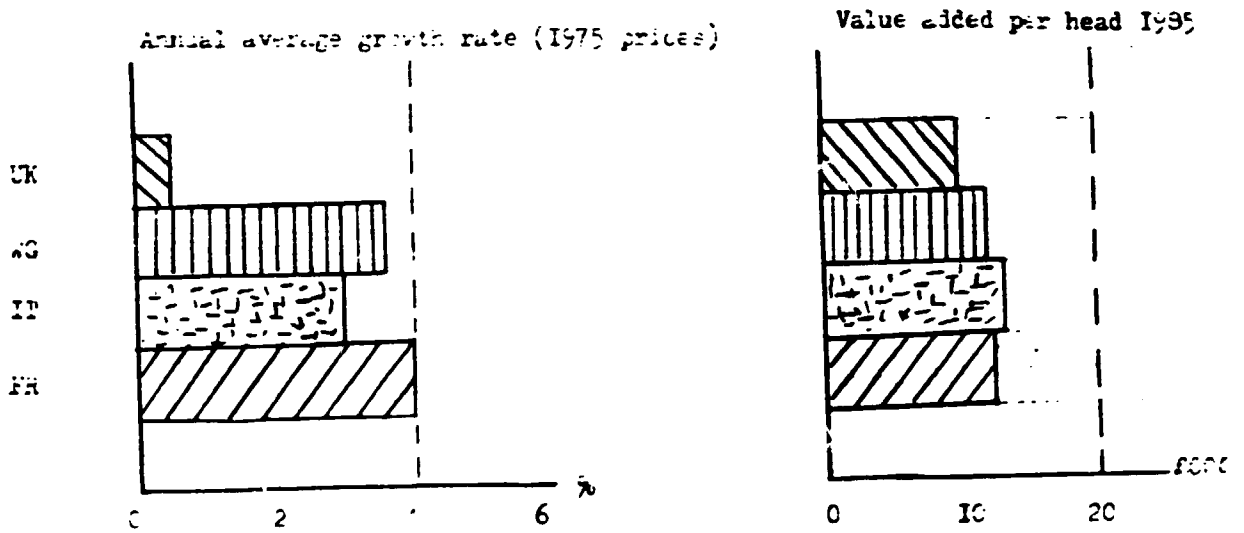


Figure 4 Investment

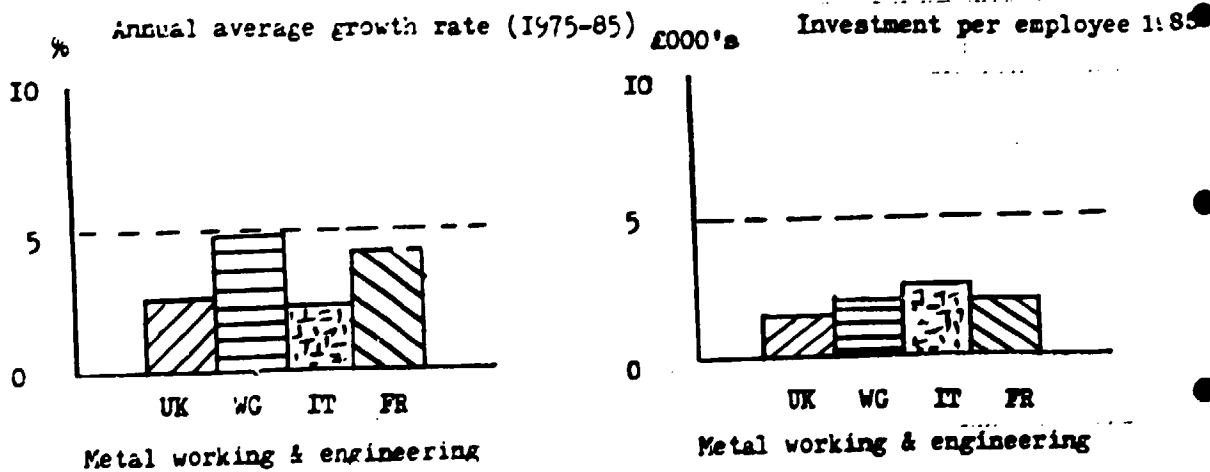


Figure 5

Employment in Metal working and Engineering

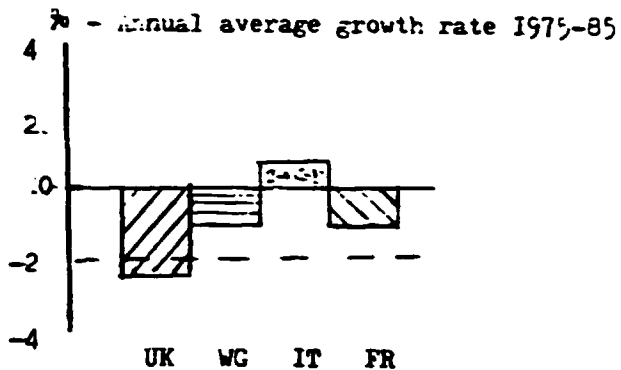
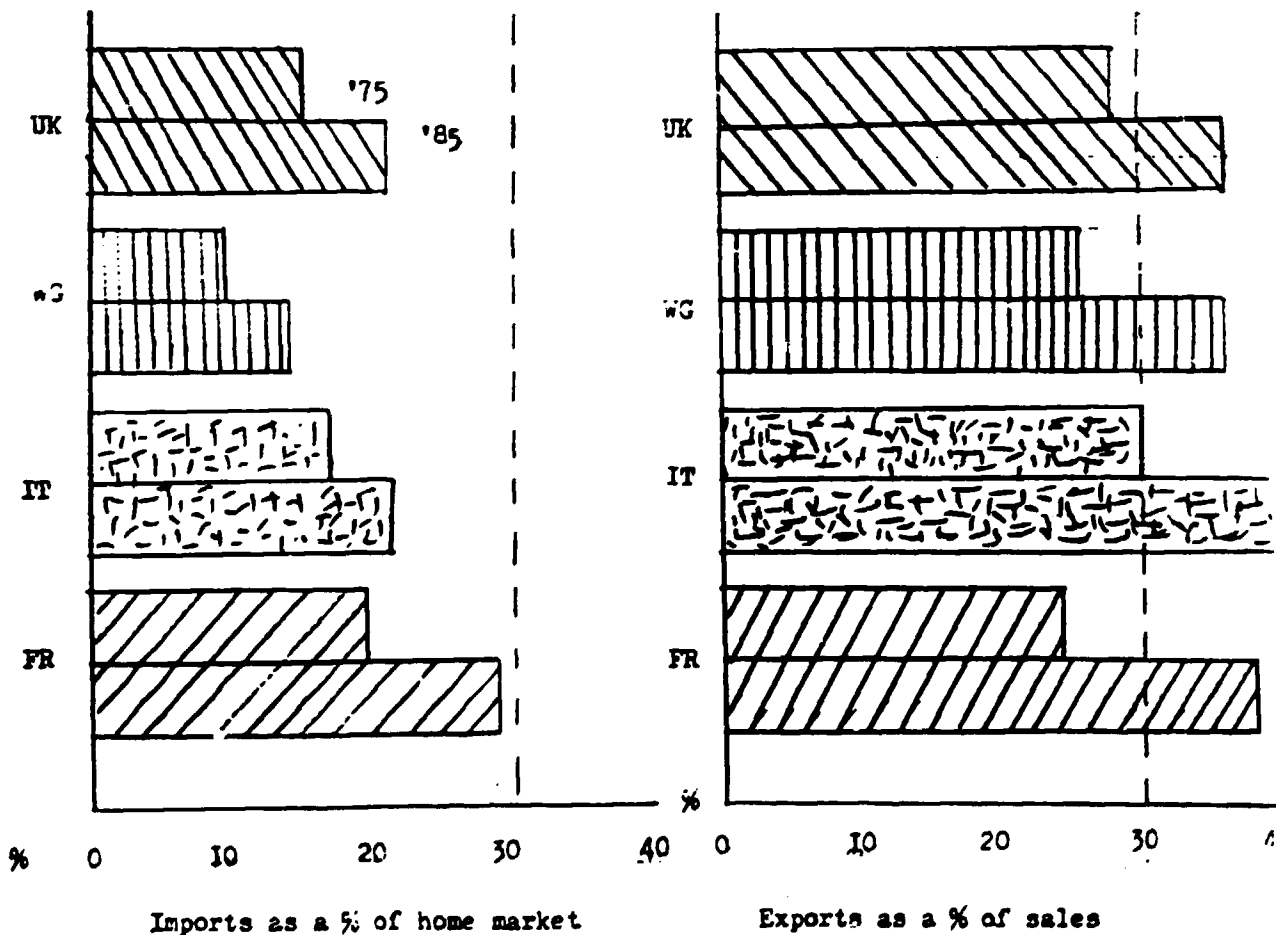


Figure 6

Sector Trading Performance - showing changes between 1975-85

Metal working and engineering



Marketing overseas is done under the auspices of the trade association, and production is kept low cost by the heavy use of subcontracting. UCIMU data for 1977 estimated that of 1200 production units, 800 were no more than specialised workshops employing less than 20 people. The remaining 400 units averaged 80 employees as against 270 in Britain, 255 in the USA and 188 in France. These smaller companies which constitute an extensive network of complementary activities on the fringe of the country's larger engineering groups are the subcontractors. The core companies design the product, build a limited number themselves to determine the lowest manufacturing cost, redesign the product using value engineering for cheaper production, and then subcontract to the low cost suppliers. In this the Italians resemble the Japanese who also make extensive use of subcontractors, up to 20 per cent of total manufacturing cost in the Japanese sector. In Italy it is estimated that up to 70 per cent of the manufacturing costs of the larger enterprises is made up of subcontracting.

Such a production system provides the Italian metalworking sector with a low cost manufacturing base. But it is more than that. It is a new form of production and is the rational response to the need for specialised services in a fast changing global market. High productivity, small capital intensive specialist companies are more suitable for this global market competition than large scale, bureaucratic assembly line companies.

The government has supported this path of development by national legislation encouraging the growth of industry associations to provide the common services to small firms which would normally be furnished by the overheads of a larger manufacturer. Local government has also provided assistance in the form of industrial workshops and estates, training, and various measures of financial support.

1.5.4 Germany

The metalworking sector in Germany has a solid basis in the machine tool industry. Between 1955 and 1980 it established itself as the second largest producer of machine tools in the world, and the leader in exports. Its position in the machine tool market was founded on the metalworking sectors specialisation in various sub sectors of the industry. The sector as a whole was at the forefront of technology in those specialities and was made up of large numbers of small product specialist firms, each of which offered a range of products/services within their specialisation.

Globally, the critical dimensions of competitive success changed with the arrival of numerically controlled technology. The consequent increase in development and sales and service requirements, created pressure towards larger companies. This orientation has by and large been missing in the German specialisation. Nor is the German metalworking sector under so much pressure from low wage countries, because their specialities are relatively sophisticated. Nevertheless the sector has had to meet some challenges and it has evolved an institutional structure, and been supported by an industrial policy, at both national and regional level.

First and foremost among these has been the industry-wide cooperative Research and Development Programmes which allow for economies of scale in research, and prevent unnecessary duplication of effort. Led by a strong association (the VDW), the industry cooperates in basic R&D work and competes only in the application of that research to individual company's products. Through contacts with the eight major technical institutes the VDW provides research which small companies could not undertake themselves, and companies can themselves sponsor a project, which will be co-funded by local and federal government provided the results are published within two years of completion.

Aachen, the prime machine tool research institute, is the focal point for this activity not only as a teaching institution for undergraduates with emphasis on machine tools but as the link between industry and academie as graduates who have been in the metalworking industry for a few years return to pursue research. This close relationship and the scale of such activity, encourages cooperation between firms in other areas. Indeed West German industry has been described as a group of clubs. Cooperation extends through standardisation of product specifications, to sales and service support in foreign markets, which enables the smaller companies to compete effectively in export markets and benefit from economies they could not exploit alone.

With the benefit of hindsight from the British experience, and probably also with better management, German companies in the early 1970s did not merge with any and every possible candidate and proliferate product lines, but pursued rational strategies for strengthening their speciality. Max Mueller-Brinker, for example, a lathe specialist took a controlling interest in an Italian automatic lathe producer, and Gildmeister (Germany's largest company) acquired Heidereich and Harbech in order to apply NC to their range of lathes. As the Financial Times commented comparing Germany to the UK, "there have been recent signs of a few larger groups emerging, but these have been based on a greater degree of specialisation". The industry structure which then emerged, of specialist groups cooperating in the critical areas of basic R&D and overseas sales, has been strong enough to maintain the German industry's worldwide position.

Summary

The metal working sector has traditionally been an important part of manufacturing in Western Europe, with employment in metal working and engineering being still one third of manufacturing employment in West Germany, and approximately one fifth in the other main European industrial countries.

Although the growth of mass production provided a new source of demand to the sector for specialised equipment, metal working itself remained a small and medium batch production industry unable to enjoy the economies of scale of volume production. It was an industry characterised by low increases in labour productivity, with a work process which involved frequent interruptions, changeovers and complicated work scheduling patterns.

As a producer goods industry, it has suffered from the fall in average investment since 1973, and in particular, the decline in construction activity. Nevertheless, the application of computers to the production process has brought about an industrial revolution in the sector over the last decade. Computer Aided Design (CAD), Computer Aided Manufacturing (CAM) and the linking of the two (CAD/CAM) together with the computerisation of materials handling and storage and a number of similar developments, have together allowed producers for the first time to benefit from the kind of economies associated with volume production while remaining batch producers. The industry was always flexible, capable of responding to particular customer needs. The development of electronics has now automated this flexibility.

The most successful producers have been those who have combined flexibility and automation with specialist products. The niche marketing which has become a feature of consumer goods industries is also found in metal working. Close links to customers, a capacity to design products for specific customer requirements, a new concern with finish and appearance and with quality - these are the features which have distinguished the market leaders.

Britain, which has been the slowest of the major European economies to respond to these trends, has seen the metal working sector decline in value added and employment over the last decade. More successful have been France, (whose government has encouraged large scale investment in the new technology), Italy and Germany. The last two have developed industries based on specialisation, quality and a

flexible industrial structure which unites large co-ordinating firms with a wide range of skilled and automated sub-contractors. Major firms like Bosch, located in the fast growing Baden Wuerttemberg region of West Germany, have turned themselves round after the early 1980's depression by decentralising product development as well as production to specialised sub-contractors, acting in part in the role of an industrial co-ordinator to a regional network of independent firms. Similar flexibility and specialised market orientation has allowed the textile machinery manufacturers in the same region to outcompete the more standardised former international majors of this industry located in the United States.

In spite of the overall depressed level of investment and construction activity, new areas of demand and the new metal working processes have led to growth areas emerging in the metal working sector. Of these a number are of relevance to Cyprus:

- heating, ventilating, air conditioning and refrigeration equipment

- energy conservation equipment

- water treatment equipment

- hygienic valves for the food processing, pharmaceutical and biotechnology industries.

The new products and processes which have emerged in the construction related parts of the metal working sector - both in structural steels and the HVACR sub-sectors - as well as those pertaining to water management, will be of particular relevance in the event of an upturn in the Middle East market.

II

THE METAL WORKING INDUSTRY IN CYPRUS

2.1 Composition of the Industry

The Metal Working industry in Cyprus (excluding electrical machinery) accounted for 10% of manufacturing value added in 1985, and a similar amount of manufacturing employment. Like other newly industrialising countries, metal working has contributed only marginally to manufacturing exports, (5% in 1985), but accounts for nearly 30% of manufactured imports (see Table 1). It has, therefore, a considerable negative trade balance, C£209 million in 1985, or 44% of the economies overall negative trade balance. This is a measure of the importance of this sector to the Cypriot economy, and of policy towards its domestic development.

Originally, the industry was tied to services for the agricultural and mining sectors, provided by one or two person metal workshops and family businesses. After the events of 1974, however, - which resulted in the separation of much commercial agriculture and the major mining concerns in the North of the country from the economy of the South - the axis of the sector shifted to supplying the construction industry. With the construction boom providing a strong demand, output more than doubled in real terms between 1976 and 1980. Since 1980 the sector has continued to grow (by 52% in real terms between 1980 and 1985), with construction related sub-sectors again making a contribution.

Figure 7 presents the main sub-sectors, Table 2 gives their share of sector value added in 1985, and Table 3 shows their growth between 1980 and 1985.

Table 1

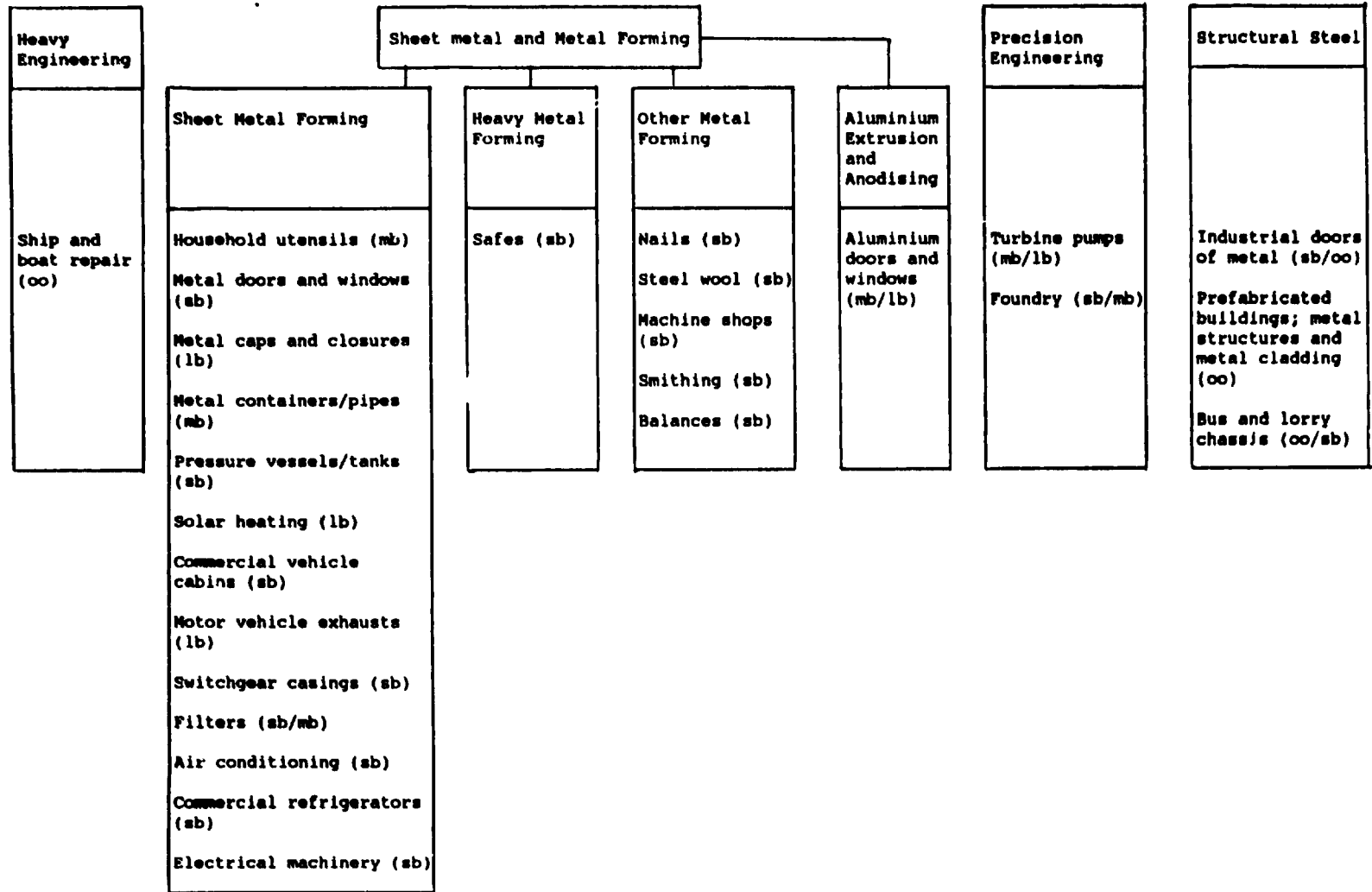
The Metal Working Sector and its Significance for Cypriot Trade

	Cyprus		Reference Country							
	1980	1985	Korea 1980	Malaysia 1980	Singapore 1980	Brazil 1980	Indonesia 1980	USA 1980	UK 1980	FGR 1980
% Exports of National Exports	6.4	5.4	3.4	1.23	6.65	6.6	0.05	16.1	14.9	10.6
% Imports of National Imports	28.9	29.4	16.4	10.8	9.9	9.57	19.8	6.25	8.6	6.5

Source: Cyprus Industrial Statistics
International Marketing Data and Statistics.

Figure 7

Cypriot Metal Working Industry



Key: oo one-off job shop
 sb small batch
 mb medium batch
 l large batch

Table 2

Composition of Cypriot Metal Working sector, 1985
% of sector value added

Aluminium doors and windows	18.7
Metal doors and blacksmithing	16.0
Machine shops	15.5
Turbine pumps	7.4
Metal caps and closures	7.0
Solar heaters	5.9
Refrigeration	5.3
Ship and boat repair	4.1
Prefabricated buildings	3.8
Motor vehicle assemble and cabins	2.8
Aluminium anodising	2.6
Metal containers, pipes and other products	2.1
Tinsmithing	1.9
Air conditioning	1.7
Other motor vehicle equipment	1.3
Nails	1.0
Motor vehicle exhausts	0.8
Steel wool	0.8
Household utensils	0.6
Coppersmithing	0.4
Balances	0.3

Source: Industrial Statistics 1985

Table 3

Growth of the Cypriot Metal Working Sector 1980-1985
(GDP value added at 1980 prices)

	1980	1985	% growth
Turbine pumps	210	1,284	511
Metal caps and closures	237	1,201	406
Aluminium doors & windows	1,057	3,226	205
Air conditioning	97	290	199
Tinsmithing	142	334	135
Refrigeration	521	918	76
Aluminium anodising	278	445	63
Solar heaters	624	1,011	62
Coppersmithing	46	72	56
Blacksmithing/metal doors	1,815	2,768	52
Nails	120	166	38
Metal containers, pipes and other products	494	367	25
Household utensils	85	100	17
Balances	45	49	8
Machine shops	2,469	2,675	8
Steel wool	n.a.	130	-
Motor vehicles exhausts	152	142	-6
Other motor vehicle equipment	238	222	-6
Ship and boat repair	925	703	-24
Prefabricated buildings	943	658	-30
Motor vehicle assembly and cabins	886	483	-45
Total	11,384	17,254	52

Source: Industrial Statistics

The following points are clear from the tables:

- Cypriot metal working is predominantly an industry of sheet metal and metal forming. Heavy engineering in the form of ship and boat repair accounts for only 4% of value added. Precision engineering in which we have classified turbine pumps is 7%. Structural steel is also 7%. 82% of value added in the industry is therefore made up of sheet metal and metal forming products.
- over half of value added is accounted for by three sub-sectors: aluminium doors and windows; metal doors and blacksmithing, and machine shops and threshing machines.
- a third of the sector is concerned solely with the production of doors and windows; and just under a half with construction related production (doors and windows, including the anodising plant, solar heaters, air conditioning, and prefabricated buildings).
- the heating, ventilating, air conditioning and refrigeration sub-sector which has been growing strongly in Europe accounts for 13% of the sector, and includes a significant presence in energy conservation equipment.
- the sub-sectors which have declined in real terms are those concerned with motor vehicles, ship and boat repair and prefabricated buildings, the last reflecting the fall-off in construction activity in Cyprus and the Middle East. Those that have expanded most rapidly have been the aluminium and metal doors and windows, air conditioning and refrigeration equipment and solar heating - all of them construction related activities. The turbine pump sector and the metal caps and closures were the two most significant growth areas among the remainder.
- the agriculture related metal working - machine shops and threshing machines - expanded only marginally, in line with agricultural output.

- the great majority of the sub-sectors are involved in one-off or small batch production.

Overall, the sector is small scale, labour intensive light industry.

2.2 Industrial structure

The scale of production can be judged from Tables 4-6. In the metal products sector, there are only three firms with more than 50 workers, while 93% of the firms have less than 10 workers. This picture has changed little over the decade. Furthermore, the small firms, with less than 10 workers produce nearly half the value added, and more than 90% of the value added is produced by firms with less than 50 workers. The average size of firm in the sector is 3.8 employees which is the lowest of all five sectors included in the current study.

The above figures refer to metal products excluding machinery and transport equipment. Table 6 shows a breakdown of the metal products sector, including non-electrical machinery and transport equipment (with which our sample survey was also concerned), and shows that it broadly confirms the picture of Table 4, with an average employment per firm of 4.3. However, there are considerable differences between sub-sectors, with the larger firms being found in the metal containers, turbine pumps, aluminium anodising and pre fabricated buildings, while 77% of the firms are in three sub-sectors, metal doors, windows, and blacksmithing, aluminium doors and windows, and machine shops and threshing machinery. These three account for 51% of employment.

Table 4

Metal Products
Number of firms according to number of employees

	less than 10	10-49	50-99	100 and over	Total	Average no. of employees per firm
1976	393	37	3	-	433	3.8
1981	568	57	3	1	629	4.2
1987	788	59	2	1	850	3.8

Source: Industrial Statistics

Table 5

Proportion of value added by different
employment size categories 1985

	%				
	less than 10	10-49	50-99	100 and over	Total
1985	48.8	41.6	3.8	5.8	100

Source: Industrial Statistics

Table 6

Average employment by sub-sector 1985

	No. of enterprises	No. of persons engaged	Average no. of employees per firm
Metal containers, pipes and other products	3	111	37.0
Anodising of aluminium	2	62	31.0
Prefabricated buildings	5	149	29.8
Turbine Pumps	14	381	27.2
Air conditioning	11	160	14.5
Nails	5	65	13.0
Metal caps and other closures	22	231	10.5
Refrigerators	20	192	9.6
Household utensils	3	27	9.0
Balances	2	18	9.0
Other motor vehicles and equipment	8	64	8.0
Motor Vehicle exhausts	8	51	6.4
Shop and boat repair	26	140	5.4
Solar heaters	49	258	5.3
Motor vehicle assembly and cabins	36	160	4.4
Machine shops	177	677	3.8
Alum. doors and windows	273	853	3.1
Blacksmithing, metal doors and windows	374	818	2.2
Coppersmithing	12	25	2.1
Tinsmithing	55	108	2.0
Total	1,075	4,577	4.3

Source: Industrial Statistics

This small firm size indicates the sectors service orientation. Firms are geared towards flexibility in their response to the market place. On the other hand this structure indicates the general lack of specialisation across the sector. In view of the geographical location of Cyprus and the problem of importing raw materials, most small firms/workshops tend to be generalists by nature and prepared to consider all varieties of work in order to maintain their throughput.

2.3 Structure of Operating Systems

The nature of the operating systems within the sector falls into two basic categories:

- (1) 'make from stock direct to customer' i.e. all (or most) input resources are stocked but goods are made only against and on receipt of customers orders.
- (2) 'make from stock to stock, to customer', i.e. all (or most) input resources are stocked and the customer is served from a stock of semi-finished and finished goods.

Some companies within the sector operate on a combination of these two basic systems; the majority however utilise the former. It is estimated that 68 per cent of the total output of the sector is based on system (1) above. Normally, where this operating system is applied, input stocks need to be tightly controlled in order to balance the expected size of the order book and hence level of production. Control over raw material inventories is crucial to cash flow under system (1). However, while this operating system was utilised by the majority of firms in the sector, little control existed over the level of input stocks in relation to orders. With the majority of small firms being geared towards job shop/small batch production, the most appropriate operating system should be to 'make

from source direct to customer,' i.e. no input resources are held and all goods are made only against and on receipt of customers orders. It is estimated that 92 per cent of production in the smaller firms (majority) was only undertaken after orders were received, although substantial material input stocks were held (Lathwood 1986).

The larger firms utilised operating system (2) above. Unlike the small firms, the bulk of their output relied on sales to export markets, particularly in the Middle East. The level of output in these firms, fluctuates in accordance with market conditions, with buffer stocks of semi-finished and finished products being held in order to cope with demand variations. With firms engaged in a product/market business orientation, scheduling and planning are centred on continuous production or medium to large batch production.

There is very little subcontract work stemming from the larger firm to the smaller, with the result that component manufacture on a continuous production basis was undertaken by the product/market orientated company. Indeed, even among the smaller firms there appeared to be little or no subcontracting. It has been estimated that approximately 3 per cent of the total value of production output is undertaken on a subcontract basis, indicating the substantial level of independence of the small and large firms in the sector.

2.4 Factor intensity and productivity

Linked to small size is labour intensity in production. Cypriot manufacturing as a whole is labour intensive, but as can be seen from Table 7, the metal working sector has a lower amount of fixed assets per head than the manufacturing average. Although some sub-sectors are above the manufacturing average, the three main sectors, threshing machines and machine shops and metal and aluminium doors and windows, all have an even more labour intensive character than Cypriot industry as a whole.

Table 7

Metal Working Industry: Fixed Assets per worker 1981

	CE
Metal products (nails, aluminium anodising, wire, solar heaters, metal caps and containers)	9.677
Refrigeration	8.504
Ship and boat repair	8.046
Motor vehicle assembly and repair	6.200
Pumps	6.178
All manufacturing	5.608
All metal products except machinery	4.890
Threshing machines and machine shops	3.903
Structural metal products (door, windows and prefabricated buildings)	3.536
Air conditioning	2.061
Cutlery, tools and hardware	1.433

Source: Census of Industrial Production 1981

Recently, a number of firms have made major investments which have increased factor intensity. One of the most advanced aluminium extrusion plants is now operating in Cyprus; Nemitas have invested in a modern precision foundry. By and large, however, Cypriot metal working remains at the low investment, jobbing shop level.

Productivity was accordingly low. Figure 8 charts the value added per worker for each sub-sector of the metal working industry against the average number of workers per firm in the sub-sector. This confirms the picture of the sector as diverse and fragmented with the bulk of it being composed of small low productivity firms. In all, 17 of the sub-sectors were below the average level of productivity of manufacturing as a whole, and only 4 above. The manufacturing average level for firms of under 30 workers was under C£5,000, so that the metal working sector was not unduly out of line with the rest of small-scale manufacturing. But by international standards, Cypriot productivity and its investment per workers is low, reflecting the early level of development which the industry has reached.

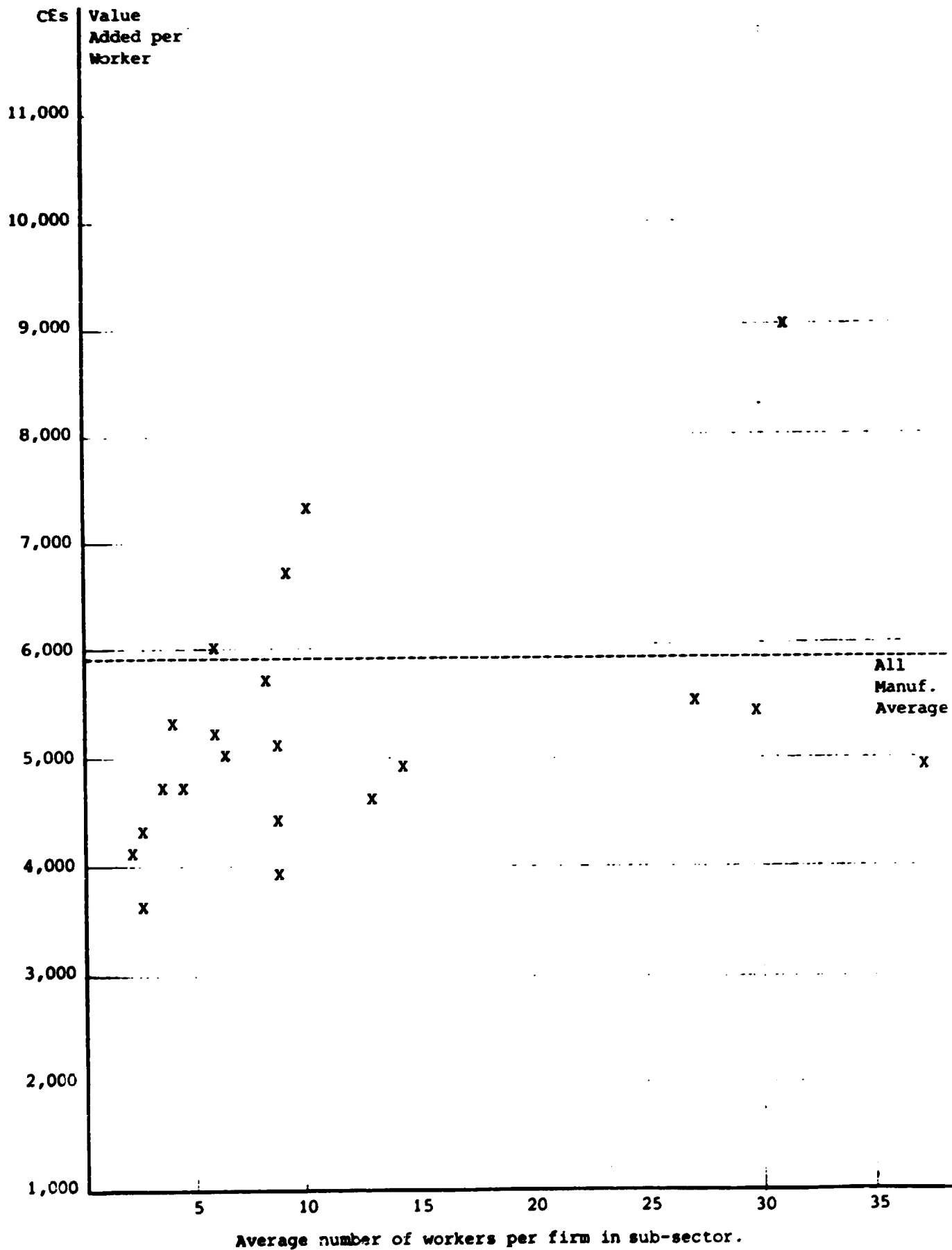
2.5 The sector and international trade

2.5.1 Imports

The metal working sector in Cyprus is relatively insulated from international trade. While imports account for nearly four fifths of the domestic market, the sub-sectors which have grown up have done so because they enjoy some measure of natural protection. This is true, for example, of the service type one-off or small batch industries. With 92% of the production of smaller firms being made to order, it is clearly beneficial for the producer to be close to the customer. This is as true of the repair and maintenance function as it is of many of the construction-related activities where air conditioning equipment and structural steel products are liable to be made to order, and similarly with a proportion of the doors and windows output.

Figure 8

Metal Working Sector
Size and Productivity 1985



For some of the medium sized firms producing for stock, the items in question are for the most part more economically shipped as raw materials to be made up locally than as finished products because the bulk of the final product makes for higher transport cost. This is the case with metal containers, pipes, tanks and pressure vessels, motor vehicle exhausts, commercial refrigerators or bus and lorry chassis. In the case of metal caps it is the printing which is important: this could be done abroad, but there are advantages in having a local facility. The technology for printing and punching is simple, and transport costs are lower for the sheet steel than the finished moulded caps, so that the industry tends to be decentralised geographically.

For the most part, the industry has had limited protection - except for the few less simple products like turbine pumps, as well as the filter industry, nails, aluminium anodising and crown corks - so that we do not foresee entry into the Customs Union as liable to have substantial effect on home production. The filter industry will be hit seriously and aluminium extrusions could also be significantly affected if all quota protection is ever finally removed. Turbine pumps, however, are on the list of exempted products.

There is little internal linkage within the sector. All raw materials for the sector have to be imported. Examples of the main commodities imported include iron and steel structures, tubes and pipes, castings, rolled steel, mild steel sheets and plates, round bars, angles and sections, aluminium rods, lead sheets, hand tools, base metal fittings, internal combustion engines and motors. All but the most basic machines are imported together with sub-assemblies and the majority of components.

2.5.2 Exports

The other side of the fact that Cypriot production is primarily service and locally oriented is that exports are a small proportion

of output for the smaller firms. For the large companies, however, exports make up 69% of total output. Table 8 shows that for the sector as a whole although exports reached nearly 30% of gross output in 1981, they have now fallen to 21%. Between 90-93 per cent of the gross output exported from the sector finds its way to the Arab markets with the remainder being distributed to EEC and other areas. The major Arab market countries include Saudi Arabia, Libya, Egypt, Iraq, Lebanon, Kuwait, Bahrain, Jordan, Yemen, and Dubai. The fall in the price of oil together with major disruptions in some of these markets over the last five years have severely impeded the growth and continuity of these areas as markets of short-term penetration.

The principal exports from the sector to the Arab markets include water coolers, refrigerated cabinets, sheet metal enclosures, turbine and centrifugal pumps, metal closures (screw caps, crowns etc), air conditioning units, low voltage switchboards and trunking, and fabricated steel structures.

In recent years the falling demand in the export markets of the Middle East has had a significant impact on companies in the sector which had geared their output and marketing effort to these areas. Moreover, the economic climate of the Middle East markets has accelerated the development of a more competitive environment in this area through greater sophistication in purchasing requirements based on higher international standards, price competition, design and support services. The early advantage seized by Cypriot exporters due to their geographical location in relation to these markets after 1974, and the cash rich situations which they encountered, has also been eroded by the penetration of the Arab markets by overseas firms possessing distinct competitive advantages. Competition from Italy, Spain, France, Japan, Korea and the United States has produced an environment where Cyprus firms in the metal working sector are becoming increasingly marginalised in Arab markets.

Table 8

Output, Exports and Imports 1980-85 (current prices)
Metal Products, Machinery and Equipment

Year £M.Cyp	1980	1981	1982	1983	1984	1985
Gross out- put	38.4	51.3	59.9	60.9	66.9	75.2
Domestic exports	9.5	15.1	15.1	13.2	15.3	15.7
Imports for home consumption	123.0	141.9	167.4	186.1	231.6	224.4
Crude trade balance	-113.5	-126.8	-152.3	-172.9	-216.3	-208.7
Domestic consumption	151.9	178.1	212.2	233.8	283.2	283.9
Exports as % of gross output	24.7	29.4	25.2	21.6	22.8	20.8
Import penetration	80.9	79.6	78.8	79.5	81.7	79.0

Source: Department of Statistics and Research

The consequences of this competitive environment in Middle East markets are beginning to reverberate in the Cyprus market. Traditional exporters having lost market share in recent years have turned inwards to the home market to meet the sales shortfall. With the apparent saturated level of the home market there is evidence that traditional exporters are basing their home market strategy on price competition. The smaller firms in the sector appear to be responding to discounting: a downward price spiral could lead the sector down over the medium-term to producing lower quality products, cost cutting through manpower savings, tighter margins and higher debt levels. In the light of the current capital structure of firms in the sector, the ability to respond positively in the face of a downward price spiral will be extremely difficult if not impossible in some instances.

2.6 Key problems in the industry

2.6.1 The size of the internal market, scale and new technology.

If the Cypriot metal working industry remains as it is, its growth will be limited by the rate of growth in its local markets. Given its dependence on construction which has been a declining market, and agriculture, which has been growing only slowly, this seriously reduces the prospects for metal working. Yet if the sector is to expand, either by import substitution, or by expanding its export markets, then its prime task is to benefit from the electronic revolution in metal working which we discussed earlier.

As of now, this revolution has only just begun in Cyprus. During our stay we visited 23 firms in the sector, accounting for 27% of employment and 50% of output. These included all the major firms. We found only three firms with CNC equipment, 9 sets of computer controlled machinery in all. Six of them were owned by a single firm, Nemitsas, the largest producer of turbine pumps, which had just invested in an up-to-date computer controlled investment casting

foundry. A second firm had a CNC forming machine and a CNC brake press and a third had a state of the art aluminium extrusion unit.

These three firms represent the leading edge of technology in Cypriot metal working, but they also reflect the problem of modernising within so narrow a home market. For the extrusion machinery, the foundry and the brake press, all had to operate well below capacity, thus substantially increasing their unit cost.

2.6.2 Capacity utilisation

The problem of the full utilisation of capacity was not confined to modern machines. We found evidence of serious under utilisation both of machinery and buildings in a number of firms that we visited. In one case, the firm was operating in one small section of a building, the rest remaining unused. In another, capacity utilisation of as little as 20% was observed. In Table 9, we show the ratio of sales to fixed assets. A low figure indicates that sales are not sufficient for the size of asset investment. From our sample, we found that nearly two thirds of the firms (63%) had an asset utilisation ratio of less than 1.5 (that is to say, the annual sales were less than one and a half times the book value of fixed assets). This is very low, and indicates serious capacity utilisation problems.

Table 9

% Firms in sample		Asset utilisation ratio
18%	<	1.0
45%	<	1.5
27%	>	2.0
10%	>	5.0

Source: Company interviews

2.6.3 Stocks

There was also evidence of serious overstocking, (see Table 10). This shows that 37% of sample firms had stocks which only turned over one and a half times a year, that is to say, they were held on average for 8 months or more. In the case of 16% of the firms, stocks were held for more than a year, and we saw examples of this with firms carrying large quantities of steel whose working capital cost seemed not to have been fully appreciated.

Table 10

% Firms in sample	Turnover Stock ratio
16%	< 1.0
21%	< 1.5
42%	> 2.0
10%	> 4.0
11%	> 5.0

In part, the level of stocks is a matter of improved stock management. But it also reflects a major structural problem for the industry. Given that most inputs are imported, notably steel and aluminium, Cypriot firms face the problems of purchasing economies - with bulk order discounts as well as concern over delivery dates. For the firms visited, we estimate that an average of 67% of raw material inputs were held as stock rather than used for work in progress, that is to say, materials (as against all stocks) were held for 8 months or more. Taking 1985 figures for the sector as a whole, and assuming an average stock turnover of 2.5, we estimate that raw material stock holding accounted for 37% of gross output (see Table 11).

Table 11

Metal Working Sector: cost analysis 1985

	C£s '000's	% of output
Raw materials	45,103	55.4
Labour costs	19,459	23.9
Gross output	81,363	100
Raw material stocks	30,219	37.0

Source: Industrial Statistics
Company interviews

The significance of these figures is as follows. If raw material stock holding was cut in half, then - assuming 10% interest on the working capital required - this would be equivalent to a 7.7% reduction in labour costs.

2.6.4 Working capital and financial structures

The size of stocks served to put pressure on the companies' financial structure. Almost without exception, we found that companies were operating at their maximum overdraft limit. If we take the customary norm of 60:40 equity to debt as a guideline ceiling then for nearly half of them (44% as shown in Table 12) there was no further scope for financial gearing given their present debt levels. For a number of companies the overdrafts were no longer regarded as a source of funding for fluctuating working capital requirements, but had become hard core financing. Working capital levels within the firms were restricted to narrow limits and based more on continuous creditor stress than on sufficient throughput of resources resulting from healthy sales trends. In some cases, firms expressed anxieties about impending cash crises with no room for manoeuvre, as a result of their existing debt levels.

Table 12

% of Firms in sample	Debt:equity ratio/gearing
20%	> 120%
14%	> 100%
10%	> 80%
20%	> 60%
19%	> 50%
17%	< 50%

In part, the financial difficulties in which metal working firms now find themselves, is linked to government and financial sector policies. The system of capital allowances encouraged investment in fixed capital which could not, within the existing industrial structure, be fully utilised. Capital in the form of government assisted loans, plant finance and relaxed working capital sources from the commercial banks encouraged small businesses to locate in premises not commensurate with their turnover and size. Banks who have too often been more concerned with the collateral of the borrower than the prospective viability of the enterprise allowed high levels of borrowing for investment in premises and machinery which were not adequately supported by the Times Covered Ratio of many firms in our sample (ie. cash flow before interest and tax divided by interest and principal repayments).

The result of these policies is the excess capacity we noted above, and the vulnerable financial structure of the industry. The present downturn in the sector is increasingly highlighting these weaknesses.

Furthermore, from the viewpoint of the major creditors to the firms, notably the lending institutions, we judge that on the basis of our visits, they may well be over exposed in the sector. If companies cannot service the debt the banks can either roll over the interest into extensions of the loans or be faced with attempting to realise the value of their debentures. With the sector conditions reigning

at present, it is not unlikely that the commercial lenders may be faced with some difficulties in asset realisation. The value of the assets in relation to the performance of the sector and its capital structure, would appear to be much less secure than is currently estimated.

Our conclusion on finance is that, in metal working at least, the flow of investment finance has not been a problem. That is not to say that worthwhile projects without adequate collateral might not go unfunded. Rather that we did not come across any significant examples of such projects, and that instead a more common occurrence was overlending more than underlending. In an industry in its early stages of development the positive guidance and advice provided through the mechanism of lending controls by the banking system is particularly important. This aspect of industrial banking has not been strong in the commercial banking sector of Cyprus, and can, we hope, be developed in the future particularly with respect to the metal working sector, given its current financial vulnerability.

2.6.5 Specialisation

We have noted the generalist nature of much of the industry, and the lack of specialisation. This compounds the problem of scale in a small market. One striking instance was in the air filters sectors where one company produced more than 1,000 different filters in order to be able to supply a full product range. Not only were batch size small, but it also meant holding stocks of finished goods on a 'just in case' basis. In a number of other cases, firms in the same sub-sector competed against each other with similar product ranges, rather than specialising. This may be sustainable in some parts of the home market: but the first step for expanding exports would be to develop a complementarity between firms in the sector to provide a Cypriot range supplied by firms working on a specialised basis.

2.6.6 Product Design

The majority of producers rely on product designs which are either straight copies of foreign products or are based substantially on foreign designs. Moreover, in both cases the Cyprus products tend to be underdesigned as opposed to exceeding or matching the original level of design of the often dated, copied version. Thus, there is a tendency for locally produced items to be poor or less efficient copies of the original.

2.6.7 Labour and training

Skilled labour is one of the key components for competitiveness in engineering, and has been one of the foundations of Japanese and German success. In a recent study of Japanese engineering, the sample firms were found to have 40% of their workforce made up of college educated engineers, all of them trained in CNC machines, whereas a comparable US sample had only 8% of their workers as engineers, with fewer than 25% of them having been trained on CNC machines.

In Cyprus the industry is not at that level of development. But even at the pre-computer stage of technology, Cypriot firms face a number of problems which have been the focus of a substantial report by the Industrial Training Authority. The main points made by the report were as follows:

- 20% of the sample workforce of 2659 left the industry during 1985, 78% of them skilled and semi skilled workers. This meant that a quarter of all craftsmen and semi skilled operatives left the industry (Lathwood et al 1986 p 31).

- Those leaving appear to have been substituted by newcomers.

with a lower level of skill. 61% of the new entrants had no previous work experience and 17% came from other industries. With more than half those leaving the industry as the result of redundancy, the report concludes that "a large proportion of the experienced and trained workforce are made redundant by employers and are replaced by inferior cheaper labour" (pp 31, 45 and 54).

- Of those workers with training, few had received the training in their current trade. Of machinists only 42% had received any formal training in machining. For plumbers the figure was 24%, for fitters and welders 23%, for aluminium fabricators 1% (pp 32-3).

- Only a third of the 146 companies had nominated training officials, and the proportion was lower for the smaller firms (p.120).

The report made a number of recommendations about extending the training provision in appropriate skills, including management techniques, and encouraging the formation of group training associations for small firms to allow them to get specialist advice and set up in-house training in spite of their size.

The overall picture provided by the report is of a serious absence of a well-trained, experienced and expanding skilled workforce. If Cypriot industry is to respond to the new industrial revolution in engineering, it is of the first importance that it raises the general level of engineering skills, as the basis for the further development of the skills required to operate CAD and CNC systems.

2.7 Conclusion on the characteristics of the metal working sector

In short, we found that with few exceptions, Cypriot metal working had not adopted the new orientations that have characterised European industry over the past 15 years. Not only was the new computer aided machinery not being introduced, but the emphasis on specialisation, niche marketing, product quality, and stock minimisation was also absent. Even at the pre computer level, many of these functions were not being satisfactorily performed: production planning; job estimation; financial control systems; research and development marketing; strategic planning; and quality control. For many firms, local markets may not be large enough to justify the new machinery (though it is rapidly falling in price, and these prices should be monitored). But the restructuring of European industry has not been a question of equipment alone. It is also one of enterprise philosophy. We have no doubt that much can be done within the Cypriot industry even without major capital investment. The capital investment should be seen to extend as much as to initiate a new approach.

2.8 A gathering crisis for the industry

2.8.1 Declining growth and profitability

Metal working is a sector which is likely to be little affected by the Customs Union, but is nevertheless, in increasing difficulty. During the 1980's, the rate of growth of output, exports and imports have all fallen, with exports actually falling absolutely in real terms. In Tables 13 and 14 we show the linear trends for these items, that is to say the rate of change of the rate of growth, rather than simply the rate of growth itself. In mathematical terms, they represent the second differentials. They show that although the rate of growth of imports has continued to exceed the rate of growth of output, its rate of change has fallen sharply over the last five years, by 72% as against 33% for output.

Table 13

Linear Trends - Gross Output: Imports for Home
Consumption and Domestic Exports - at Constant Prices

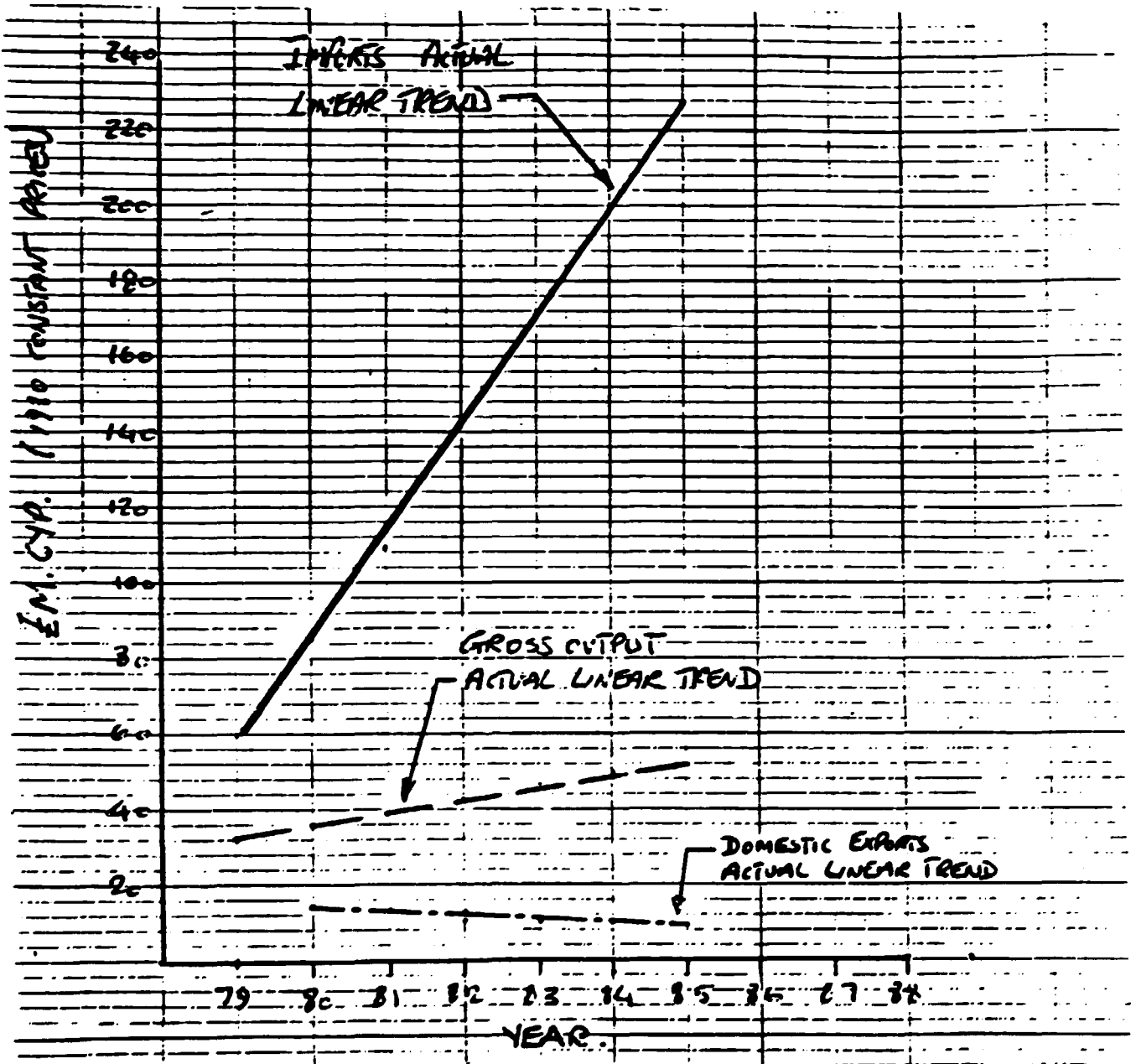


Table 14

Linear Rates of Growth at 1980 constant prices

	1979/80	1980/81	1981/82	1982/83	1983/4	1984/5
Gross output %	9.6	8.7	7.0	7.4	6.9	6.4
Imports %	51.5	34.0	25.3	20.2	16.8	14.4

While the figures for gross output may give some encouragement the overall trends reflect the general decelerating rate of activity in the sector in the last 5-6 years. The trends may perhaps indicate the market saturation level within the sector. Likewise, because of the sectors' links with industries outside manufacturing the slowdown may reflect the rate of decline in economic activity generally.

From the calculated linear trends and rates of growth one point emerges clearly: in spite of the high level of import penetration, the domestic output of the sector has in fact remained fairly robust. This confirms our view that firms in the metal working sector may not suffer any substantial or generally damaging effects from the realisation of a full customs union with the European Economic Community.

With respect to our survey sample we found that many companies were experiencing falling incomes. This was particularly the case with export sales to the Middle East. 43% of the sample firms exported to the Middle East. Of these firms, 20% had experienced decreases in export sales ranging from 15-17% over the past 12 months; the remaining 80 per cent had experienced decreases ranging from 30-40 per cent.

The pressure on the income side resulting from reduced sales levels over the past 18 months has begun to manifest itself in reduced net profit margins, and by companies responding to this situation by reducing labour costs. According to firms in the sample, the majority were experiencing substantially reduced real pre-tax rates of return at an aggregate level of around 7.5 per cent.

While the apparent profits crisis was reported as endemic among the smaller firms, the situation of the larger firms in relation to the rate of decrease of returns is more difficult to ascertain. For example, the appropriation of surplus through the purchase of 100 per cent overseas subsidiaries which are not consolidated in the accounts of the holding/parent company has the effect of distorting the actual trading profits of the Cyprus parent company. This aspect together with the inability to verify the expenses of overseas offices and thereby gain a clear picture of the matching of costs with revenues, makes assessment and analysis of the actual rates of return for some companies rather arbitrary. One particular firm in the sample reflected the above situation and consequently the net profit margins and rates of return on capital as computed from the Profit and Loss accounts and Balance Sheets, do not give an accurate picture of the situation.

This problem aside, it appears that for the majority of the firms in the sector the profit margins are being squeezed, mainly as a result of decreasing activity in both the domestic and export markets and the resulting downward price competition that has been generated. Price cutting is clearly becoming a common response to the declining levels of activity. From a strategic and economic point of view, recourse to such price cutting is likely to be debilitating if not terminal for many firms within the sector.

2.8.2 The economics of the profits crisis

Table 15 illustrates the linear trends in the rates of growth of certain key variables within the sector. The effects of the profits crisis experienced by firms in the sector over the last 18 months can be gauged more accurately from the net operating surplus trend (ie, net profit) in the years 1980-85. Throughout this period, the sector has been experiencing a downward trend in the levels of surplus generated; however, the rate of profit decline has been diminishing considerably over the period.

2.8.3 A decelerating decline in the rate of profit

The fall in the rate at which profitability was declining can be explained to a large extent by the significant downward trends in the rates of growth of both labour and material costs. Labour productivity increases combined with the decreasing rate of labour and material costs have provided the major contributing factors to the deceleration in the rate of profit decline. The moderate rates of increase in output prices have also helped in reducing the rate of fall in profitability, although these increases appear to have played a less significant role than the other key variables.

2.8.4 Labour costs and employment

In a labour-intensive industry with slow rate of productivity growth, the overall increase in labour costs resulting from the tight labour market during the 1980's has clearly played a role in reducing profitability. Table 16 shows that labour cost increases have been higher in the metal working sector than for the manufacturing sector in general, indicating the relatively greater labour constraint in an industry which employs primarily male workers, a significant proportion of whom are skilled.

Table 15

Linear Trends in the Rate of Growth
of Key Indicators at 1980 Constant Prices

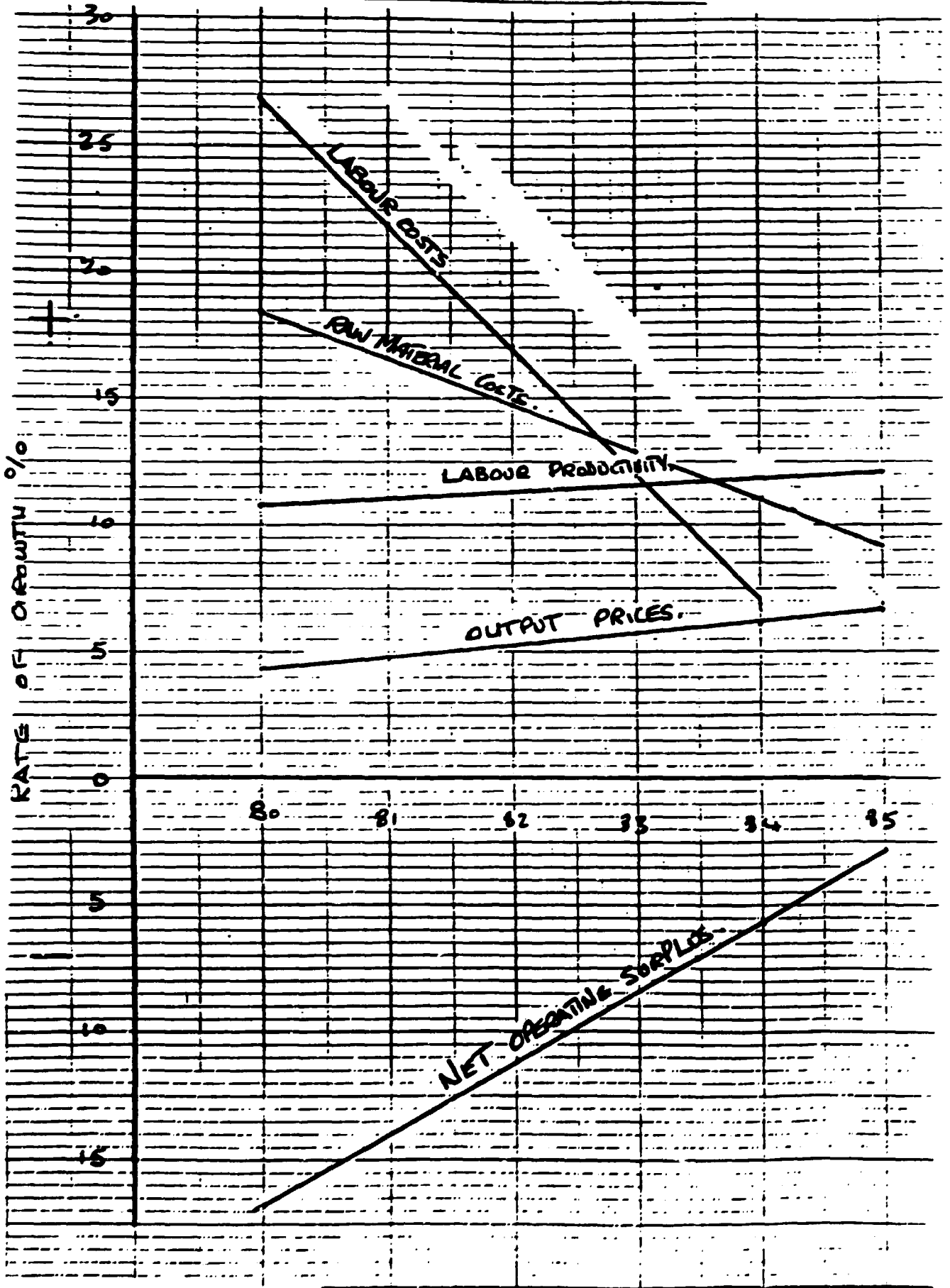


Table 16

Annual Labour Costs Changes 1981-85

in percentages

Year	Retail Price Index	Metal-work sector annual increase in labour costs	Annual increase in manufacturing unit labour costs	Annual increase in reference countries unit labour costs (Greece, Spain, Portugal, Asia)
1981	10.8	20.4	17.0	11.0
1982	6.4	15.7	12.0	4.0
1983	5.1	7.9	7.0	0.2
1984	6.0	11.1	6.0	1.5
1985	5.1	15.9	7.0	4.8

Source: Cyprus Development Bank

Table 17

Employment in the Metal Working Sector 1980-85

	1980	1981	1982	1983	1984	1985	1986
Sector employment	4761	5056	5160	5057	5009	4577	4485
% Change on previous year	-	6.20	2.06	-1.74	-1.20	-8.6	-2.0
Total manufacturing employment (000's)	44.5	44.8	43.8	43.3	43.1	43.6	43.3
Sector as % of total manufacturing	10.7	11.2	11.7	11.7	11.6	10.4	10.4

Source: Industrial Statistics

Nevertheless, the increases in labour productivity and the slowdown in output growth has now had the effect of reducing employment. Between 1982 and 1986, the number of jobs in the sector has fallen by 13% (see Table 17). Given that skilled labour is one of the key elements of the new flexible specialisation developing in Europe, it is of the first importance that a training strategy be developed in tandem with the industrial strategy.

2.9 Summary and conclusions

Four fifths of Cyprus's demand for metal and engineering products is met from imports. The Cypriot industry is primarily concerned with servicing functions (repair and maintenance, one-off job shop production) and the manufacture of light industrial products. It is predominantly small scale and labour intensive, with only three firms employing more than 50 workers in the metal products sector itself, and a further six if we include non-electrical machinery and transport equipment. Four fifths of sector output goes to the home market, exports being confined to the larger firms selling to the Middle East.

In terms of industrial orientation, approximately half the sector output is geared to the construction industry, and a further sixth to the agricultural sector. There is little heavy or precision engineering and a diminishing structural steel production. 82% of the sector is concerned with sheet metal work and metal forming.

In January, we visited a sample of 23 firms who comprised 50% of output and 27% of employment in the sector. On the basis of these visits and discussions with other industrialists, we identified the following problems which were common to the majority of firms:

- the investment in fixed assets and plant was often unjustified in relation to output capacity.

- the majority of production processes were underutilised
- only three firms possessed CNC machines; a number of others had outmoded machinery
- raw material stock control was inadequate
- production planning tended to be minimal
- work in progress inventories were high
- job shop estimating procedures were inadequate
- financial control systems were also lacking
- there was little if any research and development
- many firms lacked a design capacity
- training in many firms was minimal
- there was poor quality control in many firms
- marketing skills tended to be limited
- many firms lacked a strategic/planning outlook
- management opportunities were limited because of the family ownership structure.

This list, which appears formidable, should be seen as a preparation for the next stage of the sector's development rather than a criticism of the previous one. For the sector is still young. It has responded with energy and flexibility to the demands made upon it over the last decade. But if it is to make the transition from skilled job shopping into an industry - which we believe it must do if it is to sustain its growth through into the 1990's - then, it needs to start with a careful assessment of its weaknesses set

against the background of the trends in Europe. A number of firms have begun to follow a new strategy and their growth over the last five years shows the potential which exists for the metal working sector in Cyprus. We also found a great willingness to discuss these issues amongst the industrialists and the trade unions, recognising the gathering pressures upon the industry, and the need for change.

These pressures are now growing. In 1986, the volume index of sectoral production fell by 8% and stood at its lowest level since 1982. Exports have been falling during the 1980's, and employment fell by 13% between 1982 and 1986. Although labour productivity has been on a rising linear trend, and labour and raw material costs on a falling one, profits have been squeezed. The current situation is particularly serious with a fall-off in the Middle East export markets and a turn inwards into the already slowing domestic market. Price cutting has become a feature in the internal market and with many firms at their borrowing limits, we believe that the industry is entering a period of serious difficulty, particularly for smaller firms.

The Customs Union itself, if it goes ahead, will add to these problems to a limited extent. Much of the industry has had little tariff protection, enjoying rather a natural protection as a job shop industry close to its domestic customers. There are examples of sub-sectors which would be affected, notably air filters production and aluminium extrusions. Turbine pumps, too, could be expected to suffer from the removal of protection, but this has been recognised by the proposal to make them one of the exempted products in the Customs Union provisions.

The gathering crisis within the industry is likely, therefore, to be largely independent of the Customs Union. It will be serious, nevertheless. Yet, just as the Chinese word for crisis is also their word for opportunity, so we believe there is an opportunity for the metal working sector in Cyprus. If it can take on board the new philosophy, with selective investment in the new equipment, which has

characterised the electronic revolution in the metal working sector in Europe over the last decade, and if it can learn from the strategies of flexible specialisation which have had such success in Germany and Italy, then we see no reason why the Cypriot industry cannot recover the dynamism it had during the second half of the 1970's. It commands a strong geographical position in relation to the Middle East market, which gives it an immediate advantage in relation to Northern European competitors.

If Cyprus is to profit from any upturn in the Middle East markets, particularly in the event of a third oil price rise, a major process of restructuring is required in many of its sub-sectors. It is to the strategy for this restructuring that we now turn.

Chapter 2 Appendix

Survey Sample

For reasons of time, a full survey of all the firms in the sector was not possible. Accordingly, the Ministry of Commerce and Industry in conjunction with the Cyprus Chamber of Commerce and the Employers Federation provided a sample of companies which was intended to cover the main sub-sectors and different firm sizes.

The methodology employed was to draw up a comprehensive questions list (questionnaire) which was the framework for in depth visits and interviews with the companies. The questionnaire gave the set of interviews a structured and consistent basis from which to form a clear analysis of the sector.

The sample

The sample covered 23 firms across the spectrum of the 21 sub-sectors within the Industrial classification codes for the sector. The total number of employees in the sample is 1,222, which represents 26.7 per cent of the persons engaged in the sector. The sample accounted for approximately C£30.6 million of gross output from the sector at 1986 current prices, which represents 49.6 per cent of the gross output figure for 1985.

The sample was made up as follows:

3 companies with 1-15 employees

7 companies with 16-30 employees

5 companies with 31-50 employees

8 companies with over 50 employees.

In addition, two meetings were held with groups of industrialists from the sector, some drawn from the sample, others not. These were open-ended discussions on the problems of the industry and potential strategies towards it. In all, the industrialists from some 340 companies were either visited or attended the evenings' discussions. Discussions were also held with Trade Unions representatives as well as with financial institutions to discuss particular sub-sectors as well as the general issues involved.

III

STRATEGY

3.1.1 Sector Strategic Approaches

In developing a sector strategy we should distinguish broad strategic approaches, and more detailed policies for implementation. We begin by the approach we recommend for the sector as a whole:

- i) The aim for the sector should be to develop niche markets with updated production equipment. The equipment needs to be of the kind which will automate the sector's current general flexibility. We do not believe that the alternative strategy based on low factor costs and the achievement of volume economies for standard goods is likely to succeed in any of the sub-sectors in the immediate future. In the same way, we do not think that a strategy which aims to compete - on the basis of equipment alone - with large international companies is a promising one.
- ii) On the production side, the main immediate issue is how to increase specialisation in order to realize volume economies, and at the same time find ways of harnessing technology developments without creating excess capacity. Many firms now have flexibility without the specialisation or the modern equipment necessary to improve working capital and fixed asset utilisation.
- iii) Firms should aim to improve product quality and concentrate on

market development, building on existing knowledge rather than meeting downturns in markets by policies of diversification or price cutting in order to increase market share.

- iv) The sector should aim in the medium term to adapt already developed foreign technology to the needs of the domestic market and other economies in the region. In this way, it will upgrade product design for Cypriot products. A research and development capacity needs to be built which at first concentrates on adaptation as a step towards independent product development.

- v) The Middle East and Africa should continue to be seen as the most promising areas for expansion for the bulk of the metal working sector, with Cyprus playing the role as an adapter and developer of northern country products for these markets.

- vi) In terms of product strategies, the long term aim should be to develop reverse engineering with a view to firms carrying out complete product manufacture rather than assembly or part production. Core product development would include:
 - valves, ball valves, lobe valves and plugs.
 - all pumps, including hygienic pumps
 - gears and worm screws
 - motors
 - couplings.

- vii) For such an integrated programme to be achieved, the industry will have to expand and improve product technology including expertise in casting, forging, pressing and forming, metallurgy, machining, welding and joining, finishing and embellishing. A long term training strategy around the expansion of these skills is a necessity for the industry as a whole.

viii) major attention needs to be paid to improvements in the management of the production process, including:

- product control - parts scheduling, planning, loading, inventory control, purchasing.

- quality control - accuracy of measurement, finish monitoring, sampling methods, testing, QA check standards.

These will contribute towards the central task of improving the productivity of working capital.

ix) The strategy should build around the larger firms in the sector and the smaller firms most immediately linked to them: this implies the need for sub-sector strategies.

x) Strategies for these sub-sectors should keep in mind developments taking place in other sectors of the economy as well as those put forward in this report. In particular, the following initiatives have significance for the metal working sector.

- the expansion of the solar energy programme

- the further development and export of water management systems

- the expansion of the pharmaceutical, bio-technology and food processing sectors.

The above strategic orientation is one of flexible specialisation rather than standardised low cost volume production. It suggests starting from existing strengths in both product and process know-how rather than embarking on new products of which there is little manufacturing experience. Thus, a key feature of the strategy is that it should be directed towards developing products which would improve labour productivity in the typical small manufacturing establishments. The orientation is towards the future needs in markets both at home and in the Middle East, rather than fostering high-tech development for its own sake.

3.1.2. Enterprise strategies

This general strategic approach has implications for changes in enterprise strategy. The most immediate issue here is the focus on market niches, and the links between a niche strategy and product development.

Niche market development

A market development strategy should be based on identifying a firm's niche in the market as opposed to simply operating in a general market. Small enterprises should concentrate on targeting a specific segment of the market where pricing policy ensures viability and product/service loyalty becomes an important element of the customer's choice decision. The niche may be a tiny part of the total market but growth will involve a large increase in production or service. The development of a niche lends itself to a more simple evolution to the complex management process of budgeting, job costing and day to day control of the business. Organisational development for growth is made easier by the market niche strategy. Each growth stage requires investment in both fixed assets and working capital and this is often (almost always) not recouped until a consolidation phase is reached (prior to another surge). Coupled with the financial requirements of growth strategies is the constraint of

managerial skills. Both these areas need investigation prior to or simultaneous with the adoption of market development strategies.

Product development for niche markets

A niche rather than a standard product strategy requires that close relations be maintained between existing and potential customers and the producing firm. For what is required by many customers in this sector is a flexibility of response and a capacity for product development to meet immediate needs. Flexible production systems and a product design capacity are necessary complements to a niche marketing strategy.

Companies operating in export markets in close symbiotic relationships with large construction companies, manufacturers, distribution organisations and public utilities have the opportunity to pursue product development strategies. Several firms in the sector fall into this category including Cyems, Metalco, Nemitsas and Muskita. The close contact these companies have with large client organisations is important for the following reasons:

1. It provides the interaction and feedback necessary for product development. New products should be developed in response to the needs of these major clients. Generally, by the time such a product is ready for wider, perhaps European markets, it will have been through an extensive refinement and testing process based upon feedback from the major customer. For these companies to develop in a middle economy, it is important that the client organisations employ competent engineers. They should have sufficient ability and opportunity to seek novel solutions and undertake original development work requiring new instruments and testing facilities. Lesser engineers will tend to play it safe and buy existing solutions and equipment from large multinational suppliers.

2. It provides credibility for factory sales. If a company has made sales to large international construction companies of world standing, then it has enhanced its credibility when operating outside of the normal boundaries of its sales territory.

Initially the products are likely to be highly customised and made in low volumes. Being engineered solutions to specialised industrial problems, development and manufacturing costs can be supported by industrial policy initiatives sponsored by the government. They should be good engineering solutions using up-to-date, but not necessarily fully high tech or state of the art technology. The basis of competitive advantage lies in the experience built up while providing novel engineering solutions to a particular problem, rather than a unique invention. The initial engineering and problem solving emphasis of the company means that early examples of the products are well-engineered but with room for improvement in presentation. This would include industrial design, packaging, proper documentation and instruction manuals.

The manufacturing requirements of products which are highly complex, with a high unit cost and in low volumes, are typically for highly skilled labour but with relatively low capital investment in production technology. The design engineers of the client organisations should be closely involved with the manufacture of the product. Such products are suitable for local manufacture and should be used to create more cooperative links between the larger and smaller firms in the Cyprus sector through the use of subcontracting.

In time, as markets grow locally and in the traditional export markets - as well as internationally - these products can become increasingly standardised, perhaps with a range of options or modifications available. The extent of local manufacture undertaken will depend on the complexity of the product and likely production volumes. If there remains a high degree of customisation and a high unit selling cost then most of the product is likely to be

manufactured "in-house" by the larger firm, while increasing standardisation and volume could result in significant manufacturing by the smaller subcontract firms.

In some circumstances, coalitions with international companies can be an important means to gain market credibility, market access and/or international marketing skills. The coalition partners might be general equipment companies providing the major systems or subsystems for the overseas purchases. Such coalitions can provide contracts, credibility and access to marketing and service skills for the ongoing business.

This strategy of product development by the larger firms exhibits a relatively "soft" entry mode into manufacturing via research and development. The need to progress at a modest pace, at least in early years, in research based product development should be reflected in Government sponsorship through R&D grants.

When products are fairly well developed and ready for international marketing, the firms should have access to financing sources based on their business track record, their developed products, and the explicit possibility of international buyer interest and contracts. Moderate amounts of capital will be required at this stage and the most appropriate sources will be from a Development Bank able to take a long term view of the project and provide management and negotiation skills and market intelligence.

Financing during the prototype development stage should ideally be from a source that will leave the company free to conduct a full range of negotiations with potential customers at some later stage in the product's development. This also reflects an exit strategy dimension in the role of the Development Bank. If the company's prospects are enhanced by product development and the potential market growth this holds, then the enterprise in this category should be able to attract further capital from both venture capital sources and other commercial and/or private sources. Once products are

developed and initial markets secured, company expansion and market development can require large amounts of capital and at this stage the exit of the Development Bank investment might be prudent to avoid conflicting interests with other commercial sources.

3.2 Institutions

A sector strategy can only be partially developed and implemented by firms acting on their own. Collective institutions are needed - private and public - in order to support the individual enterprises in their task.

3.2.1 Industrial structure and inter-firm co-operation

It is our view that co-operation between enterprises must be the starting point for any successful sector strategy. Currently, there is substantial rivalry between firms, reflected in the price cutting strategies we have already noted. Few of the strategic aims will be achieved if this negative competition is not replaced by what we call positive competition within co-operation. Firms need to co-operate to develop structures which will give them the required support individually. Once those structures are in place competition can take the form of innovation and product quality rather than price cutting and market spoiling. We cannot emphasise too strongly that the initiative for survival in the current circumstances lies with the firms in the sector acting together to develop and implement a sector strategic plan.

At the moment, the structure of the industry is fragmented, based as it is on the small family firm. One policy to tackle this is to encourage mergers and takeovers as promoted by former UK governments. While we believe there are advantages in increasing the number of medium sized firms, the experience of the past decade is that - in spite of government policy - the family firm in Cyprus is as resilient in the metal products industry as it has been in other

sectors. What is important therefore, is to build on the advantages of such a decentralised industrial structure, and develop ways of overcoming its disadvantages.

The main disadvantages of the current small firm structure are as follows:

- individual firms cannot afford to finance many of the overhead services necessary to sustain a niche marketing strategy, notably:
 - international marketing capacity
 - product design and development
 - strategic planning
 - a skill training programme.

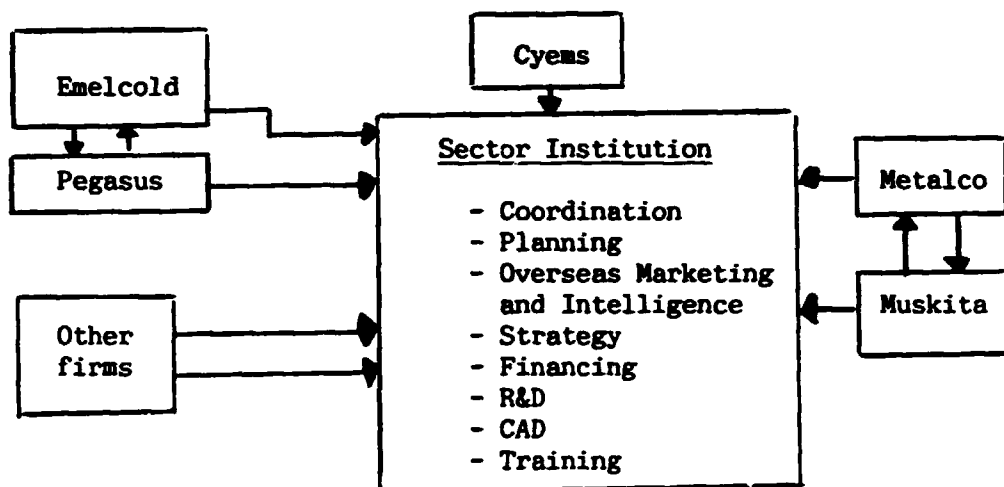
- few firms are of the size that can invest in the latest relevant technology, notably the CAD-CAM systems. Those that have installed state of the art technology almost all find themselves facing problems of capacity utilisation.

- firms often produce the same product ranges as their rivals, regularly resorting to price cutting for market share, rather than developing particular specialisations within an overall sectoral product range.

To overcome these disadvantages we consider it of paramount importance that one or more sectoral consortia should be established

which would enable joint services and strategic planning to be undertaken. This institution should be controlled by those in the industry, and should have a core staff financed by private funds, with particular services financed on a 50:50 basis by private funds and government. An example of how a sector institution could be structured is set out in Figure 9.

Figure 9



The sector institution should undertake some or all of the following functions:

- complement the existing network of overseas marketing personnel currently employed by firms on an individual basis. The function of the consortia's marketing staff would not only be to search out new markets and sell Cypriot products, but also to maintain close links with overseas markets, acting as a direct channel for market requirements, as well as being a source of intelligence on market changes and competitors development.
- specifically, they would be responsible for identifying new technologies and products that can be transferred to

Cypriot industry. They would also seek to identify available licenses via foreign research institutes, as well as foreign companies seeking licensees to service the Middle East market.

- provide common technology services, including research and development facilities, and a product design capacity.

- act as a location for a CAD bureau for the metal working sector.

- encourage rationalisation within sub-sectors, and the development of specialisation by firms within an overall Cypriot product range. Also seeking to secure full utilisation of existing modern facilities through co-operative arrangements between firms.

- act as a source of information about technical and other developments in the international metalworking industry, and as a focus for the development of a sector strategy for metal work.

- provide consultancy help to firms entering joint venture and/or licensing agreements.

- act as a lobby for financial resources for product/market/business development and act as a catalyst for the development of co-operative funding from resources within the sector. This function would include liaising with the sector and other sources of funds for joint services within Cyprus, the EEC and the UN system.

- co-ordinate an expanded skills strategy for the industry in conjunction with the Industrial Training Authority, the Higher Technical Institute, the Cyprus Productivity Centre and the member firms in the consortium.

We recommend that firms within the sector form one or more consortia for the above purposes. We also recommend that members of the industry visit one of the Italian metal working consorzia, to gain first-hand knowledge of how such co-operative institutions are run and what they achieve.

3.2.2. Public Institutions

It is also necessary to have a co-ordination among public institutions in support of the sector strategy. This should include five elements:

- i) Strategic planning. In line with the recommendations of the main report, we recommend that the new Strategic Planning Council further develop the sector strategy for the metal working industry outlined in this report, paying particular attention to the elaboration of sub-sect. strategies, plans for a common stockholding facility, for research and development, and for long term training. The elaboration of this strategy should be undertaken in close conjunction with the industry (individually and through their joint institutions) and with the trade unions.
- ii) Co-ordination of government action around the strategy. This would include co-ordination of the activities of the MCI's extension service, the policies on competition, machinery imports, standardisation, research and development, and the domestic and overseas training programmes.

- iii) Acting as a catalyst linking the metal working sector with other domestic sectors who act as customers for metal working, in particular the construction industry, the Water Management Agency, the Department of Town Planning and Housing, the Department of Building and Works and the Ministry of Agriculture.

- iv) Supplying through the newly established Export Promotions Council assistance and support for joint action by firms in the sector in expanding their overseas marketing and market intelligence network, notably in Middle East and African markets.

- v) Providing, through the Cyprus Development Bank, catalytic support to the programme of industrial restructuring through the provision of equity finance, long term funds, as well as advisory services to groups of enterprises as well as individual ones.

We recommend that the Government adopt this programme of strategic planning and support to the metal working section.

3.2.3. A Strategic Framework

The task for government is to perform the key strategic and implementation functions undertaken for example by the Ministry and International Trade and Industry (MITI) in Japan. MITI provides a coherent strategic framework within which individual firms can plan; it acts as a forum for the exchange of information between firms in the sector, and between the sector and suppliers, purchasers, and industrial policy makers themselves. It provides administrative guidance; it encourages groups of firms whether as export cartels or simply social gatherings; it also acts as a central co-ordination body within the government, being itself responsible for foreign

trade policy, as well as acting as a critical link with the financial sector.

Developing convergent opinions and plans on a number of issues from standardisation, to design and training, can lead to overcoming the incompatibilities and redundancy that exists in the sector. One of the secrets of Japanese industrial success has been the existence of MITI as a comprehensive, integrated planning and implementation body.

We recommend that the Strategic Council in drawing up a sector strategy for metal working, includes clear guidelines on how the functions specified above can be performed, and by whom, as well as establishing procedures for monitoring performance by the public institutions concerned.

3.3 Sub-sector strategies

The diverse nature of the industry means that in some instances a sub-sectoral strategy is needed in addition to the sectoral one. In what follows we consider the most important sub-sectors. As part of the further development of sector strategy, these outline strategies need to be discussed and extended in conjunction with the firms concerned.

3.3.1 Pumps

There are six pump manufacturers all producing the same product range of vertical, submersible and centrifugal pumps. One of the firms dominates the industry in terms of the series and sizes of pumps offered within a particular range and in the volume capabilities it possesses. Investment in a computer controlled foundry section at a cost of C£1.5 million has given the company flexibility in both batch size and moulding pattern. The automatic foundry yields costs and

quality benefits over the previous, labour intensive, system. Higher quality casting results in less rework, throughput time is increased, delivery times reduced and economies of scale ensue. The firm now has a potential capacity of 15,000 units per annum as opposed to the 6,000 units per annum prior to the investment. Its strategy is to expand up to its capacity by competing on both price and quality in the domestic and export markets of the Middle East.

Among the company's other assets are five CNC multipurpose lathes providing the machining flexibility to cater for the range of discharge heads and bowl machining required for the complete product range. These assets linked with the C.C. foundry provide a strong foundation for flexible manufacturing which the company intends to complement with a CAD link-up in the near future.

The volume/price/quality strategy being pursued by the company poses a significant threat to the other manufacturers. While some do not see themselves as possessing the ability or the inclination to counter the dominant firm, they are nevertheless exposed in product/market terms because of range similarities. Others who exhibit 'wrong-size' characteristics by having a significant investment in volume - but much less than that required to compete for dominance - are faced with both product range and pricing problems.

The dominant firm itself is not entirely secure in the robustness of its longer term strategy since its push down the marginal cost curve may not be possible unless it abandons certain product series within its range in order to obtain substantial economies of scale .

In order to bring some rationalisation to this sub-sector and embark on a niche strategy, the two central issues that need to be addressed are the use of the investment casting facility in the dominant firm, Nemitsas, and the duplication of the product ranges between firms.

In our view, it will be some time before Nemitsas can hope to make full use of its casting capacity. At the moment, the other firms in the sector are importing their castings - often of a lower quality - from abroad. This makes no sense either for the Cypriot balance of payments, or for the external competitiveness of the Cypriot firms themselves. It is most desirable that some way be found for the sector as a whole to make use of the new foundry at reasonable prices. This would contribute to the overheads of Nemitsas, and reduce imports. It would also provide the smaller firms with a 'bowl' which requires less rework after casting and consequently reduces the direct costs of manufacture while ensuring a better quality product.

Similarly, we recommend that Nemitsas consider specialising on a small range of products, concentrating on developing a market reputation for high quality, high efficiency products as they are currently in the process of doing. At the same time, the other companies should likewise be encouraged to specialise in those products transferred by Nemitsas, thus increasing batch sizes and reducing direct costs.

In order to further strengthen the sector, the government should contribute to the financing of a CAD CAM link between the investment casing facility and CNC machines. At the moment, Nemitsas is one of the firms in the sector with CNC machines. Other firms should be encouraged to invest in them, and thereby allow them to make use of the CAD CAM link. Such government support should be made conditional on the adoption of the two aspects of the rationalisation strategy with respect to the use of the foundry and the firm specialisation of product range.

A CAD-CAM facility would enable all firms to focus on the design of a specialised product range with existing distribution channels being used to develop the market for the newly designed and upgraded products. For Nemitsas in particular, the CAD facility would allow them to seriously pursue a product development programme aimed at

It will be some time before Nemitsas can hope to make full use of its casting capacity. At the moment, the other firms in the sector either use other local foundries, or they import their castings - often of a lower quality - from abroad. Where the latter happens, it makes no sense either for the Cypriot balance of payments or for the external competitiveness of the Cypriot firms themselves. Some firms are now trying to set up their own foundries in Cyprus. For the smaller firms this offers no ready remedy, unless they can collectively invest in a high quality foundry of the Nemitsas standard. What would be most economic from the viewpoint of the sector as a whole would be for Cypriot pump producers to make use of the Nemitsas foundry at reasonable prices. This would contribute to the overheads of Nemitsas, and reduce imports. It would also provide the smaller firms with a 'bowl' which requires less rework after casting and consequently reduces the direct costs of manufacture while ensuring a better quality product.

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A CAD/CAM facility should also enable product diversification to become a major plank in the firm's long term business strategy, and facilitate substantial import substitution. Product areas that should be considered in such a programme include the following:

- valves, ball valves, pumps (all hygienic), plug valves and lobe valves
- gears and worm screws
- motors
- couplings
- compressors

3.3.2 Solar Heating

Substantial potential exists for market development in the solar heating sub-sector. In particular, there are good possibilities for export growth. A strategic focus based on joint venture co-operation with firms in the Southern Mediterranean, the Middle East and sub-Saharan Africa, could enable substantial export growth.

The market leader has approximately 35 per cent of the market. This firm, together with two other large firms, share 66 per cent of the domestic market with the remaining 34 per cent being taken by 70 or so small companies.

In the domestic market, quality could be substantially improved by the extension of standards. At the moments some standards do exist for manufacturing and efficiency testing. But they are not obligatory, nor are they comprehensive. The MCI Extension Service runs a testing laboratory, though it has faced some technical problems in testing. We recommend that the MCI should extend and make more effective the quality standards for solar heating, and should provide the resources necessary to ensure the effective working of the testing laboratory. The introduction of quality standards may produce some rationalisation in the industry in terms of the number of suppliers. However, this will be offset by the benefits in being able to advance the product technology. The introduction of standards will also ensure proper installation services and appropriate back-up for the consumer, an important feature of the sub-sector which presents considerable expansion opportunities.

The larger companies are well placed to pursue a strategy encompassing product design and development, particularly when the field is widened to include other water and energy products. The existing product technology with heaters is good. The main strategy weakness is in the area of marketing. From a technology point of view, solar heaters present few problems for competitors wishing to enter the market as they are easily copied. The key to longer term competitive advantage and market development with solar heaters lies with the servicing aspect associated with the purchase of the product.

The cost of solar heaters represents a substantial investment by the purchaser (approximately £300 for a 40 gallon tank). Moreover it is the type of product which can cause considerable antagonism from the consumer in the event of failure, i.e. there are particular times when heavy reliance is placed on the system. The marketing strategy should be based on the potential anxieties of product failure and aimed at selling the customer insurance through the back-up service rather than just selling a product that is a low cost water heater.

By developing this marketing strategy - linked to continued product quality development - the firms in this sub-sector can sustain market development over a prolonged period. Indeed, such a strategy (based on selling the concept of insurance) can create market share in spite of the fact that these products may be technically more sophisticated.

Export marketing opportunities exist in Spain, Southern France, Italy, Yugoslavia, Malta, Bulgaria and Rumania. Similarly, Commonwealth countries could provide excellent export markets. In spite of the fact that firms in the sector have had products copied by India, Jordan and Spain, a competitive advantage based on a comprehensive service strategy could result in substantial export growth in these countries.

Such a strategy would involve courtesy calls to customers outside the agreed service dates; twenty four hour call out service for breakdown work and regular product mailing informing customers of any improvements to their system on the basis of the most recent research and development.

A further marketing strategy could be to offer the systems on a central or lease basis. In countries where the capital outlay was prohibitive, the systems could be acquired through a rental agreement, with the emphasis on gaining customer loyalty over extended periods. This strategy would also facilitate easier sales in the replacement market, which, over the longer term, will obviously become worth more in revenue terms than the original equipment market.

As part of an export strategy, we recommend that the government should establish a solar heating export loan scheme. Exports to specific countries could be based on technology transfer with loans supplied by the government to fund the licencing agreement. In such situations, the Cyprus firm would maintain direct control over the

marketing and sales/service support functions through its own distribution channels in these countries.

An important part of such an export strategy would be a much greater emphasis on product design. Solar heaters are consumer products, and current models could be greatly enhanced (not least in the environmental impact of the tanks) by investment in design. We recommend that the government contribute on a matching basis to a Solar Heating Design Consultancy Fund aimed to upgrade the design and finish of solar panels and water tanks with a view to increasing export competitiveness and the environmental impact of solar heating within Cyprus.

3.3.3 Aluminium Extrusions

Cyprus has one of the most up-to-date extrusion plants in Europe, based in Limmasol. It has great potential for servicing the needs of the indigenous construction, insulation, refrigeration and heating and ventilating industries for aluminium extrusions.

However, the plant faces serious competition from Greek imports which appear to be subsidised. For example:

- Greek aluminium plants enjoy preferential prices from mining companies in Greece who have been given extended rights by the Greek Government on condition that Greek extrusion manufactures enjoy preferential prices for aluminium billets.
- Greek energy costs are lower.
- Greek exporters of extrusions enjoy 15-20% on the FOB value of their exports in the form of a "subsidised interest" to avoid EEC restrictions on direct subsidies, i.e. if they export, the government gives special financing arrangements interest free to cover working capital needs.

- imported mill-finish profiles are 15% cheaper because extrusion plants in Greece buy and pay in Drachmas i.e. all transaction costs are in same currency because they buy raw material billets from plants in Greece and the Drachma has been devalued by 15%.
- most extrusion plants have already written off their assets, while Muskita is burdened with high depreciation costs and interest.

Cyprus ranks among the best outlets for Greek extrusion exports and Greek producers have every incentive to undercut locally produced extrusions.

Government action is needed to ensure that total demand for aluminium extrusions is largely satisfied by the local firm. This will require the continuation of the current policy, (a) of price control, with strict monitoring by the Ministry of Commerce and Industry, and (b) of protection to ensure that the local producer is not undercut by subsidised imports. During the first phase of the Customs Union the quotas for overseas imports are due to be increased, but not to a point which will seriously threaten local production. The government should, however, argue for the continuation of quotas during the second phase of the Customs Union within the context of the strategic development of the sector.

The substantial capacity existing at Muskita also provides opportunities for exports. We recommend that the government provide interest relief linked to export sales for aluminium extrusions.

Muskita should develop distribution channels in both the Middle East and European markets and this should be done in conjunction with the

sector institution and the Export Promotion Organisation and involve public contributions to the relevant overheads in the first two years to cover the costs of establishment in overseas markets.

3.3.4 Switchgear

The switchgear sub-sector has grown principally on the export market to the Middle East. The downturn in the Middle East, together with foreign exchange difficulties has seriously curtailed the switchgear market and has forced the producers to diversify.

One path of diversification is in the product development and production of control mechanisms associated with energy conservation, and encompassing solar heaters, space heating, heating and ventilating equipment and sensors. This path builds on their expertise in electrical circuitry and testing, applying existing know-how to new applications. It also contributes to the development of Cypriot capacity in the energy conservation sector which we recommend elsewhere in this report.

A second diversification option is the production of Printed Circuit Boards. This is a more risky alternative. There is certainly likely to be a long-term market for PCB's in the Middle East and in Mediterranean countries, notably in Yugoslavia, Greece, Spain, Saudi Arabia and the Gulf States, though it will take some time to develop. In the shorter term, producers would have to look to Western European markets, which would have the advantage of providing experience for Cypriot firms in establishing themselves as quality producers in this field. However, given current capacity, Cypriot producers would have to aim for the fast turnaround, high quality premium markets, and here Cyprus's location is a disadvantage. Premium customers for PCB's in Europe require day to day contact with the manufacturers for design and rapid delivery purposes.

To be successful, it will be necessary to establish in the first instance a licensing and marketing agreement with a Western European PCB producer. We understand this is envisaged. This will provide a means for close contact with the market, and also be a means of learning design, production and market skills in this area.

We would also recommend that any new PCB facility in Cyprus should be based on the Solder Wrapping Technique (SWT) to facilitate the production of a PCB from an electronic drawing using CAD equipment. Establishing a facility based on SWT production rather than standard PTH (Plated Through Hole) circuit boards reduces the turnaround time from design to the production of the PCB to between 7-10 days.

Although we believe this is a risky diversification path, we nevertheless think it should be supported on the grounds of industrial strategy. In addition to its long term potential, the PCB facility would strengthen the Cypriot energy conservation sector in parallel with the production control facility. What will be needed is banking support which will stick with the project through any early difficulties that are a necessary part of the learning process.

3.3.5 Refrigeration

The market for commercial refrigerators and water coolers in the Middle East will continue to grow. Although there is competition in the region from India and Italy, together with possible encroachments from Japan (allied to their move to penetrate the air conditioning market), the geographical location of Cyprus provides Cypriot firms with an advantage in the heavy large unit market.

We recommend that firms in this sector consider specialising in the production of large commercial units, aiming to establish a competitive position in this niche by an emphasis on design, quality, reliability and service.

At the moment the products are robustly made, but in our judgement would benefit from value engineering and investment in design. There is also a need - following a commitment to specialisation - to upgrade the production processes to enable large batch production, and the adoption of flexible manufacturing systems based on CNC machines.

We believe there is a long term potential for Cypriot industry in this market, but that it will need considerable restructuring, and a long term financial commitment from the banking sector, in order to introduce the modern production capacity and niche market orientation which is necessary for the potential to be realised. This sector is one which will particularly benefit in the process of restructuring from access to joint design advice and CAD systems, as well as from incentives to introduce advanced flexible equipment. We recommend that if the industry wishes to follow a strategy aimed at the commercial refrigeration market, the government should support it directly and through the public financial institutions.

3.3.6 Automotive filters

70% of the domestic market for automotive filters is currently supplied by Cypriot producers. High tariffs discourage imports and encourage the manufacture of an extensive range of products to meet local demand. There is a serious lack of specialisation, with more than 1,000 different products being produced locally. This has immediate consequences in the small length of runs, and the size of finished stocks.

The coming in to force of the Custom Union will have very serious effects on this sector. The European market is dominated by firms such as FRAM, Fiat and General Motors. It is difficult to see how the local producer could withstand the dealer discounting and distribution pressures which these major firms would introduce in an open market.

We recommend that the government give serious consideration to providing adequate transitional protection - in the event of the Customs Union - to give time for the industry either to diversify or to develop an export oriented specialisation in filters. At the moment the Cypriot producer has achieved some success in European export markets, on the basis of selling small quantities of filters to boost the stocks of European wholesalers and retailers. We recommend that the Export Promotion Organisation contribute to the funding of market research to identify products from the range which could form the basis of longer term market development in the European and domestic markets. The study should also investigate the possibility of a licensing agreement with a European producer, to provide the basis for business development.

Investment in flexible manufacturing systems at this time would only be prudent if a joint venture, licensing agreement and niche market strategy was effectively pursued.

3.4 Cross-sector policy

For some initiatives, the appropriate level of action is that of the sector. Both the enterprise consortia and the Strategic Planning Council will be responsible for developing the detail of this part of the strategy. In this report we will comment on four areas of initiative: raw material stockholding; the development of technical competence; research and development, and the system of capital incentives.

3.4.1 Raw Material Stock-holding Strategy

The ratio analysis from the sample highlighted the raw material stock holding problem. Raw material stocks did not match the levels of activity of the firms. Indeed, the levels of raw material stocks possibly dictated the operating process of making from stock direct

to customer when output would have been more economically achieved by making from source direct to customer.

The high raw material stock holding reflects, in the first instance, the geographical situation of Cyprus in relation to the steel stock suppliers of Europe and elsewhere. Bulk orders are placed to reduce prices and minimise the freight costs and number of deliveries. However, the raw materials stock position also reflects the lack of cooperation in the sector in an area of business which tends to be neglected in the framing of strategies.

The high "fixed" overdrafts of many firms in the sample can be partly accounted for by the financing costs of raw material stocks. These financing costs have become hard core borrowing as a result of the inability of firms to match raw material stock utilisation with output activity. This in turn has led to stock obsolescence.

To counteract the disadvantages of Cyprus's geographical location we recommend that the Government and industry jointly finance a feasibility study on a raw material sourcing company to serve the steel stockholding needs of the sector. Firms would draw materials from this source in relation to their order books and output requirements, thus keeping stockholding costs to a minimum. We suggest that the steel stockholding company should be owned by a consortium of firms in the industry and should sell at world prices to local firms. The government either directly or indirectly should finance the working capital requirements of the stockholding company on an interest relief basis for an initial five year period. A firm in the sector which currently imports large quantities of steel stock materials could be used as the vehicle for this proposal enabling the start up of such a venture to take place immediately. In addition to considering the financial and broader economic benefits to be derived from the project, the feasibility study should consider the experience of other similar projects that have been operated successfully, for example those in India.

3.4.2 Raising technical competence

The strategy outlined in this report requires an upgrading of skills and technical know how. In some instances it is a question of updating skills, developing multiple skills, or retraining. In others completely new skills will be required.

In pursuit of the above and in support of the approach contained in the Lathwood, Procopides and Kyriacou report, we recommend the following:

1. The ITA in conjunction with the metal industries sectoral institution, should continue to identify the skill needs of firms and workforces, with respect to the new strategies being adopted at sub sector and firm level.
2. The ITA should continue to encourage the educational institutions and training centres to tailor courses to meet the specific future needs of firms engaged in the move to flexible specialisation. The courses should cover design, management, production techniques, work methods, quality control, marketing, computer and CAD skills.
3. The ITA should consider providing grants to firms in order to finance the costs of cover or disruption resulting from personnel secondments to training establishments either overseas or in Cyprus.
4. The metal industries sector institution in consultation with the Ministry of Labour should seek to attract Cypriots working abroad, and where appropriate temporary expatriates, to provide key technical skills to firms developing new technology processes, more intensive marketing, and product development.

5. The metal industries sector institution should complement the work of the ITA in encouraging its member firms to provide more systematic training programmes for their employees.

6. Two annual scholarships should be provided to encourage the study of CAD/CAM in appropriate institutions abroad.

3.4.3 Managerial Skill

It is important that the upgrading of skills includes the issue of management. In part it is a question of management possessing technical competence. The technical institutes in Germany, and the technical colleges in France have been important factors in raising the technical skills of industrial management as well as the skilled workforce. This is in striking contrast to Britain. At the same time there is the question of management skills themselves, which are particularly important for a fragmented industry like that in Cyprus. These skills should include not only the technical skills of production control, marketing, financial systems management and so on - but also the skills of co-operation, both with other firms and with the workforce. The lack of managerial specialisation is one of the greatest potential drawbacks of a small firm industry. One answer is to have some of that skill provided at the consortium level. Another is to place an emphasis on raising the general level of managerial skill throughout the industry.

We recommend that the ITA, in conjunction with the enterprise consortia, develop a management training course appropriate to the metal working industry, and establish criteria by which to judge the growth in the level of managerial competence in the sector over the next five years.

3.4.4 Research and Development

The substantial extension of a research, development and design capacity is an urgent requirement for the strategy proposed. We have suggested that a CAD bureau be established as part of the enterprise consortia, and that the consortia further develop a common R&D facility. It may also be appropriate to extend the facilities available at the Higher Technical Institute, and we recommend that the HTI be asked to consider the feasibility of this after consultation with the industry.

What is necessary from the government end at this point is to adopt a clear policy of R D & D support to the sector. This would include the following features:

- a) the establishment of a metal working research and development fund, and a fund for encouraging the adoption of CAD and CAM equipment in the industry.

Funds in both cases should be provided on a 50: 50 basis with the firms concerned.

The combined size of the funds should be set initially at 4% of gross sectoral output, which would indicate a sum in 1986 prices of C£3.4 million

- b) The funds should be targeted at the larger manufacturers, on the condition that they would sub contract work to smaller firms and involve them in product development at an early stage.

- c) the emphasis of the support should be adaptation to the market need rather than high tech development for its own sake. When high tech solutions are justified, funds should be provided on a co-operative basis - say in developing a flexible manufacturing systems base. This would ensure a measure of standardisation between firms, and their compatibility with common Computer Aided Design facilities and flexible manufacturing systems.

- d) Attention should also be directed at the state of the art skill centred CNC machine tools and flexible manufacturing systems which are being developed in Denmark, Germany and Britain, under the impetus of the innovations associated with the University of Manchester Institute of Science and Technology. Developments along these lines would ensure that the adoption of modern metal working technology acted as a complement rather than a substitute to the development of a skilled engineering workforce for the sector.

- e) R&D aid should not be considered as a specific sum going to a specific company concerned with making a leap forward through high technology projects. The government should not gamble on the success of individual firms but attempt to raise the overall level of competitiveness across the sector, which through time will hopefully generate its own successes.

Industrial policy encouragement and subsidisation of cooperative research, undertaken by the Government, will allow smaller firms more scope for specialisation and to benefit from higher levels of research output than they could have sustained themselves. This can enable a technical competitive lead to be sustained in the specialist product areas. Cooperative schemes reduce wasteful duplication of effort. Research and Development is one of the best examples of externality, and it is almost certainly subject to economies of scale. As such it is likely to be a source of market failure which a sector strategy can, at least potentially, rectify.

We recommend that the Government establish a Research and Development Fund, and a New Technology Acquisition Fund for the metal working sector, on the lines outlined above, and within the context of the sector strategy developed by the Strategic Planning Council.

3.4.5 Incentives

We are of the view that the system of capital allowances is not well suited to the process of restructuring required in the metal products sector. It has encouraged too heavy a fixed investment in some cases at the expense of investment in the key areas of product development, design, marketing, training, financial control and so on. A more balanced approach is needed, in part through the establishment of special funds such as the Research and Development Fund and the New Technology Acquisition Fund outlined above, and in part through a modification of the capital allowances scheme.

We therefore recommend that the system of capital allowances be modified over the next few years with assets attracting only an annual writing down allowance of 25 per cent after a certain period:

e.g. asset purchased on or before:

		<u>Allowance</u>
	31 May 1987	100%
Year to -	31 May 1988	75%
Year to -	31 May 1989	50%
Year to -	31 May 1990	25%
Thereafter:	annual writing down allow	25%

METAL

SUMMARY OF RECOMMENDATIONS

1. The strategy for the sector should be developed upon the basis of the principles of flexible specialisation. This involves:
 - niche marketing
 - improved product design
 - increased specialisation
 - automation of flexibility through CAD and CAM.
 - technological adaptation
 - improved product and quality control

2. Firms within the sector should establish one or more consortia to undertake on behalf of their members any or all of the following functions: strategic planning, co-ordination, overseas marketing and market intelligence, the operation of a CAD bureau, and organising of training programmes, as well as assisting in the obtaining of finance. It is also recommended that members of the industry visit one of the Italian metal working consorzia to gain first-hand knowledge of how such co-operative institutions are run and what they achieve.

3. The government should adopt a programme of strategic planning and support for the metal working sector. An appropriate body (such as a Sector Strategic Council) should draw up, as part of the metal working sector strategy, clear guidelines on how the public sector can co-ordinate its activities in support of the sector, particularly with respect to: strategic planning, implementation; links between the metal working sector and public and private customers; export promotion; and the provision equity and long term loan funds through the Development Bank. The body should also establish procedures for monitoring performance by the public sector institutions concerned.

4. In the pumps sector, ways should be found for the firms in the sector to make full use of the new foundry at reasonable prices; as well as to agree an increased enterprise specialisation of output.
5. The government should contribute to the financing of a CAD CAM link between the investment casting facility and CNC machines in the pump sector, as well as encouraging investment in CNC machines. Such government support should be made conditional on the adoption of a rationalisation strategy by firms within the sub sector.
6. The Ministry of Commerce and Industry should extend and make more effective the quality standards within the solar heating sector, and provide the resources necessary for the efficient working of the solar heating testing laboratory.
7. The government through the Export Promotions Council should set up a Solar Heating Export Loan scheme and a Solar Heating Design Consultancy Fund as a means of encouraging product improvement and exporting of these products.
8. The government should continue its policy of support for the strategic development of the aluminium extrusion industry, by relevant protection and with strict price control.
9. The government through the Export Promotion Organisation should provide interest relief linked to export sales for aluminium extrusions.

The Export Promotion Organisation should also consider providing a contribution to the relevant overheads of firms in the aluminium extrusion industry seeking to export, at least

for the first two years.

10. The development of a PCB facility in Cyprus should be adopted as a priority within the sector strategy, linked in to diversification in the switchgear sector.
11. Firms within the refrigeration sector should consider specialising in the production of large commercial refrigeration units, with an emphasis on design, quality, reliability and service.
12. The Government should consider providing adequate transitional protection for the air filters sub sector in the event of entry into the Customs Union and that the Exports Promotion Organisation should contribute to the funding of market research to identify products from the range which could form the basis of longer term market development, as well as to identify potential licensing agreements with European producers.
13. The Government and industry jointly should finance a feasibility study on a raw material sourcing company to service the steel stockholding needs of the sector.
14. The metal industries sectoral institution should continue to identify the skill needs of firms and workforces, with respect to the new strategies being adopted at sub sector and firm level.
15. The ITA should continue to encourage the educational institutions and training centres to tailor their courses to meet the specific future needs of firms engaged in the move to flexible specialisation. The courses should cover design,

management, production techniques, work methods, quality control, marketing, computer and CAD skills.

16. The ITA should consider providing grants to firms in order to finance the costs of cover or disruption resulting from personnel secondments to training establishments either overseas or in Cyprus.
17. The Metal Industries sector institution in consultation with the Ministry of Labour should seek to attract Cypriots working abroad, and where appropriate temporary expatriates, to provide key technical skills to firms developing new technology processes, more intensive marketing and product development.
18. The metal industries sector institution should complement the work of the ITA in encouraging its member firms to provide more systematic training programmes for their employees.
19. Two annual scholarships should be provided to encourage the study of CAD/CAM in appropriate institutions abroad.
20. The ITA in conjunction with the enterprise consortia, should develop a management training course appropriate to the metal working sector and establish criteria by which to judge the growth in the level of managerial competence in the sector over the next five years.
21. The Government should establish a Research and Development Fund and a New Technology Acquisition Fund with initial joint resources of C£3.4 million.

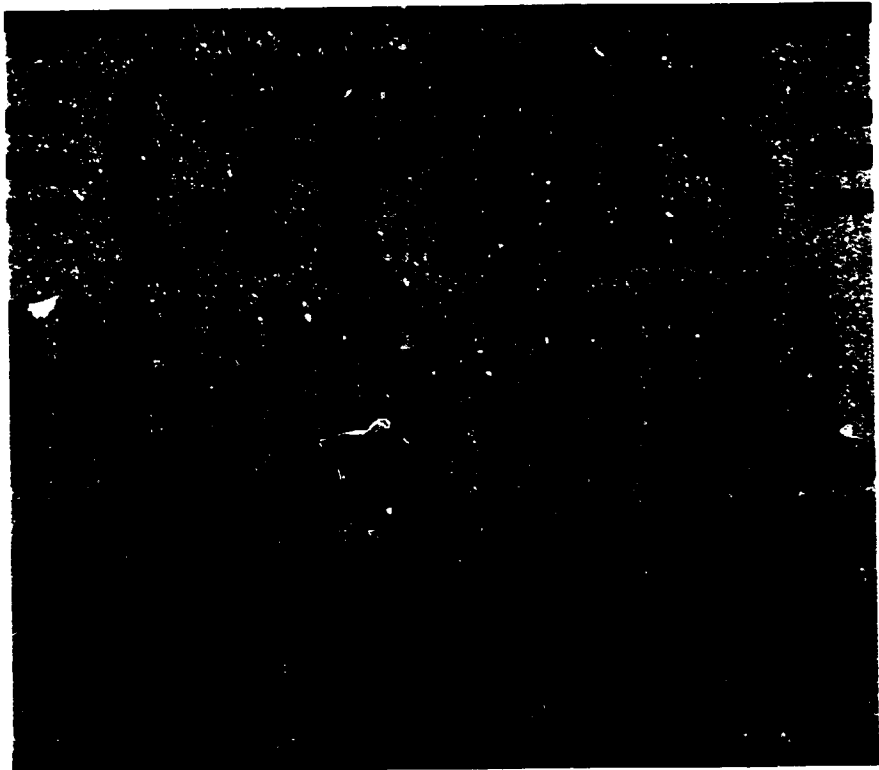
22. The HTI in conjunction with the industry should consider the establishment of a metal products R&D facility.

23. The system of capital allowances should be modified in order to establish a balance between government incentives to the software as well as the hardware needs of the sector.

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**A STRATEGY FOR THE STIMULATION OF
NEW, KNOWLEDGE BASED INDUSTRIES**

Raphael Kaplinsky

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KNOWLEDGE BASED INDUSTRIES

SUMMARY

This Strategy for the Knowledge Intensive Sector in Cyprus is in four parts. The first addresses the increasing science-content in production, pointing to its growing knowledge-intensity and its links with high per capita incomes and sustainable growth. Section 2 is devoted to an assessment of major trends in the world economy in this sector, highlighting five developments - the rise of information technology and the new service industries; the introduction of electronics-based systemic technologies; post-electronics technological change, especially the biorevolution; and the growing importance of biotechnology. Attention is also paid to the increasingly important role being played by venture capital. All these developments are relevant to strategy formulation in the knowledge-intensive sector in Cyprus. Section 3 surveys the knowledge-intensive sector in Cyprus and discusses the evidence of such activities in manufacturing firms using local technology, manufacturing firms using foreign technology, Business Services (including computing and the offshore sector), the telecommunications sector, the tertiary education system, some government departments utilising such technologies and the availability of venture capital. It also considers existing policies which bear a relation to the knowledge-intensive sector. The last section maps out a strategy for the short and medium future of this sector; it also identifies a number of policies which are of long-term significance.

Four basic principles underlie the identified strategy. The first of these concerns the type of policy intervention which is proposed - instead of the more readily-recognised physical infrastructure required for the production and transport of goods, the knowledge-intensive industries require a knowledge-intensive infrastructure.

The second principle concerns market orientation. Cyprus' two main neighbouring rivals in knowledge-intensive activities - Israel and the Lebanon - are effectively debarred from much of the regional market. Therefore the major target for exports in the short-to-medium run is considered to be the regional market. However, based upon the experience of other exporters of knowledge-intensive services, it is difficult to envisage such a strategy succeeding without its prior development in the home market. The third principle underlying the future development of this sector concerns the importance of education and training. Guided high-level education abroad is part of the identified policy-response for all knowledge-intensive sectors, as is the enhancement of local research and development capability. The final principle underlying strategy-formulation in this sector concerns the question of monitoring performance. Where relevant, a series of monitoring programmes are recommended, allied to the selective identification of market niches by a combination of local and foreign consultants.

The identification of suitable market-niches and the specification of the recommended policies is undertaken in relation to the four major trends identified in the global economy and enumerated above.

Information Technology and the New Service Industries.

The primary function of the strategy suggested for this sector is to facilitate its external operations, especially in the regional market. The sectoral strategy identifies three sets of opportunities - in professional services, in water management and in energy services.

1. The Professional Services Sector

Many types of professional services face a saturated local market (eg accounting, construction) or a highly competitive foreign market

(especially construction). At the strategic-planning level, therefore, this suggests the opportunity for four major initiatives. The first is based upon a local technical capability - computer software - and the second arises in relation to the enhancement of international communications (under which is subsumed the offshore sector).

(a) Computer Software.

A twofold strategy is suggested for this sector. The first concerns the development of Greek-based software since there exists a unique opportunity in this area, beginning in Greece itself but then targeting expatriate communities in other countries. This will require the translation of existing software into Greek, a process which has already begun in at least one of the Cypriot software firms. The major problem with this strategy is that of selective marketing. Therefore the Export Promotion Organisation should also make its facilities available to the software industry. Some form of coordination within the industry is also essential, and this is most likely to be successful if organised through some combination of subsidies and firm-contribution.

A second aspect of the software strategy relates to the computerisation of the state sector. This is especially important in parts of the state which deal with international matters, such as trade and communication. However there is also a general need to upgrade the efficiency of government departments with some possibility of future exports of the software which results.

(b) The Offshore Sector.

Cyprus already has a large number of attractions to offshore firms. In addition the local branches of international accounting firms are prohibited from operating abroad and therefore actively market the attractions of Cyprus abroad. Given this, there does not seem much need for the government

to become actively involved in this process of marketing. Instead the government can usefully undertake two major sets of policies. The first priority should be to ensure that the telecommunications sector is encouraged to invest in the latest technology and to keep ahead of future developments such as ISN (integrated services network) and ISDN (integrated services digital network) which are widely believed to be essential for sophisticated transmission of data. It also involves the enhancing of international telephone services where, despite major improvements, calls to the Gulf and to Europe are often disrupted. Attention should also be placed upon the frequency and destination of air-connections, where there may be some need to make marginal improvements despite the fact that Cyprus is reasonably well-served already. A second important role for government is that of regulation. Cyprus - aiming at high value added service operations of international credibility - cannot afford to allow shady enterprises to locate on the island. Therefore some form of regulatory mechanism ought to be instituted or the existing one in the Central Bank needs to be improved. Since a number of local accounting firms are aware of these problems, they too should be incorporated into this regulatory system. Finally, there is a tendency to govern this sector through a bewildering series of minor regulations. Instead of this a unified legal code might be introduced which sets out these issues in a clear manner. Failing this it might make sense to set up a "one-stop shopping" office where prospective offshore firms can determine the full range of opportunities and responsibilities.

The second component of activity flowing from Cyprus' location, stability and international communications comprises journalism and international conferences. The policy interventions required here are marginal, with particular emphasis placed upon the marketing of the island's attractions. But it reinforces the necessity of ensuring

that both the telecommunications and international air-connections are maintained at the highest standards.

2. A Strategy for Water Management

The locational opportunities for developing and marketing a comprehensive capability in water management (from collection, through storage, distribution and measured application) are clear in relation to the Middle East and Gulf region in which the water constraint is very severe. Moreover if the wider region is considered - that is sub-saharan Africa - then the opportunities become magnified. What is significant about this water management capability is that it covers the supply of both professional services and manufactured outputs.

Cyprus has a great deal to offer in this integrated picture of water management. Despite these clear opportunities, the government has made it difficult to meet demand for these services in the region by putting severe obstacles in the way of government officials working abroad. The first and easy response to this institutional blockage would be to relax these constraints on government officials working abroad.

More substantively we propose that a Water Management Agency be established to seek out these foreign opportunities and to coordinate inputs from all the relevant Cypriot parties. In the first year its funding should be 80 percent government and 20 percent industry, falling progressively to 20 percent government and 20 percent industry in the fifth year with the remainder being self-financed.

The major difficulty facing this proposed strategy concerns foreign exchange and budgetary constraints in many of the potential markets, especially in sub-saharan Africa. Therefore it might be necessary in

the future for this Water Management Agency to provide concessionary finance on terms similar to that provided by competitors.

3. Energy Services and Products

A decision has been made to establish AREC. Whilst this is a positive step we believe that too few resources have been devoted to it. There are, moreover, additional export opportunities which arise out of its efficient operation. What is required is to refocus the agency to incorporate the export of services, to force an increase in the pace of change and upgrade the technological expertise which is being devoted to these activities. For a coherent strategy to emerge we believe that five major sets of changes will be required

- (a) An agreement should be reached with two of the foremost renewable energy institutions in the world, one in Israel (which has both great expertise and similar environmental conditions) and one probably in the USA. For an annual retainer - say of \$30,000 - AREC should be provided with an annual state of the art report on developments in the renewable energy field, or a selected subset of these (perhaps solar energy). The government should also send postgraduate students to these same institutions for study.
- (b) it is proposed that representatives of user-industries be added to the Management Committee of AREC.
- (c) AREC should begin to function as a Consulting Agency on Energy Conservation, with a financial package similar to that proposed above for the Water Management Agency. Once the Consulting Agency has cut its teeth on meeting the needs of local industry, it should be induced to begin to sell its services abroad to the region.
- (d) A special budget should be provided which will facilitate industrial R&D on energy conservation

within Cyprus. To facilitate this, some mechanism should be established whereby this will be subsidised in the early years.

- (e) AREC should reinforce its intended role of certifying quality standards, and in order to induce local firms to collaborate, this should be linked to assistance with export-marketing provided by the Export Promotion Council.

Policies to Facilitate the Adoption of Appropriate Electronics-Based Automation technologies.

We have considered the possibility of recommending the establishment of a science park in Cyprus, but after careful thought have rejected the idea. Instead we believe that it makes more sense to identify niches in which Cypriot technological capability exists and which can be strengthened (such as solar water heaters and higher value added pumping systems). Three infrastructural-institutional policies should be adopted to further the development of indigenous technological capability in manufacturing.

- (a) Local purchasing policies. There is in fact already a similar policy concerning the utilisation of local counterparts by foreign consultants working to government contracts. This is a useful and important policy which should be thoroughly implemented and extended in an analogous manner to the selective local purchasing of high-technology products produced in Cyprus which have reasonable expectations of meeting global standards at some date in the medium-term.
- (b) An incentive scheme should be introduced in Cyprus in relation to a specified list of consulting services (especially with respect to inventory- and production-control), enabling automation technologies and design skills to be developed. This will also have the effect of consolidating design capability on the

island and forging links between them and local industry.

- (c) There is a need for purpose-built 'intelligent' buildings of the sort which are now very common in the USA and Europe. This could be combined with a sharing of some key functions and technologies which individual firms are unable to afford on their own. It is important that a developmental role be included in the provision of these services with a management geared to this end.

In addition to these institutional and infrastructural aspects of policy to encourage knowledge-intensive manufacturing enterprises, it is also advisable to consider a strategy around the development of pumping systems. The aim of this strategy should be to deepen value added by aiming to move into the development of higher value added pumps and pumping system.

Preparing for the Biotechnological Revolution

Biotechnology is likely to be the heartland technology of the future with a wide range of potential applications, especially in the "industrialisation of agriculture". Any strategy of dynamic comparative advantage must take this important factor into account, especially in the planning of long-run education and R&D. Despite the growing problems which these types of development pose for a small-island economy such as Cyprus, there are also positive opportunities which can be grasped.

There are three major biotechnology-based niches which Cyprus could exploit. Each of these builds upon already-existing initiatives, is based upon opportunities in the regional market, relates to skills under development on the island (especially at the ARI, the one research institution of international excellence in Cyprus) and suggests a framework for the development of long-run expertise.

(a) **Fish Farming.** The general attractions of fish-farming are of course enhanced in ecologically poor regions such as the Eastern Mediterranean. Fish farms need round-the-year attention and are largely based upon a combination of commitment and experience. There is already a sea water fish farm in the Akrotiri Base and the CDB has spent some time in trying to generate local partners for an expanded joint venture. Three policy responses arise from the identification of fish-farming as an area for specialisation.

The first is to go ahead with the existing fish-farming venture. The second policy implication is to invest in the training required for Cyprus to become a regional leader in this field. And, thirdly, at a future date when the first two steps have been completed, it will be necessary to develop a wider programme which includes the promotion of fish exports as well as the sale abroad of fish-farming expertise.

(b) **Animal Husbandry.** Cyprus has an effective capability in the general area of animal husbandry, especially in relation to animal management, nutrition and breeding. Were Cyprus to have an excess supply of this breeding stock there would be little difficulty in marketing it abroad in the region. Specialisation in animal breeding therefore offers major possibilities, not just with respect to import substitution but also in relation to the exports of both live animals and breeding services.

For this opportunity to be grasped a number of steps need to be taken. First, for the animal breeding programme to advance, additional PhD level expertise is required with respect to dairy cows, swine, poultry, sheep and goats; additional technical staff will also be required to back-up these researchers. Second, once the needs of the local market are met, a purpose-built boat will be required to transport the animals. Third, there will be the need to develop some form of executing agency which will market the animals and the technical services abroad.

(c) Fertigation involves the controlled distribution of inputs to individual plants ("hydroponics in the soil"). Through the activities of the ARI and the Ministry of Agriculture, Cyprus has developed an internationally-recognised capability in this field. But for this sector to be expanded competitively, the following steps will be required. First there is the need for expanding the research cadre. Second, there is an immediate potential for a productive link between the ARI, one or more of the local software houses and the firm manufacturing electronic displays. Third, one of the problems of utilising local inputs is the poor quality of much of the plastic piping used in irrigation systems. Quality standards should therefore be set and, as in the case of SWHs, access to subsidised export marketing should be linked to the attainment of certified standards. And, finally, a consulting capability should be established to promote the export of fertigation technology and knowhow, similar to and linked with the animal breeding programme discussed above.

The ARI has a critical role to play but it is constrained in this by a freezing of recruitment as part of a general ban on all further government employment. It is also constrained by the same problem facing the Water Development Dept and other government agencies, notably the great difficulty found in allowing staff-officers to work abroad. As in the case of the proposed Water Management Agency and AREC these problems could be resolved to a large extent by developing a consulting capability which would lead the ARI to generate some of its own income by selling its institutional services, initially within Cyprus and subsequently in external markets.

Venture Capital

The relative abundance of capital on the island should not be confused with its uneven distribution and there is clearly some role to be played by the provision of venture funding. Therefore two proposals are suggested. First, the CDB should be allowed to assume a more developmental role in this respect and should thus be relieved

of some of its current performance-criteria which inhibit the development of venture capital activities. Second, a special loan facility should be provided by the Central Bank to the commercial banks at a reduced rate to facilitate the development of venture capital loans.

Monitoring

The monitoring of the strategy for the knowledge-based sector poses a particular difficulty in that unlike other sectors on the island, there is much less local capability available to determine whether the appropriate niches have been targeted and whether progress is proceeding at an acceptable level. Consequently some form of monitoring system should be developed which is allied to institutions abroad. This can be linked to market-surveys undertaken by specialists. Such links are likely to be relatively costly in relation to those in other sectors; but the costs of ignorance in fields where the knowledge-base is changing so rapidly are even greater.

INTRODUCTION

There are some sectors in which Cyprus has an already established industrial presence, notably those which have featured in earlier sections of this Industrial Strategy. In general these sectors have utilised labour-intensive technologies, especially in the garments, furniture shoe and metal working industries. With their comparative advantage being based upon cheap labour and standardised products (a phenomenon which we have loosely referred to as Fordism) these sectors have become increasingly vulnerable to foreign competition in external markets. And as protection against European producers falls with accession to the EEC it is certain that they will also face significantly higher levels of competition in the domestic market.

Of course this problem with global competition is not confined to the Cyprus economy, and it is instructive to note that three major strategies have been adopted in other countries which have found themselves in similar circumstances. The first is to fight the competitive pressure by trying to make Fordist technological systems even more competitive - often this involves pressures to reduce real wages since labour costs in this mode are crucial to competitiveness. A second alternative is to attempt to "dematurise" these mature sectors by making the transition to flexible specialisation; this strategy has been discussed in detail in earlier chapters in which we laid out a programme of policies for each of the five major sectors represented in Cyprus. However a third strategy has become increasingly popular, especially following its successful pursuit in Japan and South Korea. It involves a carefully thought out programme of "marching through the sectors" - that is, of moving into areas which are increasingly intensive in technology, information and knowledge.

In previous decades of industrial development the identification of technology with knowledge and information would not have been automatically accepted. For example, many of the large-scale production-lines introduced in the heyday of Fordism might have been technologically-intensive, but this might not necessarily have meant that they were either especially science-based, or that they involved the intensive coordination and manipulation of information. But there has been a qualitative change in the nature of technical progress in the past decade or so which has meant that any policy of "marching through the sectors" must necessarily involve the simultaneous transition to knowledge- and information-intensive activities.

Knowledge-intensity in production is not always easy to define; nor is it possible to define a clear distinction between those sectors which are knowledge-intensive and others which are not. Yet the growing science-based information-intensity¹ of production is an historically important phenomenon and should not be overlooked in policy formulation, especially that which is focussing on long-run dynamic comparative advantage. As Mytelka observes,

"..knowledge inputs have become increasingly more salient in the contemporary process of capital accumulation and its attendant mode of consumption. If we include in knowledge not only research and development but also design, engineering, advertising, marketing and management, then present trends suggest that knowledge inputs may be displacing capital, land and labor as the primary defining feature of the production process.."²

In this part of the Industrial Strategy we shall consider the prospects for developing a range of these knowledge-based industries in Cyprus. However, unlike the earlier sets of analyses on the existing sectors (where it was possible to highlight concrete opportunities for change based upon a modification of what already exists), in the knowledge-intensive sector it is necessary to operate in much more speculative mode. In part this is because the time-horizon required to move towards new areas of specialisation is

necessarily longer than when industrial restructuring is involved. But it also reflects the inherent uncertainty in new areas of specialisation, for if they were easily identified there would already be a string of existing producers.

1.1. Growing Knowledge-Intensity of Production

Most of the technological developments in the traditional industries which have dominated the major industrial economies had their origins in the nineteenth century, building on craft skills in production. The development of formal schools of engineering and the subsequent systematic application of science to production resulted from the development and expansion of the chemicals and other process industries in the second half of the last century. As the scale of production has progressively increased in many of the pioneering industrial sectors such as textiles, steel and energy so have they thus become increasingly science-based in nature. The exceptions have been industries which for various reasons were inherently difficult to mechanise. Thus both the shoe and garments (but not textiles) sectors remained craft-based and small scale since their material inputs were limp and this effectively precluded mechanisation. In other cases - for example parts of the food industry, some engineering sectors and the furniture industry - demand (and thus the scale of production) was often too variable to allow for effective mechanisation. It is perhaps no surprise to find that it is these exceptional and non-science based sectors which have risen to prominence in Cyprus over the past two decades, since they have all involved activities in which scale economies are slight.

This growing science-based nature of industrial technology in the scale-intensive sectors has in recent years come to be supplemented by the application of automation for the first time to the exceptional sectors noted above. The reason for this has been the development of the new inherently flexible electronic technologies which will briefly be considered below.

As a consequence of the above-mentioned factors there are important differences in the sectoral intensity of R & D. Considering the orientation of R & D in Japan and the USA for example (Table 1), the share of R & D in value added is such that all of the sectors in which Cyprus possesses a comparative advantage are way down the scale of research effort.

The upshot of these historical developments has been the growing importance of Research and Development in industrial competitiveness. As can be seen from Figure 1, whilst R & D is not a sufficient indicator of dynamic comparative advantage (witness the position of the USA and the UK as high R & D spenders but relatively poor economic performers³), it is clearly a necessary element. A second factor worth noting is that although the large economies tend to spend a greater proportion of GNP on R & D, it is the medium and small OECD economies who have tended to increase the proportion of their Gross National product going to R & D. And, thirdly, it is evident that three of Cyprus's main regional neighbours and potential competitors - Greece, Portugal and Yugoslavia - are relatively poor performers in R & D expenditure. This has important implications for future industrial strategy on the island.

One final factor worth bearing in mind is that the science content of technology has become so intense that no economy - even the USA which accounts for over 40 percent of all OECD R & D - can continue to concentrate on all sectors. Some specialisation is essential, as is acknowledged by the OECD in the case of Japan

"The Japanese pattern of specialisation is the best adapted to foreign trade. Especially since the first petrol shock, Japan has committed itself to fast growing industries (electronics, computers, scientific instruments, machinery, motor vehicles) and has progressively given up its 'niches' in mature industries (textiles, footwear, leather, tobacco, furniture, non-ferrous metals)."⁴ (OECD, 1986, p13).

II

DEVELOPMENTS IN KNOWLEDGE-INTENSIVE SECTORS IN THE GLOBAL ECONOMY

Before we proceed to an analysis of what already exists in the knowledge-intensive sectors in Cyprus - or what may exist in the future - it is necessary to preface the discussion by providing an overview of the major changes occurring in relevant world technology in this area. For any strategy which Cyprus might wish to adopt will inevitably be heavily conditioned by what is happening in competitive sectors in other economies. Therefore it is necessary to consider briefly five areas of activity - four are based upon technological developments, and the other concerns institutional issues of finance and organisation. Each of the elements of the industrial strategy mapped out for this sector in later stages of this chapter relates to these emerging trends in the knowledge-intensive industries of the global economy.

2.1. Information Technology, Convergence and the New Service Industries.

The balance between workers involved in direct production and those involved in indirect activities has shifted over the years such that in many modern automobile plants, for example, less than half the workforce is directly engaged in producing cars. There are a variety of different types of indirect activities, but in one way or another most of them involve the manipulation of information. One form of information is the specialised knowledge embodied in technology, but there are other bodies of relevant data such as that concerning the nature and extent of markets, information on work-in-progress and inventories of finished goods, knowledge about sources of material inputs, information on the labour force, and so on.

Since the proportion of indirect workers - predominantly manipulating information - has tended to increase over the decades it is no surprise that the share of information workers in the workforce has also risen in most economies. Figure 2 shows the extent of this increase for most of the world's richest economies in which between 1950 and 1975 the share of information-workers in the labour force generally increased by more than 50 percent. In many of the more advanced economies almost half the labour force now devotes itself to the manipulation of information.

Following the onset of the Industrial Revolution the major thrust of technical progress has been in the mechanisation of the work done by direct labour, so that the transition to a labour force of indirect workers (that is, to an "Information Economy" as it is often known) has threatened to slow down technological progress and thus to push up economic costs. However, the recent development of microelectronics technology has for the first time allowed the systematic automation of many information-processing tasks and this, as will be shown below, is having a dramatic effect in reinvigorating productivity growth. But the very nature of this new microelectronics technology is such that it is forcing a process of technological convergence between industries which were previously separate. This is because it operates through digital logic, in which interrupted flows of electricity (or, perhaps in the future light) become the medium through which information is not just processed, but also transmitted. Thus it is that the telecommunications industry is converging with the information-processing industry, and both are perhaps also coming to be closely allied to the broadcasting industry. The phrases used to describe this form of convergence - informatics, informatique or telematique - provide a graphic image of the process which is underway.

Coincident with the transition from direct to indirect labour in manufacturing has been a general tendency for the service sector to grow in relative size, and for that of the manufacturing sector to decline. This has been an especially important phenomenon as per capita incomes rise. It is important, however, to note that there

are a variety of types of services, and which one expands depends upon both the structure of the economies involved and the policies which are being pursued. At one end of the spectrum are the unskilled-labour intensive services, such as domestic services and parts of the tourist industry. In general these services are associated with low-income countries, although it is worth noting that the revival of gross employment in the USA in the early 1980s was largely associated with the growth of low-wage service activities.⁵ At the other end of the spectrum are the emerging Value Added Network Services (VANs) which involve the sale of information over the telecommunication system and are considered by many observers to be the growth-industry of the future. Clearly, these services are quintessentially knowledge-intensive, reflecting also the phenomenon of technological convergence noted above. Another, and perhaps the predominant type of service activity is that which is related to the production and distribution of goods in the manufacturing sector, referred to generally as Business Services. There are a wide range of Business Services, ranging from the shipping and insurance sectors to the various types of professional consultancies which are indirect inputs into production, such as civil engineering, accounting and legal services. These latter professional-skill based services have become increasingly important in modern manufacturing and infrastructural activities. It is predominantly this latter type of service on which we will focus in the strategy which will be mapped out below.

The experience of those industrially advanced countries which have witnessed the relative growth of these manufacturing-related services has been that there is generally a crucial link between an ability to service the needs of a domestic industry with that of an overseas industry. Thus it is also sometimes argued that the export of services must necessarily be linked to the export of manufactures. But whilst this argument has some basis to it, it tends to be more applicable to larger economies and probably reflects one of the determinants of successful service-exports, rather than the sole determinant. Indeed there have been some important exceptions to this rule of thumb, such as when a country exports human skills as migrant labour and lives off the remittances. This has been an

important phenomenon in the case of Cyprus, but even more so in Jordan and India (where migrant remittances are the single largest source of foreign exchange). Successful though this policy might have been in some countries though, it is fraught with danger. As the global (and Cypriot) construction-sector is learning to its cost, reliance on an external market which is experiencing diminishing incomes or which has completed a large programme of infrastructural investments requires a particularly flexible response.

Two important lessons can thus be learnt from the experience of developing the service sector in other economies, particularly those with high per capita incomes. The first is that if an economy is to see an expanded role for the export of services, these services will almost always be linked to services first developed and made available to the local market. There is thus a synergy between local and foreign markets. Secondly, the export of services without some form of complementary manufactured exports will be vulnerable to long-term erosion of market shares. As a UK House of Lords Select Committee Report on Overseas Trade concluded,

"..valuable though the services sector is, the Committee consider that growth still depends primarily on manufacturing and they doubt how much further services can be expected to continue to substitute for manufacturing. There a number of reasons for this.

First, the services sector is very dependent upon manufacturing... A second reason is that the value added in manufacturing exports is some three times greater than that in services... Further, service industries like tourism which are only slightly dependent on manufacturing will not be able to make up for a loss of manufacturing" (House of Lords Select Committee Report on Overseas Trade, Volume 1, paras 92-3, 1985)⁶

Both these sets of conclusions are based upon the experience of industrially advanced countries which are not only richer than Cyprus, but also much larger. It may be conceivable for a country the size of Britain to have substantial exports of manufactures to service, but the same may not be true for a small and underpopulated

island economy such as Cyprus. Yet it is important to be informed about the significance of these factors so that when Cyprus begins to map out its own concerted strategy for the export of services, this is done in the full knowledge of the pitfalls which it is facing.

2.2 Microelectronics, Automation and the Importance of Systems in Production.

Although there has been a general increase in the pace of technological change over the past few centuries a few major developments have been key. These "technological revolutions" have been so important they are one of the main factors accounting for the recurrence of global economic booms and depressions, such as those which occurred in the 1870s and the 1930s, and that which is currently racking the global economy. Examples drawn by the historians are the steam engine, the railroads, the steel industry, the internal combustion engine and, now, the microelectronics revolution.

As was mentioned above, one of the major reasons why the application of microelectronics to production has become so important in historical terms is that for the first time it allows the mechanisation of the information-processing activities which have become central to production. As a consequence, the electronics industry has made the transition from its narrow origins around the development of computers to a series of subsectors which have come to be of growing importance. These include consumer electronics (e.g. TVs, hi-fi), office automation (e.g. word processors, personal computers, stock-control computers), machinery (e.g. Computer Numerically Controlled machine tools, Computer Aided Design, industrial robots, automatic testing equipment, programmable sewing machines) and military products (e.g. radar). By the mid-80s, the electronics industry had grown to an annual global turnover exceeding \$150bn and was second in size only to the automobile industry. Whilst in recent years many economic sectors have been experiencing a declining real market, those industries applying electronics to production (and thereby

reducing costs and product lead times, and increasing quality) continue to operate in healthy markets.

The role which microelectronics can play in enhancing competitiveness and increasing flexibility is documented in each of the sectoral case-studies considered in earlier chapters of this Industrial Strategy. Equipment incorporating this technology is, in general, cost-effective and provides an important component of the transition to flexible specialisation. There is, however, an important characteristic of this technology which needs to be borne in mind as a general tendency informing industrial strategy formulation in all sectors, including the knowledge-based ones, and this relates to the systemic characteristics of electronics technologies. As we noted above, since the core of electronics technology is the interrupted flow of electricity, these control devices blend ea. with the transmission of power and information; hence the phenomenon of convergence. One of the consequences of this is the systemic synergy between different electronics equipment. If individual machines are controlled by electronically controlled digital logic systems, they are very easily linked together. This means that the gains from linking two or more electronically-controlled machines are generally far greater than the sum of the productivity gains realised for the separate machines. Hence the growing importance of CAD/CAM (computer aided design/computer aided manufacture) and other forms of Computer Integrated Manufacturing (CIM).

This growth of systemic synergies is not confined to linked machinery, but is reflected in a much wider trend towards systems in product and process development. For example, some years ago automobile assemblers would buy window glass from one manufacturer, a window winding mechanism from another, the window handle from a third supplier, the window fascia from a fourth, and so on. Now auto assemblers buy window-winding systems - incorporating all of these previously separate items - from a single supplier whose skill in large part arises from the ability to put all these separate components together into a system. Similar trends are to be found in other sub-assemblies of the automobile industry (eg complete

dashboards, transmission systems) as well as in many other sectors such as the garments firm, where the Italian firm Benetton has been able to put together an integrated, electronically-controlled system which stretches from the cash-register to the design-terminal.

A further feature of this same process of systemic-development is the growing importance of "life-cycle cost" calculations⁷ in investment decisions, especially in technologically-complex areas. This assumes systemic proportions in two senses. First, it includes the costs of the whole production and consumption cycle in which the costs of maintenance and termination are considered in tandem with initial investment costs. And, second, it raises the problem of system-balancing in which optimisation between various points in the operating and production cycles are key to life-cycle performance. These considerations have become especially important in large infrastructural investments as well as in process plant and expensive and costly durable goods such as aircraft.

2.3. After the Microelectronics Revolution.

Although in any one period of history there will be a dominant technology finding application in many spheres, there will also necessarily have to be a series of supporting developments in other sets of technologies. For example, the application of motor power to lathes in the nineteenth century meant that the cutting tools could run much faster. This necessitated the development of hardened forms of steels since those which had previously been utilised were unable to withstand the forces generated in faster cutting. Similarly, as the microelectronics revolution sweeps its way through many sectors there will be a necessary process of ancillary technological development which poses new problems and opens opportunities for new activities. At the same time, of course, there will also be opportunities opening in sectors unrelated to microelectronics or its applications. Since these offer potential opportunities for Cypriot firms it is helpful to obtain some overview of these emerging areas of specialisation.

One list of identified opportunities is that provided by Europe's largest venture capital firm to guide its operations (Table 2). As can be seen whilst some of these sectors are clearly related to the applications of electronics, others are not. In a similar vein Table 3 comprises of a list of new sectors identified by the Japanese Ministry of Trade and Industry (MITI) as being

- (i) some way from commercial development, but with clear commercial possibilities already visible
- (ii) somewhat risky, given their distance from commercial exploitation, and
- (iii) having widespread repercussions by affecting the processes and products in many other sectors.

Again, in this Japanese list of Next Generation Base Technologies, we can observe sectors which are closely related to the application of microelectronics, sectors whose development is spurred by demands placed by the application of microelectronics (i.e many of the materials technologies) and a sector which comprises of a new set of technologies which are reckoned by many to represent the technological revolution of the future, namely biotechnology.

The biotechnologies are thus identified as an area of widespread future application. For a variety of reasons, including the fact that they relate centrally to agricultural technologies in which Cyprus already has a demonstrated capability, there are reasons to believe that technological niches exist in biotechnology for future Cypriot activities. These specific niches will be discussed in later sections, but here it is useful to map out some of the major general trends in biotechnology which are currently emerging.

"Biotechnology is perhaps best defined as the manipulation of living organisms in order to alter their characteristics in some fashion, to encourage them to produce some desired product, or to use them as a component of a broader production process. In this sense it is very old indeed, for such a definition encompasses traditional plant and animal breeding as well as the fermentation of such products as beer, cheese and yogurt. But whereas the 'old' biotechnology depended largely on selection to obtain desired results, the 'new' biotechnology uses an enhanced understanding of the molecular constitution of organisms to achieve directed alteration at the cellular and molecular levels"

(Buttel FH, Kenney M and Kloppenburg J, 'From Green Revolution to Biorevolution: Some Observations on the Changing Technological Bases of Economic Transformation in the Third World', Economic Development and Cultural Change, Sept 1985)

These biotechnologies include recombinant DNA and tissue culture and look likely to affect both the industrial and agricultural sectors. In order to avoid covering unnecessary terrain, we will briefly consider only the major agricultural applications since these are likely to have direct relevance to Cyprus. Moreover they are also probably closer to commercialisation. There are thus three major areas of application.

- (i) Plant genetic manipulation and breeding
- (ii) Animal applications of embryology and genetically engineered products, and
- (iii) The use of genetically manipulated organisms to produce or substitute for agricultural products.

Whilst many of these biotechnological applications are inappropriate for a small island economy such as Cyprus, there are nevertheless clear possibilities of specialisation and these will be identified in the latter stages of this strategy for the knowledge-intensive

sectors in Cyprus. Such technological developments may also have important indirect effects on the Cyprus economy - for example by producing synthetic substitutes for Cypriot products - and these, too, require monitoring.

2.4. The Institutional Context for Innovation

The growing science content in technology has necessarily made the process of invention increasingly specialised. In some cases this occurs within the R&D divisions of firms, but independent research institutions and universities have also come to play a major role in the search for new products and new ways of making them. The transfer of these original ideas into the commercial world - that is, the process of innovation - has often become increasingly problematic as the scientific content of technology has increased.

It must be said that there is no unique "best" manner of facilitating this process of innovation and the appropriate institutional mechanisms will of course vary not only across sectors, but also between countries and over time. For example, it would appear that the most innovative firms in the USA and the UK are new, start-up ventures. The existing large firms are often too bureaucratic, too slow and too staid to take advantage of the new opportunities which have opened up. Thus the pioneering Apple personal computer was invented and first commercialised in a garage by two "dropouts", and a host of similar stories can be drawn from other new, technology-intensive sectors. By contrast in Japan and Germany the pioneers of new products and processes have continued to be the same large firms which have long dominated these economies. The reasons for these differences in behaviour are in part cultural - one distinguished observer argues that the consensual decision-making process in Japan means that whereas the process of decision-making is slower in Japan than the USA, the process of implementation is much more rapid.⁸ But in other respects it also reflects historical factors since in both Germany and Japan the senior positions in industry have tended to be

occupied by engineers, whereas in the USA and the UK it is the accountants who have triumphed in the hierarchy.⁹

Cyprus does not conform easily to either of these stereotypes. Whilst in one sense its cultural affinities are closer to those of Europe than Japan, the consensual legitimation of social decisions is more akin to that of the Japanese and German models than to the conflictual modes of the USA and the UK - witness the quite unusual pulling together of all sections of the society in the post-invasion period. Nevertheless, partly because of the strong cultural affinity with Western Europe, partly because so many of its educated population have been trained in the UK and the USA, partly because of the plethora of small firms on the island and partly because of the strength of the family as an industrial institution, it is probably more relevant to fashion Cyprus's innovative experience in the European mould than that of Japan.

This, therefore, throws the focus of attention on two institutional characteristics of the American and British economies. The first is the role played in innovation by venture capital and the second is the extent to which new technology-intensive ventures have been facilitated by the establishment of science techno-parks.

In the context of new knowledge-based industries emerging from the determined efforts of highly-skilled individuals "spinning-off" from the larger electronics companies and the university system, access to finance has often come to be seen as a critical problem. The key aspect of this financial input is that it has been speculative and not based upon investments protected by security; if the project fails most of the financial input is simply lost. It is this type of finance which is known as Venture Capital. Yet, it is the bitter experience of many venture-capital firms that the provision of finance to support a bright technological idea is much too narrow an input for any reasonable measure of success. Probably even more important than finance alone is the managerial capabilities of the new entrepreneurs; and this must be allied to the potential for

finding real markets. Thus after an initial flirtation with technologically innovative ideas, the venture capital firms have come to put prior importance on management and markets before even assessing the technology. Where management does not exist, one of the primary tasks of the venture capitalists is to introduce it.

Thus, as Figure 3 suggests, there are typically likely to be a number of phases in the development of these new venture-capital financed firms, each of which will have particular managerial and financing problems of its own. And, characteristically, it is only when the enterprise is well into production that a profitable balance-sheet will emerge. To keep the rate of return up in the face of these initial losses and the general problem of risk and uncertainty, the venture-capitalists will try to avoid swamping the new concern with cash; this also has the function of keeping the managerial team lean and on their toes.

Particularly in the USA these venture capital firms have come to play an important role in the development of the knowledge-intensive sector. And in the process they have often been enormously profitable. They now represent big business, as is evidenced in Table 4. The USA, with 550 venture-capital firms involving an investable pool of some \$20bn clearly dominates, followed by the UK and Canada.

One of the useful sets of information which emerges out of a focus on the venture capital industry - which is essentially investing in the technologies of the future - is that it provides a window on what these emerging areas of sectoral specialisation may be. Table 5 confirms the observations made earlier that the major focus of present technological development was in the electronics-related territory, but that future specialisation is likely to also incorporate biotechnologically related innovations.

Closely associated with the development of venture-capital financing for new firms has been the development of science/techno parks. The origins of this are to be found in the early spin-off of academics from Stanford University in California (including at an early stage the founders of Hewlett Packard, now one of the world's major computer companies). After the Stanford experience the idea spread rapidly through the US university system, including the clustering of firms around MIT in Boston and the Science Triangle in the south east. After a while it was not just the universities which spawned the new ventures, but large firms such as IBM and even in some cases the space programme and the defence industry. Coincident with this early transition from an exclusive focus on the university system, the private sector also came to be involved in the provision of purpose-built industrial accommodation.

From the USA the idea of these science parks has spread to Western Europe. In the UK it began with the Cambridge University science park and rapidly spread along the M4 corridor with purpose-built industrial sites being provided by local authorities and the private sector. A string of technoparks - modelled on the South Bank Technopark - are also being planned in London. France has developed a similar conurbation of new industries around Lyons and other European countries are also taking steps to implement the idea of science parks. Finally, perhaps of greatest long-term significance, Japan is in the process of constructing a whole city which will be devoted to the development of science-intensive production.

III

THE EXISTING KNOWLEDGE-INTENSIVE SECTOR IN CYPRUS

In mapping out the extent of the knowledge-intensive sector in Cyprus it is helpful to begin with an exploration of four categories of activity - manufacturing utilising domestic technological capabilities, manufacturing using foreign-technology, professional services and the offshore sector. In some cases this may involve enterprises which make an intensive utilisation of scientific knowledge throughout their activities as well as in their products; in other cases this may involve particular science-intensive stages in their production process.

In addition to these four subsectors of activity, it is also important to provide an overview of the telecommunications industry, the uptake of computing technology on the island, the tertiary educational system, some governmental departments involved in R&D and the policy environment in which knowledge-intensive investments are being considered and made. The availability of venture capital is also an issue of relevance. The reasons for focussing on these sets of activities should be clear from the preceding discussion on developments in the knowledge-intensive sectors in the global economy.

In the course of preparing this industrial strategy for the knowledge-intensive sector, 32 different institutions were visited, some of them on multiple occasions. Of these 9 were off-shore companies, 8 provided services to both local and foreign markets, 3 provided services only to the local market, 2 manufactured high-technology products, 7 were branches of Government, 3 were involved in education and training and 1 was a development bank. Clearly the short time-span available for enquiry can provide only a cursory outline of these activities in Cyprus. Whilst some details may need to be revised (especially with respect to some of the professional

services which were not adequately investigated), we are confident that the general trends which are highlighted here are accurate.

Before proceeding to this discussion it is worth noting that there is unfortunately no measure of Cyprus's allocations to R & D, either in individual sectors or in aggregate. Given the nature of its industrial sector and the absence of a university, it is almost certainly very low. Only the Agricultural Research Institute (and perhaps parts of the Ministry of Agriculture) appears to have a systematic programme which can in any meaningful sense be described as either Research or Development. On the other hand, where the island probably scores well is in its potential for these types of activities, since it is widely recognised that its population is in relative terms, highly educated.

3.1. Knowledge-Intensity in the Manufacturing Sector

In the manufacturing sphere there is little sign of domestic technological capability. It could be said that the two or three firms manufacturing and exporting pumps and those three or four large manufacturers producing solar water heaters represent the systematic application of science to production. Yet the pump manufacturers are really only producing designs copied from abroad many years ago - for example, no efforts have yet been made at finite element stress analysis or group technology in organising production. And although Cyprus has the highest ratio of solar water heaters per capita of any economy in the world their designs are merely copies of imported ones and lag behind the frontier in efficiency.¹⁰

The absence of an adequate design capability - one of the prior conditions for domestic technology - on the island is well-known and is documented for individual sectors in other chapters of this Industrial Strategy. The case is exemplified by the plight of one of the high-tech service firms on the island. It is owned and staffed by two PhD's, one of whom studied in the UK and subsequently worked

in what was then the world's premium Computer Aided Design research institution; the other graduated from a prestigious American university in chemical engineering. They have been almost wholly unsuccessful in getting any commissions at all from local industry. Their experience has been that manufacturing technology is wholly craft-based, rather than involving the application of formalised scientific principles. Local workshops are reluctant to work from plans and prefer to muddle through on the basis of past uncodified experience. In recognition of this problem the CDB has recently employed a PhD-level expert in CAD/CAM. However he is still at a preliminary stage in developing contacts with local industry.

We visited one fledgling firm which is struggling to make its way in the application of microelectronics to the presentation of information. It is staffed by two foreign-trained electronics graduates and its experience will be recounted below in the discussion of venture capital. It represents perhaps the only example in the island of the development of indigenous knowledge-intensive technological capability in manufacturing and whilst on the verge of growing from infancy to childhood, its path remains obstructed by the absence of a high-technology culture on the island and, as with the design-consultants mentioned above, a generalised distrust of local technological capability.

Whilst the picture of manufacturing industry depending upon domestic technological capability is thus slight, there is a little more evidence of the utilisation of knowledge-intensive foreign production technologies. But here, too, the picture is somewhat gloomy. In the garments, shoe and furniture industries - each of which is having to compete in increasingly competitive foreign markets - recent years have seen the acquisition of a number of items of computer-controlled machinery. Yet this has been relatively modest by international standards - there is, for example, no computer aided design, grading or cutting machinery in either the garments or the shoe sectors. Whilst sophisticated elements of technology such as automated warehouses, automatically guided vehicles and flexible manufacturing will not be suitable for Cypriot industry systems for many years.

there are other elements of new technology which could be gainfully applied. But there is little evidence of this. In the engineering industry there are probably only around 6 computer numerically controlled (CNC) machine-tools on the island. There is no computer aided design (CAD) terminal in Cyprus at all and no Apollo/IBM/Sun type engineering workstation; the nearest to this is an emulator at the Cyprus Development Bank which is not suitable for serious utilisation. No electro-discharge machinery (EDM) or electro-chemical machinery (ECM) exists. There is also no evidence of the application of any CAD package for either design or even the lesser tasks of parts-programming or drafting. It is important to note, here, that these are all important elements of modern manufacturing technology without which lead-times cannot be shortened, production cannot be made flexible, costs cannot be reduced and international quality standards cannot be met.

The picture is not one of unremitting gloom, though. The CDB has recently appointed a specialist in CAD/CAM. The largest pump manufacturer has recently installed a modern imported foundry and is beginning to develop a liaison with the CDB expert to facilitate the parts-programming of its machinery via a CAD terminal. From there it is a relatively short step to utilising the terminal for design. There is a firm making a limited number of printed circuit boards (pcb's) for the telecommunications agency and the CDB is exploring the prospect of making multilayered, double-sided pcb's under subcontract for a British company. A new modern foundry is being installed (at a cost of £1m) to manufacture items under Japanese and American licence for export to the EEC. Yet there remains a long path to entering the modern world of manufacturing by applying knowledge-intensive technologies to production. Given the context of entry to the customs union there cannot be a great deal of time to make the necessary adjustments.

The situation is slightly better in relation to the utilisation of computerised management and production scheduling technology. As is evident from the chapters on garments and shoes in this Industrial Strategy a few firms in these sectors have begun to make use of such

information-systems to increase productivity. The largest pump manufacturer is also an active user of such technology, having had much of its software written in Cyprus (see below).

3.2. Knowledge-Intensity in the Service Sector

The service sector has a number of components to it, one of which is loosely termed as the Business Services sector. This comprises six subdivisions, each of which is knowledge-intensive and related to professional skills. These are legal services; accounting, auditing and bookkeeping; data processing; engineering, architecture and technical services; advertising and market research; and a series of ancillary professional services.

As can be seen from Table 6 these business services have grown more rapidly (in terms of employment, that is) than all services, which have in turn grown more rapidly than all manufacturing.¹¹ The value-added per worker in the business services sector (Table 7) has been consistently lower than that in the manufacturing sector which is not surprising given the higher fixed capital assets in manufacturing. But what is significant is that during the 1970s this gap in value added/job declined markedly as the knowledge-intensity of these business services increased. Figure 4 shows the distribution of individual elements of this business service category from which it is evident that the accounting, legal and civil engineering subsectors are the most important. Thus in this sense - that is when contrasted to manufacturing - Cyprus has seen something of the same transition to knowledge-intensive services as have the major industrially advanced economies.

Most of these services are used by other enterprises on the island. There are however two major exceptions. The first of these is a large construction firm¹² which at the height of the Middle Eastern market had a turnover exceeding \$1.25bn; it is now considerably lower than this. The second example is a market research and consulting

firm, active in the near east and Africa, employing around 250 people in Cyprus of whom about 50 are professionals. In addition there are a limited number of other business service firms (e.g. two software houses and two engineering consulting firms) which have sold services abroad.

The significant feature of these two successful enterprises is that they have both established offices abroad and this is considered a prerequisite for success in this area. For example, one of the island's smaller civil engineering firms has been for work in the Gulf area. Despite extensive personal contacts - the major owner worked in the Gulf for a number of years - and the investment of around £35,000 in touring and tendering, they had managed to obtain less than £4,000 work. Another factor limiting the export of these types of services is that when linked to international partnerships (especially in the accounting area), they are confined by agreement to the island.

It is this restriction which has led some of the local accounting firms to actively induce foreign customers to locate on the island. In one case a book listing Cyprus's attractions was produced at a cost of £100,000 and circulated globally, with an emphasis given to distribution in the middle-eastern region. For this and other reasons there has been a steady expansion in the number of offshore companies registered locally (Figure 5), although most of these were dormant. Thus of over 4,095 registered offshore companies in 1987, only 560 could be considered 'active'. Most of these were very small and the largest 15 accounted for around 400 jobs out of the registered total employment of 2,002 in 1986.¹³ A survey of 23 of these companies conducted in 1983¹⁴ found that the major reasons for locating in Cyprus were

- its geographical location (78%)
- international communications (70%)
- telephone services (43%)
- telex services (35%)
- the low cost of living (30%)

- tax incentives (30%), and
- the use of the English language (17%)

The total inflow of foreign exchange associated with offshore companies more than trebled from £35m in 1982 to £20m between 1982 and 1984, but because of the low tax rates the income tax generated (£2.1m corporate tax and £1.7m income taxation on foreign nationals in 1984) was insubstantial.

3.3. Tertiary Education and other Higher Level Training.

There is a long and ongoing debate on the island on the question of whether a university should be established. In addition to the political pressures favouring a university, there are also four major technical reasons in its favour. First, it would allow for the guiding of study to meet the needs of Cyprus's economy. Secondly, it gives the opportunity to tap the natural abilities of poorer members of the society who are currently unable to obtain scholarships for foreign study and whose parents are not rich enough to finance these studies independently. Thirdly, it will provide a climate of intellectual and technical discussion on the island which will contribute to a general upgrading of Cypriot technological capabilities. And, fourthly, it will provide a pool of local academic and technical skills which can be drawn on by local industry for advice. The major argument against the establishment of a university is that whereas Cyprus can at present choose to send its students for the best education abroad, a local university may become either partisan to a particular viewpoint or be mediocre in quality, thereby actually lowering the quality of technical cadre on the island. Moreover, it is argued, that although at present nothing is being done to stream foreign studies into particular areas, there is no reason why this could not be done so in the future.

Whatever the merits of the case for the establishment of a local university, its absence has not been associated with the neglect of

tertiary education by the island's population. In relation to population Cyprus has one of the highest number of tertiary-level graduates of any country. It does, however, have three characteristics which are worth noting and are relevant to the development of a knowledge-intensive sector. First, a large proportion study in five countries - of the 8,448 Cypriots studying at tertiary level abroad in 1983, for example, 4,918 were in Greece, 846 in the USA, 773 in the UK, 695 in France and 535 in West Germany.¹⁵ Second, of these studying abroad, the largest single category (approximately 18 percent) was engineering and technology, with 14 percent in the social sciences and 13 percent in business studies. And, third, the most highly educated Cypriots remain abroad largely because of the absence of opportunities domestically. Some examples illustrate this latter point. We interviewed a Cypriot with a PhD in Hydraulics from a prominent British university who had returned to the island to work and had been unemployed for fifteen months despite extensive job-search; the engineering design consultants discussed above as well as the CAD/CAM expert at the CDB felt themselves to be in something of a technological vacuum; we interviewed three postgraduate Cypriot physicists manufacturing personal computers in a London science park who expressed great interest in returning home but felt that there was a lack of opportunity in Cyprus.

In addition to these students studying abroad Cyprus also possesses its own tertiary level institution, the Higher Technical Institute. The HTI was established in 1968 and currently has around 640 students admitted to a variety of technical courses.¹⁶ It is striking that in 1984 38 percent of their graduates were in civil engineering, with 27 percent in electrical engineering, 20 percent in mechanical engineering and 15 percent in marine engineering. This reflects two features. The first is the historical construction boom in the region and on the island; this has however come to an end and there is now an acute oversupply of civil engineers on the market. But it also reflects the impressive dynamism of the HTI which has rapidly expanded its production of electrical engineers in response to the technological developments discussed above.

Although the HTI lends itself as a proto-knowledge-intensive institution on the island it has hitherto failed to obtain the requisite level of support which it needs to make a transition to this status. For example, in 1986 the total equipment budget for R&D in the HTI was derisory, in the region of only £4,000! This was despite repeated requests for equipment which in 1986 were £70,600 for mechanical engineering, £8,000 for electrical engineering and £70,500 for civil engineering. As a measure of this equipment-starvation the HTI has to send its students to local firms to use their CNC equipment during slack periods as it has no NC equipment of its own; the principles of Electro Discharge Machining and CAD are taught, but there is no equipment for the students to undertake practicals.

We will return to this problem in our recommended industrial strategy below, but to show that it is not an isolated case, the experience of the Agricultural Research Institute (ARI) is perhaps equally striking. The ARI is probably the research institution of excellence on the island. In some areas - such as fertigation - it has an international reputation and many of its staff are offered advisory posts abroad of a consulting and sabbatical nature. Yet due to the blanket freezing of all government appointments, the present staff is ageing (now an average of 44 years) and little renewal of cadre is occurring, let alone expansion into new targetted areas. In a carefully documented five year plan the ARI has appealed for the appointment of 17 new scientists, especially at the less costly junior level. Yet these requests for specialisation remain blocked by the general government ban on new employment.

It can be said, therefore, that in relation to tertiary level education and research, the island possesses great potential which is not being exploited. There are three major reasons for this. In the first place no attempt is apparently being made currently to direct foreign students - even those studying on state-allocated scholarships - into important growth areas. Second, the local training institution is effectively starved not only of an R&D budget, but also of the equipment needed to train its students.

Third, despite an excellent past record, the major local research institution is being allowed to drift into a lower league despite its own recognition of the need for corrective policies.

3.4. The Use of Computing in Cyprus

We have seen above that the electronics industry has been key to the recent growth of the industrially advanced countries and that it is the building block of the Information Technology which is likely to dominate most economies in the future. We have also seen that insofar as the incorporation of electronics in equipment in Cyprus's manufacturing sector is concerned, the picture is bleak. Yet in the important area of computing and information-control, the performance of the Cyprus economy is considerably superior. This is not in the manufacture of information-processing equipment, but in relation to its utilisation and the writing of the software required to make it useful. As an indicator of the growth in utilisation of this electronic data processing equipment it is instructive to see the trend of imports of all office automation equipment (Fig 6). This rose from virtually nothing in late 1974 to almost £6m in 1985, with the share of electronic equipment becoming dominant (illustrated in Fig 7 by the declining share of typewriters in the total). 1985 saw something of a tailing-off of this rapid growth and this, as we shall see, possibly suggests a measure of maturity in the market, a similar phenomenon to that occurring in other countries.

No coherent public survey has yet been made of the computer industry in Cyprus, and since it is so important a building block for the knowledge-intensive sector it is worth trying to get a measure of what currently exists. It would appear that there are 8 mainframe computers on the island of which five are NCR and 3 are IBM. The mini-computer population is in the region of 234 (some of them are more modern 32 bit superminis) of which just under one-half are NCR with a further 30 percent supplied by DEC and just over 10 percent by IBM. The micro-computer (i.e personal computer) population is around 1,000, of which approximately 40 percent are IBM, 30 percent are Far

Eastern IBM clones and around 20 percent are NCR. The total replacement value of this stock of computers - mainframe, mini and micro - is in the region of £11-12m.

Most of this computer hardware was utilised in the private sector and the home (around 40 percent), with the banks coming next in importance (25 percent) followed by the government (20 percent) and the software and supplier industry accounting for the remainder. Within the private sector itself, it is not certain how these machines are distributed across sectors. However, one measure of computer use is the distribution of computing machines operators, (see Table 8). Of the 288 operators recorded in the 1985 Registration of Establishments, 44% were in the finance, insurance, real estate and business services sector, 31% in trade, restaurants and hotels, and only 13% in manufacturing. Of the subsectors the most important was wholesale trade with 24% of the total.

While the micros are used with little local back up, the mainframe and mini computers require software. Some of this is imported, but software is also provided within firms using the computer equipment and by the specialist software industry.

In total there are around 450 trained software writers in Cyprus, approximately half of whom are members of the Cyprus Computer Society.¹⁷ Most of these must be employed in firms utilising computers since our survey of the software sector on the island accounted for only 105 employees.⁽¹⁸⁾ The total turnover in this software sector was in the region of £1.1m in 1986, having experienced rapid growth over the past 5 years; in the case of one of the leading software houses, for example, the annual growth rates were 8.3% in 1981, 57.3% in 1982, 116% in 1983, minus 13.4% in 1984, 21.6% in 1985 and 23.2% in 1986.

The question which now confronts the island hardware importers and software suppliers is whether this growth can be maintained in the

future, and if not, what is to be done about this. There are signs, as many firms in the industry reported, that the frenzied growth of the past few years is slowing, as is also illustrated by the slowing of imports illustrated in Fig 6. Various estimates have been made on penetration. One importer undertook a survey of 218 of the largest organisations in Nicosia, excluding government, banking, insurance and hotel. Of those with a turnover exceeding £1.5m, 40 out of 90 of already had mainframe or minicomputers. Of those with a turnover between £.5m and £1.5m, 35 out of 130 also possessed computers. It concluded therefore that around 35 percent of the private sector within Nicosia was already computerised. Other importers broadly shared this view, agreeing that the major market in the future lay in government which is barely computerised. Finally, these judgements were corroborated by the software industry, in which the largest firms were being forced abroad for expansion since the local market was becoming increasingly competitive and had lost its impetus. Indeed one of the largest software firms went so far as to describe the local market as being saturated, which is almost certainly an overstatement.

This picture represents a story with both positive and negative features. On the positive side the burgeoning local market has allowed the entry and specialisation over the past few years of around 4-5 competent software houses. They have cut their teeth on, and been funded by the requirements of local users. However on the negative side this is reflected in a gradual saturation of the market for locally written software with increasing pressures on the local sector to venture into the very competitive foreign markets.

3.5. The Telecommunications Sector

The fundamental underpinning of the trend towards convergence noted in an earlier section arose from the fact that the same technology can be utilised for both processing and transmitting information. Since information is becoming an increasingly important constituent of production - especially in the knowledge-intensive sector - the

telecommunications industry has become a vital part of modern industrial strategies. The barriers to entry in the production of this technology are enormous - in the region of \$1bn to develop a switch and a further \$100m annually to update it. So it is clearly not possible for any Cypriot firm to enter the industry as a supplier. But what is vital is the provision of modern telecommunication services which are pervasive, give reliable access to a wide variety of countries, are appropriately priced and provide the technical capability to switch information around internationally, both in written and verbal forms.

The Cyprus Telecommunications Authority (CYTA) has performed admirably in the post-invasion period. After struggling to catch-up with the growing demand for lines as the population was resettled, in 1985 CYTA was, for the first time, able to reduce the number of applications awaiting installation. The waiting list for telexes had already reached its apex a year earlier. At the same time the quality of services had been consistently improved with the proportion of conversation handled by automatic exchanges rising from 91.5 to 95.3 percent between 1981 and 1985. The total number of conversation-minutes almost doubled between 1980 and 1985 (Table 9), showing a consistent increase in phone-utilisation. International calls accounted for just over two-thirds of total phone-utilisation, although this proportion has fallen slightly between 1981 and 1985. Data-flows have also been improved with a total of 388 modems being installed by the end of 1985.

In the light of these achievements it might seem churlish to list some of the criticisms made of the authority by many of its users, but since it is such a key infrastructural technology it is important that its strengths and weaknesses be known. The major complaints registered during the course of our conversations were as follows

- (a) Costs on international calls are too high. (CYTA responds by pointing out that the 20 percent tax on these calls was imposed by the government and not itself).

- (b) Foreign calls are often interrupted and have to be redialed. This is especially the case on calls to the Gulf.

- (c) Difficulty is experienced in getting through to Cyprus from abroad.

- (d) There is a need to liberalise the supply of equipment to be connected to telephone lines. For example no hands-free phones are allowed and devices cannot be installed to personal computers which would make them useful as telex machines.

- (e) The administration of the telephone system is bureaucratic and it is often difficult to get requests seen to, even though the technical capability exists.

Nevertheless, despite these adverse comments, telecommunications facilities in Cyprus are superior to most of those in the region. A survey of 23 offshore companies in fact found that satisfaction in this area (an average of 4.7 on a scale of 1 to 5) was the highest for any of the factors encountered by these firms. But more important than these often petty complaints is the question of the speed with which CYTA is moving to embrace the new electronic communications technologies. Despite a number of failed deadlines the first intra-island packet-switching lines have not been opened and the first electronic switches were only installed in 1986. Nevertheless, by early 1987 32,000 lines (almost 20 percent of the total) were digital and the plan is to increase this to over 50 percent by 1990 - it is one of the advantages of smallness that it is possible to move rapidly to the adoption of new technologies. CYTA also plans to introduce cellular car-radios in 1988. So the agency remains forward thinking and, broadly speaking, does seem to be gearing itself for the needs of an Information Society.

3.6. Venture Capital in Cyprus.

The importance of the venture capital sector in the USA, the UK and other industrially advanced countries was highlighted in Section 2 describing developments in knowledge-intensive sectors of the global economy. In our interviews in Cyprus some respondents argued that given the absence of an overall savings constraint in the economy there was no need for a venture capital sector to be created. Such a response however stands in danger of confusing the macro with the micro - what may be true for the economy as a whole may not necessarily be true for individual entrepreneurs. The relatively recent displacement of a significant number of the island's people from their historic homes has also meant that there is a sizable group of individuals who have no access to the fixed residential securities which conventional lenders require. Moreover, many of these people have shown the requisite skills required to obtain scholarships abroad (since given their displaced status their education is more likely to be based upon performance than on family-wealth) and are thus ideally suited as technology-intensive producers. Many of these points are graphically illustrated by the experience of one of the first technology-intensive manufacturing enterprises to be established on the island.

The firm was begun by two electronics engineers returning to Cyprus from abroad, one from France and the other from the USA (where, incidentally he had the right of residence). They had come from the north of the island and their families were not able to set them up in business in Cyprus, so initially both worked as salesmen of office equipment. They met whilst working for the same firm (in fact they had gone to secondary school together) and decided to go into business together. After some thought they set on the idea of designing and manufacturing electronic displays, having considered and discarded a variety of other electronics-based products. Having no resources of their own they used the government's loan scheme for unemployed graduates and borrowed £12,000, using around half to purchase component supplies (which they had to buy in minimum quantities, thereby holding excessive quantities of stock). They

applied to various banks for additional funds for product development but were hampered by the absence of security - they knew that there was absolutely no venture capital on the island. This initial problem was alleviated by one of the owner's brother-in-laws who decided to put up £3,000 for a small share of the equity.

But despite working intense hours with only minimal pay and struggling to get the product working perfectly, more funds were required to complete development. None of the banks, including the CDB, were prepared to loan them capital without either obtaining security on the loans and/or an unacceptably high share of the equity of the enterprise. At this crucial stage they were saved by the first sign of risk-taking behaviour they had encountered. One of their old school friends - also an engineering graduate - had been working for the Popular Bank and had seen their proposal for funding. He judged the two founders to be on to a good thing and to have a high level of technical competence and thus decided to leave the bank and put in £10,000, giving each of the major partners 28 percent of the equity. The firm now possessed the three requirements which would have satisfied the venture capitalists discussed in the first section of this chapter - the technology, the market (since the final output was protected by tariffs) and a strong financial manager conversant with marketing. Production has just begun in the most primitive of workshops and the cash-flow is beginning to look healthy. The enterprise is now on its feet and looks likely to survive even after the protective tariffs are reduced.

A number of relevant conclusions follow from their story. First as manufacturers of reasonably high technology products which they had designed themselves, they are probably unique in Cyprus. Second, they encountered an aversion to risk-taking, especially in relation to finance. Third, their experience proximates in many ways to that of the design engineers who were discussed earlier in this chapter. And, finally, they probably represent the tip of an iceberg since there are probably a large number of un- or underemployed graduates who find themselves in similar situation.

3.7. Existing Policy towards the Knowledge-Intensive Sector

Defining knowledge-intensity in the loose and schematic way sketched out above, it is useful to try and sketch out the policy environment which at present governs their expansion. We have already noted that there is effectively no venture capital on the island, either in the private banking system or in the Cyprus development Bank. There are three sets of government policy which relate to the knowledge-intensive sector and which could be seen as incentives for its expansion.

The first of these relates to the Ministry of Commerce and Industry's ability to provide a 10 year tax holiday for all investments which produce new products. This however does not relate specifically to the knowledge-intensive sector and as presently framed probably acts as something of a disincentive as it only relates to manufacturing rather than to the provision of services. The second set of potentially relevant policies relates to the capital and accelerated depreciation allowances. Again this is not specific to the knowledge-intensive sector and relates to all industry. Moreover, insofar as these new industries make intensive use of human rather than physical capital, they are if anything discriminated against rather than encouraged. The third and final potentially relevant set of policies towards the knowledge-intensive sector is that attempting to attract the offshore firms, that is, trying to make Cyprus into a locale for regional coordination. The attractions of these policies are substantial and have indeed led to the location in the island of a number of offshore firms of this type. They employ professionals, utilise the telecommunication system intensively and have significant linkages with many of the island's business services firms. Yet, once again, the extent to which knowledge-intensive firms have been favoured by these policies is almost accidental since the policy itself is aimed at a wider target of foreign capital in general.

We therefore conclude that there is little evidence that the Cyprus government has recognised the importance of this sector's potential

contribution to the economy or of the importance of technology-intensive activities within existing sectors. It is therefore necessary to recognise the need for a strategy which emphasises dynamic comparative advantage. Yet, as we have seen from the experience of other countries, it is only when these have been fully integrated into the thrust of government strategy that sustained economic growth can be assured. It is for this reason, therefore, that our attention turns to the mapping out of a strategy for the expansion of the knowledge-intensive sector in Cyprus.

IV

A STRATEGY FOR THE KNOWLEDGE-INTENSIVE SECTOR IN CYPRUS

Providing a coherent industrial strategy for the knowledge-intensive sector involves a different procedure and generates different types of problems to those arising in strategy formulation in other sectors. Thus, for example, defining a path for the garments industry is clear-cut. It is possible to work with existing firms who can be encouraged to collaborate where this is appropriate. The problems of the industry are widely-known, some of the new equipment is already on the island and it is possible to establish clear opportunities for product development in the short run.

The knowledge-intensive sector differs from this picture in a number of important ways. In the first place the time horizons involved are considerably longer. For example when we sketch out a strategy for the application of biotechnology, we will point to the need to make long-term investments in high-level training; it will be the mid 1990s before the PhDs have returned and passed through the apprenticeship of practical experience. Another characteristic of this sector is that it is heterogeneous. In time, and with luck and careful planning, some of the identified areas might become a focal point for growth, becoming sectors in themselves. Thus while it might make sense to group the embryonic activities together in a single sectoral grouping at the early stages in their development, it will, metaphorically speaking, often be a matter of combining apples and oranges rather than producing a single crop. A further characteristic feature of the knowledge-intensive sector is that many of the emerging specialities cut across existing sectors and institutions. In part this is due to the systemic features of modern technological progress (as in the case of the pumping-system strategy mapped out below), but it also reflects a much wider phenomenon in which it is the common concern with information in a particular area which leads to specialisation (as in the water strategy outlined below). Finally, although the development of this sector offers

major opportunities, it is fraught with uncertainty - hence the significance of venture capital in its development in other countries.

For these and other reasons it is important to treat the identified knowledge-intensive areas for specialisation in a tentative light. They are merely suggestions of areas which bear looking at, based upon discussions with Cypriot residents and a knowledge of what is occurring abroad. There can of course be no substitute for a more detailed investigation by experts in each of these areas, integrated with coordinated strategic thinking within the Cyprus economy.

Four key principles underlie the formulation of a strategy which is designed to develop not only the knowledge-intensive sectors themselves, but also the utilisation of knowledge-intensive technologies and procedures in other sectors. The first of these concerns the type of policy intervention which is proposed. In manufacturing industries these have traditionally been geared towards the manufacture of commodities and involve incentives to purchase capital equipment, to encourage the development of manual skills and to protect local producers against imports. Few of these measures are relevant to this sector. Instead of a physical infrastructure for the production and transport of goods, the knowledge-intensive industries require a knowledge-intensive infrastructure. This means a continuous investment in people which may be more important than that in physical capital. It requires public support for research and development as well as institutions which encourage interaction between highly skilled individuals and groups. It requires a corporate philosophy which recognises the importance of indirect inputs into production, especially those concerned with specialised information. And it also requires the develop of an informational infrastructure - sometimes referred to as the "highways of the future" - if the intranational and international synergies offered by the convergent technologies are to be captured.

The second principle underlying the development of strategy towards the knowledge-intensive sector concerns market orientation. It is possible to identify four broad marketing strategies - the home market, the regional market (the Eastern Mediterranean basin, the Middle East and the Gulf States), the EEC and the rest of the world. In this context it is important to note that Cyprus' two main neighbouring rivals in knowledge-intensive activities - Israel and the Lebanon - are effectively debarred from much of the regional market. Therefore the major target for exports in the short-to-medium run is considered to be the regional market, in some cases distinguishing between the Eastern Mediterranean and the Gulf markets. However, based upon the experience of other exporters of knowledge-intensive services, it is difficult to envisage such a strategy succeeding without its prior development in the home market. The strategies proposed for the various knowledge-intensive industries are therefore first pitched at the home market and then at the regional market.

The third principle underlying the future development of this sector concerns the importance of education and training. Human resources lie at the centre of this sector's operations and these require targetted interventions to ensure the long-term development of relevant skills. In some cases this will require the reinforcement of training facilities on the island, as is suggested in the case of the other sectors included in this Industrial Strategy. But the knowledge-intensive sector requires additional investment in much higher level skills than can be provided on the island and this will also require attention to be given to the direction of students studying abroad, to their subsequent reintegration into the economy and to the maintenance of ongoing contacts with relevant foreign research bodies.

The final principle underlying strategy-formulation in this sector concerns the question of monitoring performance. The growth of knowledge-intensive activities depends critically upon developments in these industries in the global economy. Precisely because the technologies utilised are at the edge of the global knowledge-

frontier it is particularly important to keep abreast of global developments, not just to monitor their progress and direction, but also to ensure that the evolving Cypriot strategy is appropriately focussed. Few of the relevant monitoring capabilities will be available on an island economy with a small population such as Cyprus, despite its relative depth in education. Therefore, where relevant, a series of monitoring programmes are recommended, allied to the selective identification of market niche's by a combination of local and foreign consultants.

In Section 2 we considered four areas of development in the global economy which are relevant to the knowledge-intensive sector. These were information technology and the growth of the new service industries; microelectronics, automation and the importance of systems in production; post-microelectronics technological developments; and the development of risk-based venture capital. (Naturally these four sets of issues are not exclusive - for example, enterprises may often both utilise electronics-based systemic automation technologies and be risky at the same time). The strategy which is outlined below follows the same basic classification except that some of the anticipated sectoral specialisations will naturally cut across these four categories.

4.1. Information Technology and the New Service Industries.

As was evident in Section 3 discussing the knowledge-intensive sector in Cyprus, the island is well-served with respect to the service sector in general and to Business Services in particular. The primary function of the strategy suggested for this sector is therefore to facilitate its external operations, especially in the regional market. This suggests the adoption of proposals geared towards the development of specific components of this sector. These include two Professional Services which are already to be found on the island (computer software and the offshore sector) and two which require relatively new activities (water management and energy services)

4.1.1. The Professional Services Sector

In an earlier section of this chapter (see Table 5) we observed that the Business Service Sector consists of five major areas of professional services - legal services; accounting, auditing and bookkeeping; data processing; engineering, architecture and technical services; and advertising and market research. Some of these were incorporated within Cypriot firms whilst others are located in the offshore sector.

Cyprus is well-served in all of these areas of service activity and in some cases - notably civil engineering and market research - it has performed admirably, especially in the adjacent regions of the near east and Africa. As we observed earlier, the prerequisite for success in these service sectors is that the exporting firms should have operating offices in these regional markets.

In all of these sub-sectors - with the possible exception of computer software - the domestic market is well-served and indeed most of the offshore firms interviewed remarked spontaneously upon the high calibre of the Business Service sector in Cyprus. In the main they were referring here to the accounting and legal professions. But the Business Service sector in Cyprus is often also highly competitive. This is especially the case in the civil engineering market where there are increasing signs of structural unemployment of highly qualified people. It has also become a problem in recent years for the computer software industry, despite some years of rapid growth (see earlier discussion). The problem therefore is that for the share of this knowledge-intensive sector to increase, it will be necessary to identify foreign markets.

This is not easy. The construction and civil engineering markets in the region have proved to be a disaster area in recent years.¹⁹ They have fallen in aggregate and have also become considerably more competitive in nature. The prospects for the legal services sector

are also somewhat gloomy since both the local and regional markets are in general well-served. Moreover regional market tend to be particularistic and local offices are almost certainly a necessity. Accounting services on the island are similarly well-developed, but more importantly, this is a sector in which the international consortia have come to be dominant. These consortia operate by establishing partnerships with the best local firms who are then prohibited by agreement from opening offices in other countries in which the international consortia have established similar agreements. So precisely those firms which have the technical capacity to operate in foreign markets are excluded from exporting services. The advertising and market research sector is well-established overseas and the existing firms are almost certainly able to take advantage of new opportunities which may arise without the need to establish a sectoral strategy on their behalf.

At the strategic-planning level, therefore, this suggests the opportunity for only two policy initiatives. The first is based upon a local technical capability - computer software - and the second arises in relation to the offshore sector.

(a) Computer Software

We have already surveyed the development and growing maturity of the Cyprus software sector. To recap briefly, it is one in which computer diffusion is widespread, in sharp contrast to the laggardly-uptake of computerised equipment in the manufacturing industries. This predominantly applies to the private sector, however, and the computerisation of government activities remains slight. The rate of growth of the market for computer software is beginning to tail-off, however, and a similar phenomenon is occurring with respect to the software industry. However in its earlier stages the local market was sufficiently large to allow for the development of 3-4 software firms which although small by global standards, were able to develop certain niches in the market. Some of these software packages were

specific to the needs of particular local users, but others had generic applications in other firms and sectors.

On the basis of this synergistic relationship between local users, imported hardware and local software firms, two or three software firms have begun to venture abroad. One has built up a large proportion of its turnover in the Gulf and Middle East, predominantly in the hotel sector. Whilst it claims to be maintaining its market share, it suffers from the general decline in infrastructural investment in the region. Consequently it is beginning to look to wider horizons, notably in Europe. Another firm made a series of software sales to West Africa - selling to, and through, the expatriate Cypriot community - but the foreign exchange problems in these markets have also led it to consider sales to Europe. A third firm is on the verge of selling specialised business software to a British client, based on expatriate contacts in the UK.

Three important strands stand out in this story. First the local market is both slowing and becoming competitive so domestic firms are being forced to turn to external markets for growth (and probably also for profits). Second, the declining market for hotel-based software in the Gulf states is forcing a reorientation to South Eastern Europe (especially Greece), and, third, the expatriate community provides an important transmission belt for sales. We can add to this a fourth factor, which is that in the same way that proximity to local users was key to the development of the local software industry, so personal contacts with potential users are vital. Thus either customers are obtained on a word-of-mouth basis, or carefully targeted marketing is essential. Generic software advertising for software firms as small as those in Cyprus is uneconomic.

All this suggests the adoption of a twofold strategy in this sector. The first concerns the development of a "Greek strategy" to the software industry. The logic is as follows. Many users of software see it as an extension of the written word, and indeed of language in

general. It provides many of the same functions, including not only the storing of information, but the hiding of information. This latter characteristic is often an important attribute for business in general, and expatriate communities in particular. Moreover, the linguistic roots which Cyprus can touch are much larger than that of the island's own expatriate population, and the Greek motherland is, relatively speaking, undereducated. Therefore a unique opportunity is opened of addressing this Greek-based market, beginning in Greece itself but then targeting expatriate communities in other countries. This will require the translation of existing software into Greek, a process which has already begun in at least one of the Cypriot software firms.

The major problem in this Greek-based strategy is not its identification - since there are people on the island who have recognised the same opportunity - but that of selective marketing. This can be extremely expensive for a small firm for, as one of them related, the cost of flying to Athens and then spending three days trying to generate industry contacts is too expensive for a small firms. Therefore the Export Promotion Council should also make its facilities available to the software industry. This should take the form of identifying sectors in Greece and particular expatriate communities and in assisting Cypriot firms to market their services in a comprehensive manner. This latter point arises because the small number of local firms already compete in the local market and are seemingly unable to pool their marketing resources spontaneously. Some form of coordination is essential, and if this is linked through some combination of subsidies and firm-contribution (as has been suggested in other knowledge-intensive sectors), it is more likely to be successful.

A second aspect of the software strategy relates to the computerisation of the state sector. Whilst in some cases computerisation is well-advanced and effective (eg information on the offshore sector), in many of its divisions there is little evidence of the new technology, despite the fact that it is becoming mandatory in activities where accurate and up-to-date data is required at short

notice. This is especially important in parts of the state which deal with international matters, such as trade and communication. But given that many of the state's services are indirect inputs into production, high cost and poor quality make international competitiveness difficult for other sectors.²⁰

Examples of the usefulness of such computerisation are easily found. The Planning Bureau's macro-economic model has to be restricted in scope because of insufficient computing capacity; because of the absence of suitable information technology there has been a tendency not to coordinate applications for the offshore sector (even though the data base on the firms themselves is computerised). It is also possible that if effectively computerised, some of the software can be marketed abroad, particularly to other countries which have similar policies to Cyprus (as in the case of exchange control).

(b) The Offshore Sector

Another possible extension of the business service sector is that in the general area of international communications. The most important existing component of this sector are the offshore enterprises. Cyprus already has a large number of attractions to offshore firms. Its tax regime is very liberal²¹ and it is well-placed internationally. The availability of good business infrastructure and skilled labour is also advantageous. As a consequence a number of foreign firms have begun to locate their operations in Cyprus. The policy question is what can be done to expand the number of these firms and to ensure that the linkages which are created are maximised and advantageous to the local economy?

One of the interesting features of the restrictions placed upon the Cypriot accounting industry by virtue of its international links is the inability to operate abroad. This has led to a market response by one of the largest accounting firms to induce foreign firms to locate in Cyprus as a way of circumventing these restrictions - if

you cannot go to the market, bring the industry to your own territory. This has led them to actively market the attractions of Cyprus abroad and given this, there does not seem much need for the government to become actively involved in this process of marketing. Instead the government can usefully undertake two major sets of policies.

The first is to ensure that Cyprus maintains a continual investment in communications infrastructure, especially those which focus upon the transmission of knowledge. Thus the first priority should be to ensure that the telecommunications sector is encouraged to invest in the latest technology and to keep ahead of future developments such as ISN (integrated services network) and ISDN (integrated services digital networks,²² which is widely believed to be essential for sophisticated transmission of data). It also involves the enhancing of international telephone services where, despite major improvements, calls to the Gulf and to Europe are often disrupted. Attention should also be placed upon the frequency and destination of air-connections, where there may be some need to make marginal improvements despite the fact that Cyprus is reasonably well-served already.

As important as though these infrastructural improvements are - facilitating not just the location of offshore firms, but also expanding the spin-off - a much more important role for government is that of regulation. The problem of controlling an inherently mobile sector is problematic and there are indeed some who might argue that it is the very absence of control which leads to the location of offshore firms in Cyprus. But this is to ignore the differentiated nature of these offshore firms. The following extracts from a recent edition of the premium business-newspaper in Europe illustrates some of these undesirable tendencies.

"Shares' sting that netted £100m"

It has become the largest fraud to have been exposed in the past half-century, according to international regulators.

The high-pressure telephone selling of shares of negligible value at massively inflated prices is estimated to have caused small investors around the world losses of £200m in 1985 alone.

One of the two largest operators...was shut down by the Dutch authorities last spring and [the] managing director was subsequently arrested.

After three attempts on [the managing director's] life by underworld figures [in Canada] - the last led to the blowing up of his car - [the managing director] decided to diversify overseas.

...He is now also linked with companies in Panama and Cyprus..." (Financial Times, 31 January 1987.)

Cyprus - aiming at high value added service operations of international credibility - cannot afford to allow this sort of enterprise to locate on the island. It is not merely that the image of cars blowing up is politically disruptive, but more importantly that it is bad business, especially in the long run. The dubious operators are fly-by-night and are prone to moving to other locations with little notice.²³ It is also likely to make the more respectable firms in this sector less likely to locate in Cyprus. Therefore some form of regulatory mechanism ought to be instituted or the existing one in the Central Bank needs to be improved. Since a number of local accounting firms are aware of these problems, they too should be incorporated into this regulatory system.

A further minor aspect of offshore activity - a complaint of one of the largest firms - tears some attention and relates to the tendency to govern this sector through a bewildering series of minor regulations issued by the tax-office, customs and excise, Central

Bank, and so on. Instead of this a unified legal code might be introduced which sets out these issues in a clear manner. Failing this a "one-stop shopping" office should be established where prospective offshore firms can determine the full range of opportunities and responsibilities.

Another sector taking advantage of a combination of Cyprus' geographical location and its relatively strong international communications is that of international journalism and international conferences. Both thrive on proximity to a relatively hostile zone for foreign personnel and on the island's relative tranquility. Much already exists in this area of activity and has seen some success in the location of some journalists and the utilisation of local conference facilities by TNCs for their regional subsidiaries. The policy interventions required here are marginal, with particular emphasis placed upon the marketing of the island's attractions. But it reinforces the necessity of ensuring that both the telecommunications and the international air-connections are maintained at the highest standards.

4.1.2. A Strategy for Water Management

It is in the nature of island economies that water is a constraint, especially in relatively arid or mediterranean climatic regions. To some extent the severity of this constraint diminishes with size, and the fact that Cyprus is the third largest island in the Mediterranean has meant that, relatively speaking, the problem of water availability is manageable. Nevertheless over the years the agricultural sector has had to grapple with the problem of water supplies. This became especially important after 1974 when the agricultural sector found itself relying totally on rain-fed systems.

The response was to greatly expand the resources put into both water collection and water management. For a small economy such as Cyprus - especially for one attempting to replace lost infrastructure such

as ports and airports - the expenditures involved have been enormous. Fig 8 illustrates that for much of the past 12 years water development took a significant share of total government development expenditure, culminating in 1986 with a share exceeding 40 percent. Much of this - as in the South Conveyor Scheme - involves scarce foreign exchange, some of which is provided through foreign aid.

Whilst these investments had a high cost in budgetary terms and at times probably also impinged upon investment in other sectors,²⁴ they were not without benefit. Cyprus will soon have a well-developed system of irrigation which places the agricultural sector advantageously in competing with other southern European producers who face a much more severe water constraint. The development of this irrigation infrastructure also provided an important multiplier effect and helped to maintain a high level of economic activity, especially in the early 1980s when some of the export markets began their downturn. In doing so it led to the development of a local technological capability which now opens opportunities for the sale of these services abroad. The fact that the major investments in Cyprus are now complete lends an added importance to our suggested strategy of trying to market water development services in external markets.

The context in which this strategy is identified is largely regional, although it does also reflect import technological characteristics. The locational opportunities are clear in relation to the Middle East and Gulf region in which the water constraint is very severe. The fact that the major potential supplier of services (Israel) is disbarred from the region for political reasons only serves to emphasize the gap which exists. Moreover if the wider region is considered - that is sub-saharan Africa - then the opportunities become magnified. This region has been gripped by drought for some time, is becoming the focus for global aid-concentration and irrigation is being forced on to the agenda by the inability of many African countries to feed their populations. The technological factor putting water development more clearly on to the policy agenda in many countries is the growing scientisation of agriculture, of

which biotechnology is a major component. The consequence of this is that agriculture is increasingly coming to take on the characteristics of manufacturing - weather is becoming less important (through irrigation and environmental control through greenhouses), as is the importance of marginal lands (through the development of new seed varieties). The net effect is to reduce the variability of agricultural production over time and over space and for this to proceed, the careful control over water is key.

This control over water has many aspects to it. It includes the hydrological identification of water-resources in both surface and ground deposits. These water deposits have to be controlled and marshalled; they also have to be transferred to areas in which they can be of use. Making effective use involves discriminating application. Consequently, because both infrastructural investments and utilisation patterns are involved, the control of water fits closely into the previously identified trend towards "lifetime cost" considerations in investment decisions. But perhaps most important of all is the significance of getting the whole system in balance, so that bottlenecks at one point do not clog up the complete cycle.

Cyprus has a great deal to offer in this integrated picture of water management. The Water Development Department has had extensive experience in the identification of resources and the design of dams and irrigation infrastructure. Its Director is on the Board of the Mediterranean Water Institute in southern France and many of its staff have been offered short and long term contracts abroad. At the construction end Cyprus possesses one of the worlds largest construction companies with extensive experience in the region. Its past concentration on building is threatened, however, by the virtual collapse of these projects in the Middle East and Gulf so it, too, is looking for new areas of specialisation. In regard to water management the ARI has built up an international reputation threatened locally only by the Israelis who are barred from many of the potential markets. Cyprus also possesses three firms with a long history of exporting water pumps precisely to those regions which now suggest themselves as markets for water management. In addition to

these existing capabilities it is likely that in the medium term a number of other Cypriot firms will develop relevant expertise and products and even that some of the existing firms may expand their operations. What is significant about this water management capability is that it covers the supply of both professional services and manufactured outputs, confirming our earlier observation that we are witnessing a breakdown of the conventional barriers separating sectors - the emphasis is on the system.

So the opportunity exists for putting together a package of services and marketing them in the Gulf region and Africa. Curiously, despite these clear opportunities, one of the major constraints in the past has been institutional rather than technological. The government of Cyprus - for good reasons anxious to ensure that domestic needs are met first - has made it difficult to meet demand for these services in the region by putting severe obstacles in the way of government officials working abroad. All requests have to be directed to the Council of Ministers for approval, even when the officers concerned have leave in hand. They are also limited to one year abroad with no possibility of renewal.

The first and easy response to this institutional blockage would be to relax these constraints on government officials working abroad. It should be possible to expand the opportunities for state officials to work abroad, thereby simultaneously providing foreign exchange revenue and reducing domestic graduate unemployment by recruiting a pool of technical skills to take the place of those undertaking consultancy.²⁵ But this is only a partial response to a more substantive opportunity which should instead be confronted in a more determined manner. We are proposing therefore that a Water Management Agency be established to seek out these foreign opportunities and to coordinate inputs from all the relevant Cypriot parties - the Water Development Dept, the construction industry, the machinery manufacturers, the ARI and the Ministry of Agriculture. Its task should be to offer systemic services to clients, incorporating all of the elements of water management sketched out above.

The Water Management Agency should be an independent body with its own budget. In the first year its funding should be 80 percent government and 20 percent industry, falling progressively to 20 percent government and 20 percent industry in the fifth year with the remainder being self-financed. The point of this form of financing would be

- to stimulate response by industry in the early years by heavily subsidising initial costs
- to maintain state finance in the medium term so that the government retains a vested interest in ensuring that the system works and to allow it to ensure that domestic needs are also being catered for
- to maintain a long-term role for industry finance to ensure that the needs of many producers are kept in mind
- to ultimately make the institution work for a large proportion of its money to avoid bureaucracy and inefficiency.

There are a number of factors which suggest that this would be an opportune time to set this policy initiative in motion. In the first place some of the major water development projects will begin tailoring-off in three years time and by 1992 most of the large schemes will have been executed. A highly qualified and experienced staff will therefore be underemployed. A second positive feature is the collapse of the building-construction market in the Middle east and the Gulf which has led the largest Cypriot construction firm to actively seek out new opportunities. Thirdly, the pump-manufacturing market is becoming more competitive and in line with the flexible specialisation strategy underlying this report, the existing manufacturers are being encouraged to move into higher value-added niches which include pumping systems and micro-hydro plants.

The major disadvantage facing this strategy concerns the foreign exchange and budgetary constraints in many of the potential markets, especially in sub-saharan Africa. This means that in some cases systems-designers and contractors who are linked to aid agencies and concessionary forms of finance are favoured. How significant an obstacle this might be to a Cypriot consortium is unclear but it might be necessary in the future for this Water Management Agency to provide concessionary finance on terms similar to that provided by competitors. To be set against this is the fact that a water management capability of the sort we are suggesting - covering the full spectrum of activities - is relatively new and as yet the market is probably not very competitive.

4.1.3. Energy Services and Products

Since the early 1980s the government has begun to take active steps to try and reduce energy utilisation on the island. The context is one in which the World Bank has offered programme support in allowing the economy to respond to the series of increases in oil costs. The drop in oil-prices in recent years has not led to a reduction in effort since clear opportunities for cost reduction have been identified and there is widespread expectation that oil-prices will resume their growth in the early 1990s.

A number of possible ways exist to reduce the cost of oil to the economy. These include the development of a variety of renewable energy devices. Foremost amongst these are solar water heaters in which Cyprus has hitherto excelled. Local manufacturers rapidly copied the innovating Israeli firms in the 1960s and Cyprus now has the highest rate of penetration of any country in the world. This accounts for more than 90 percent of all individual houses (excluding apartments, hotels and office blocks where the penetration is lower) and amounts to a saving of just over 9 percent of all electricity demand. But the potential exists for other types of renewable devices of which wind-power is probably the most commercially attractive. Other possibilities such as mini-hydro, bio-gas and (in

the longer run) solar ponds also suggest possibilities for energy substitution.

However, attractive as though the renewable energy prospects may be, these opportunities are dwarfed by the potential savings to be realised from energy conservation. A recent study (undertaken by a joint French-Cypriot team) estimated that given the progress already made in the installation of SWH's, the likely savings between 1984-88 from energy conservation would be almost 100 times that arising from renewables. More specifically, whereas it was anticipated that renewable energy would yield some \$0.7m, the likely savings arising from energy conservation would be \$68m, with a further \$14m being generated by the conversion of oil burners to coal.

This observation is not confined to Cyprus. In the US the market for energy conservation services rose from \$5m in 1981 to over \$400m in 1985 and it is estimated that the potential European market for these services could eventually be in the region of \$52bn. What is significant and what creates the opportunity for Cypriot firms in this area is that the energy conservation industry is a new one. The US, as the figures above show, has only just moved into the area and in Europe there exist only about 10 serious energy conservation companies.²⁶

A number of sectors have been identified as providing large returns to energy conservation, grouped into those using high temperature processes (the refinery, the cement industry, the brick industry, the mining sector and the fertiliser industry), those in which electricity is the major source of energy (engineering, garments, footwear and construction) and those in which electricity and low pressure steam are involved (food, beverages and bleaching and dyeing). Of these 60 percent of the gains are to be derived from the two cement plants, one of which is still using the outdated semi-wet process. The rest of the gains will be fairly evenly spread throughout industry and will arise from a combination of improvements in daily operations²⁷ and new investments.

The response to these various initiatives concerning renewable energy has been to establish a new Applied Renewable Energy Centre (AREC) under the aegis of the Ministry of Commerce and Industry. This is currently being built at the HTI, involving some funding from the World Bank. AREC will have a number of functions which will include the assessment of renewable technologies, the suggestion of incentives to encourage use, the dissemination of information, the promotion of R&D and the arbiter of standards.

The idea behind this centre - backed by a report of admirable competence - is sound. It suffers however from two major disadvantages. In the first place there is an element of window-dressing in the new AREC, since its staffing will be rather similar to the existing team in the MCI with only one or two engineers to be added to the present establishment of 6, and a further 3 technicians to be recruited. Second, because it is in the civil service it faces some constraints on the flexibility of its operations. For example, in the case of SWH's there is a long history of debate on the island about the question of quality of insulation. But as yet the AREC has no clear plans of mechanisms which might be used to either induce or actually force local manufacturers to adopt these higher standards.

Nevertheless there does exist a climate of awareness concerning the potential savings and the embryo of an executing agency. What is required are steps to refocus efforts to incorporate the export of services, to force an increase in the pace of change and upgrade the technological expertise which is being devoted to these activities. Thus for a coherent strategy to emerge - and one which will permit the sale of technological capability abroad - we believe that five major sets of changes will be required. These are

- (a) The AREC centre is too modest; the additional two engineers and three technicians will only begin to touch the problem. Therefore the following two steps are proposed. First, an agreement should be reached with two of the foremost renewable energy institutions in the world, one in Israel (which has both

great expertise and similar environmental conditions) and one probably in the USA. For an annual retainer - say of \$30,000 - AREC should be provided with an annual state of the art report on developments in the renewable energy field, or a selected subset of these (perhaps solar energy). Second, and linked to these two institutions, the government should send postgraduate students to these same institutions for study. Use can be made of the scholarships available to the Government to focus educational development in this manner. It should also be possible to send technicians or faculty from the HTI to the same institutions for sabbaticals so that they can keep up with the state of the art in their fields.

(b) The present Management Committee of AREC is as follows

Director general, MCI

Head, Energy Services, MCI

Project Manager, AREC

Director, HTI

Director, ARI

Head, Meteorological Services, Min of Agric and Min Resources

Director, Electro-Mechanical Services, Min of Com and Works

Director, Dept of Town Planning and Housing

Representative of Planning Bureau

Representative, Electricity Authority.

None of these are drawn from the industrial sector. This is key since the underlying premise to our policy proposals is to force AREC to develop a symbiotic relationship with industry. So, coupled with the suggestions on financing (see below), it is proposed that representatives of user-industries be added to the Management Committee of AREC.

(c) AREC should begin to function as a Consulting Agency on Energy Conservation, with a financial package similar to that proposed above for the Water Management Agency. Initial funding should be 80 percent government and 20 percent industry, with the

shares falling to 20:20 after five years and the rest being self-financed. For its contributions, participating industry should be allowed preferential access (say at reduced consulting fees) - this will induce them to participate. Once the Consulting Agency has cut its teeth on meeting the needs of local industry, it should be induced to begin to sell its services abroad to the region. The fact that the gains from conservation so significantly outweigh those from new technologies in Cyprus suggests that in the less-sophisticated regional enterprises, energy utilisation will characteristically be even more inefficient.

(d) The R&D functions of AREC are complementary but largely separate from those concerning conservation. A special budget should be provided which will facilitate this R&D. In the early years this will require the purchase of equipment (as is already intended in a modest way in the existing proposal where, for example, a supermini computer will be purchased). But later it will require collaboration with industry. In order to induce industry to invest in R&D, some mechanism should be established whereby in the early years, this will be subsidised. Every attempt should be made to emphasise the developmental aspects of R&D and to prohibit the establishment of the 'British syndrome' where technological capabilities of excellence remain in the laboratory.

(e) There exists a market for the export of Cypriot made energy-related equipment. The obvious example is that of SWHs, but it is also recommended diversification into micro-hydro. In addition other possibilities are likely to emerge (for example evacuated solar collectors and sophisticated greenhouse controls), especially when the postgraduates begin to return from studying abroad. The problem with the existing producers - common as we have seen to all manufacturing sectors in Cyprus - is the low emphasis given to quality. Therefore AREC should reinforce its intended role of certifying quality standards, and in order to induce local firms to collaborate, this should

be linked to assistance with export-marketing provided by the Export Promotion Organisation. In this case assistance will only be given with external marketing if certified quality standards are met - in time this can embrace differential standards being linked to differential subsidies on export promotion.

4.2. Microelectronics, Automation and Systems in Production.

It is possible to differentiate the manufacturing sector in terms of firms utilising predominantly local technology and those depending upon foreign technology. This is an important distinction since very different - albeit not necessarily exclusive - policy proposals flow from the decision to focus attention on strategies designed to transfer technology and those aiming to develop local technological capability. For example, one possibility suggesting itself to the knowledge-intensive sector in Cyprus is that adopted by one of the most successful techno-parks in the UK to expand the transfer of high technology from the USA.

What it has done has been to target a number of science/techno parks in the USA, especially those outside of the traditional mainstream. Thus the silicon-valley area is excluded as are the science parks surrounding Boston. Instead they have identified a number of major universities in north and south California and reached the following pattern of collaboration. The common type of enterprise in these science parks is high-technology based and comprises of small venture capital financed firms. Although the products which are being manufactured are often very innovative, it is in the nature of these firms that they are unable to market the output globally. Therefore the London techno-park has reached an agreement whereby a proportion of the equity of the UK venture (say 25 percent) is given to the American innovator in exchange for the technology and for exclusive marketing rights in Europe. What the American firm gains is a large and rapidly growing market which is essential if these new products are to set the standards for the industry.²⁸ What the

British firm gains is access to foreign technology at the leading edge. The role of the London techno-park is to identify the collaborative institutions and suitable technologies in the US and to link these together with budding entrepreneurs in the UK, most of whom are highly educated.

We have considered the possibility of recommending this type of approach in Cyprus, but after careful thought have rejected the idea. The major reason is that for this strategy to work two critical factors are required. The first is a large local market in which the enterprise can establish its operations before launching into Europe. This is because marketing costs in Europe are high (especially in terms of skilled labour hours) and can only be funded by initial resources generated in the local market; the same is true for adaptations which may have to be made from American to European standards. The second factor is the access to highly skilled entrepreneurs which the London techno-park manages by virtue of its links to a major polytechnic and its location in one of the intellectual capitals of Europe. Whilst Cyprus possesses a large potential group of this sort, few are in the island and a chicken-and-egg situation prevails. Without these two major inputs it is unlikely that the American partners will be prepared to utilise Cyprus as a production base for Europe.

In these circumstances it makes more sense to conceive of niches in which Cypriot technological capability exists and which can be strengthened. One potential area is that of SWHs which has been discussed above. But there are others. What we suggest is the establishment of four infrastructural/institutional policies which might be adopted to further the development of indigenous technological capability in manufacturing.

- (a) The earlier discussion of the fledgling microelectronics firm manufacturing electronic displays pointed to the potential which a local purchasing requirement would have provided to consolidate the firm's growth. Briefly, this involved the

installation (for a few thousand pounds) of a temporary electronic arrival/departure display system, pending the thorough-going modernisation of the airport. This illustrates the potential offered by the adoption of such policies.

There is in fact already a similar policy concerning the utilisation of local counterparts by foreign consultants working to government contracts. This is a useful and important policy which should be thoroughly implemented and extended in an analogous manner to the selective local purchasing of high-technology products produced in Cyprus which have reasonable expectations of meeting global standards at some date in the medium-term.

- (b) The second involves the introduction of incentives to encourage the adoption of new electronics-based technologies. Many countries have introduced policies of this sort in the recognition that this set of technologies provide key facilitating capabilities for local industry to meet the demands of global competition, and specifically to move to the flexibility required in the industrial strategy we are sketching out in this report. The UK, for example, launched a number of schemes, each geared to the adoption of a particular set of technologies such as CAD, robots and flexible manufacturing systems. The scheme was one in which feasibility reports undertaken by a government-approved list of consultants would have 50 percent of their costs subsidised; and investments in this new equipment would benefit from a further subsidy of 33 percent. A modified scheme should be introduced in Cyprus in relation to a specified list of consulting services, enabling automation technologies and services and design skills; this will also have the effect of consolidating design capability on the island and forging links between them and local industry.

Some modifications on the systems utilised in other countries are necessary though. The relative absence of a savings

constraint in Cyprus, coupled with particularly generous capital-depreciation allowances has meant that some firms have attempted to try and "buy" competitiveness by acquiring expensive equipment rather than modernising their production control and organisational frameworks. This point emerges particularly clearly in relation to inventory control in the sectoral studies in other chapters of this Industrial Strategy. Therefore it is proposed that the financial incentives be limited to the following major areas

- consulting services to establish the feasibility of utilising electronics-based automation technologies

 - design technologies

 - inventory and production control computers and software

 - selective items of hardware identified by the sectoral working groups being recommended for all of the other sectors.
- (c) There is a need for purpose-built 'intelligent' buildings of the sort which are now common in the USA and Europe. This could be combined with a sharing of some key functions and technologies which individual firms are unable to afford on their own. For example, the joint use of a computer, shared word-processing and joint purchasing of inputs to obtain low prices. Such a project would have the additional benefits of providing what economists call "external economies of agglomeration", that is of complementing each other's needs. For example, we have seen that the electronic displays firm was forced into producing its own poor quality pcb's, but there is obviously also a role to play in joint purchasing. It would also be a good idea to include a developmental role in the provision of these services

with a management geared to this end. At key points the displays firm could have benefited from sound business advice. It could also obtain help in marketing, perhaps through links with the Export Promotion Council which might establish a separate division to try and meet the marketing problems of high-tech companies. Another feature of developmental assistance might be an initial subsidy of rents.²⁹ Once a number of firms are operating using local technology, the prospects then arise of seeing what prospects arise in utilising foreign technology for sale in Cyprus and the EEC. Finally, it is probably desirable that the management of this techno-building visit similar institutions abroad before they decide on the final pattern of operation and arrangements can easily be made for some form of preliminary training in techno-park management at relatively low cost.

In addition to these institutional and infrastructural aspects of policy to encourage knowledge-intensive manufacturing enterprises, it is also advisable to consider a strategy around the development of pumping systems. To appreciate the potential for this it is necessary to go back to two aspects of global technological development considered in the first part of this chapter, namely the trend towards systemic technologies and the link between domestic and foreign markets.

Cyprus already has three major pump manufacturers, one of whom dominates. Not only do they produce for the local market but they also have a long history of export, especially to the Third World. The product being exported is a discrete piece of equipment which is generally integrated in a water delivery system by someone else. The aim of this strategy should be to deepen value added by aiming to move into the development of higher value added pumps and into the pumping system as a whole. There are a variety of opportunities which are opened in this way. An example which can be cited concerns the emergent micro-hydro technology.³⁰ The reverse-pump turbine in this is similar to the design of an existing water pump and is indeed often supplied by pump-manufacturers. But the pump itself is only

part of a larger system and has to be optimised to the design of the electricity delivery system and local demand. The principles here proximate to the broader ideas mapped out earlier in the suggestion of a Water Management Agency, incorporating the design of the whole cycle of end-use as well as the physical technology itself. The market for these micro-hydro plants is still small, in the order or around 100-150 per annum outside of China. (In China some 10,000 micro-hydro systems are installed each year). Partly because this market is still in an embryonic form no major producer dominates it and the opportunity is open for Cypriot firms to fill a vacuum in this area.

Linked to the Water Management Agency, the use of the pump-testing facility at the HTI, the prior construction of a small number of micro-hydro plants in Cyprus (which have already been identified in previous studies) and the improvement in design technology at the pump manufacturers, there is thus perhaps a real opportunity for higher value added pumping products. Once this opportunity is identified and explored, an attempt should be made to widen this strategy to incorporate other more complex pumping technologies including those for the food and chemical processing industries. Higher technology pumps and pumping systems - based upon an extension of the activities of the most substantial existing exporters of manufactured engineering goods - should thus become a focal point for development.

4.3. Preparing for the Biotechnological Revolution

In the discussion of biotechnology at the outset of this chapter on global developments in the knowledge-intensive sector, we noted that biotechnologies have been utilised for centuries, such as in the baking and brewing industries. What is new about the latest round of biotechnologies is that they are increasingly science-intensive. Another important feature of the industry - about which there is perhaps more debate - is that they it is likely to be the heartland technology of the future with a wide range of potential applications.

Any strategy of dynamic comparative advantage must take this important factor into account, especially in the planning of long-run education and R&D.

The stakes in the biotechnology industry - which is, in fact, still in its embryonic phases - are high and the entrance barriers are increasing. For example, in the seed-area the international chemical companies have begun to monopolise seed-stocks leaving little opportunity for non-chemical firms let alone the small enterprises of Cyprus. Take as an example the potato, one of the major export crops of Cyprus.

"The ubiquitous potato has immense potential for further development through the new biotechnologies, although some of the more ambitious challenges might take 20 years to bring to the market.

At present, the food industry simply selects whichever potato best matches its requirements for chips, crisps, dehydrated forms and other fast-growing convenience foods....

[A recent] study found wastages of 50 per cent in chip-making, about 70 per cent in making crisps, and more than 80 per cent in making dehydrated products.

The new techniques would tailor potatoes to provide the shape, size, flavour, texture and integrity and nutritional content appropriate to each process.

[The report] cites progress in re-engineering the tomato into fruit more valuable to the food processor..." (Financial Times 27 January 1987).

Despite the growing problems which these types of development pose for a small-island economy, there are also positive opportunities which can be grasped. Moreover, it is also important that Cyprus develops a capability to monitor relevant technological and market developments to ensure that at some future date it has the capacity to respond appropriately. In this spirit we believe that there are three major biotechnology-based niches which Cyprus could exploit. Each of these builds upon already-existing initiatives, is based upon

opportunities in the regional market, relates to skills under development on the island (especially at the ARI, the one institution of international excellence in Cyprus) and suggests a framework for the development of long-run expertise. They are marine biology, animal husbandry and fertigation.

- (a) Fish Farming. The eastern Mediterranean, for a variety of reasons which include the problem of pollution destroying much of the marine food-chain, is not a fertile producer of fish. In the case of Cyprus, for example, the local market for fish was 4,148 tonnes in 1984, of which just over one-half was imported. Moreover, were more fresh fish to be available at an attractive price, local demand would be even higher. This problem is not confined to Cyprus but affects the whole of the region, including neighbouring Greece with its large tourist population.

Commercial fishing via boats is energy-intensive and, moreover, is often unpredictable. So, in line with the general tendency for food production to become industrialised (something which we noted is likely to be reinforced with the biorevolution), fish production is also moving to a controlled environment and fish-farming is becoming increasingly important. The trend began with high value added products such as shrimps and is now moving towards more common items such as bream. The general attractions of fish-farming are of course enhanced in ecologically poor regions such as the eastern mediterranean.

There are two sets of basic skills involved in fish farming. The first is science-based and relates to the process of genetic-breeding. This is an embryonic area and the barriers to entry are not yet overwhelming. The second set of skills required are those which are of a managerial/operational type. Fish farms need round-the-year attention and is largely based upon a combination of commitment and experience.

From the environmental point of view Cyprus is not the best site for fish-breeding. Although there are suitable areas for fish farms, they are limited in number and the tourist industry competes for the best sites. But there is good quality water - a sine qua non for fish-farming - and the prospects of successful development do exist. Interestingly, the Israelis who are faced with even more substantial environmental problems, are managing to farm and export fish products, in their case aiming at the high end of the northern European consumer market. Some preliminary steps have already been taken to develop fish-farming on the island. There is already one sea water fish farm in the Akrotiri Base and the CDB has spent some time in trying to generate local partners for an expanded joint venture. The Fisheries Dept is linked into the FAO MEDRAP regional fisheries development programme and is familiar with modern developments.

Fish-farming thus represents a clear opportunity for Cyprus, especially if it makes rapid and decisive steps to start the long process of learning. With the exclusion of the Israelis from the region it is possible that the island can in time become a significant regional exporter not just of fish, but also of farming knowhow. Three major steps are required to activate this policy. The first is to go ahead with the existing fish-farming venture. The project offers an internal rate of return of 15.4 per cent and if account is taken of the longer term investment in this sector as a whole, then it clearly merits investment. The second policy implication is to invest in the training required for Cyprus to become a regional leader in this field. This will require sending managerial and operational staff to other countries for practical training as well as guiding some of the students going abroad into relevant areas of study, especially into the genetic breeding end of the educational spectrum. And, thirdly, at a future date when the first two steps have been completed, it will be necessary to develop a wider programme which includes the promotion of fish exports as well as the sale abroad of fish-farming expertise.

(b) Animal Husbandry. Cyprus has an effective capability in the general area of animal husbandry, especially in relation to animal management, nutrition and breeding. Through the ARI it is also developing expertise in the knowledge-intensive sector of reproductive physiology. This is reflected in an active market for locally-produced breeding stock, which has a much higher value added than ordinary animals destined for slaughter and consumption. In fact the island now produces around 50 percent of its breeding requirements.

Were Cyprus to have an excess supply of this breeding stock there would be little difficulty in marketing it abroad in the region. This reflects the fact that in some areas Cyprus is not far behind the global technological frontier. For example with regard to cows, the Israelis (from whom a large part of Cyprus's stock is derived) are probably the global leaders, followed by the UK and Holland. Cyprus then matches the best of the following pack. The local market is served by a combination of the private sector and the Ministry of Agriculture. Together with ARI's capabilities, this represents a good base of local knowledge to build on.

Specialisation in animal breeding therefore offers major possibilities, not just with respect to import substitution but also in relation to the exports of both live animals and breeding services. For this opportunity to be grasped a number of steps need to be taken. First, the freezing of recruitment by the ARI is a clear obstacle to progress. For the animal breeding programme to advance, additional PhD level expertise is required with respect to dairy cows, swine, poultry, sheep and goats; in addition additional technical staff will be required to back-up these researchers. Facilities will be required to enable foreign travel, and perhaps also sabbaticals by the research staff. Clearly these appointments can not be made immediately and have to be operationalised by directing study abroad in particular areas, a policy which we have suggested in other sectors. Second,

once the needs of the local market are met, a purpose-built boat will be required to transport the animals. At the moment this is one of the major obstacles to exports. Third, there will be the need to develop some form of executing agency which will market the animals and the technical services abroad. We will return to a discussion of this consulting service below.

- (c) **Fertigation.** Fertigation is an acronym derived from the words fertiliser and irrigation. It involves the controlled distribution of both inputs to individual plants ("hydroponics in the soil"). To some extent this technology has developed to meet the needs of countries which have a great scarcity of water since traditional agricultural techniques make fairly indiscriminate use of both water and fertiliser. However it also reflects a common trend which we have observed above by which agriculture is becoming increasingly industrialised. This involves the reduction of variability in output and a diminished role for geographical location.³¹

Two major technological problems face the sector. The first is to further optimise the distribution of these inputs by carefully monitoring soil, climatic and plants conditions and here the difficulties lie in the realm of sensor technologies and software. The second major problem is to develop a suite of recipes which are carefully tailored to individual environments and crops and the ARI is now turning its attention to citrus. Together with Israel and Southern California, Cyprus is amongst the world leaders in this technology, especially with respect to horticulture.

The virtue of choosing this sector as a niche for specialisation should be clear. There already exists local capability; it lies in the knowledge intensive high value added domain of flexible specialisation; the technology is utilised locally; there is spin-off to local industry (plastic

irrigation pipes and computer software); and there is a ready market abroad which is not monopolised by external producers. But for such a strategy to function effectively the following steps will be required. First there is the need for expanding the research cadre - the ARI, which is aware of the opportunities in this sector has identified plant nutrition and soil fertility (PhD level with backing technicians) as areas for further specialisation. As in other areas this will require guiding postgraduate studies abroad, with sabbaticals and foreign visits by research staff. Second, there is an immediate potential for a productive link between the ARI, one or more of the local software houses and the firm manufacturing electronic displays. This would lead to the further development of sensing technologies and software enabling the optimisation of inputs to the plants.³² Third, one of the problems of utilising local inputs is the poor quality of much of the plastic piping used in irrigation systems. Quality standards should therefore be set and, as in the case of SWHs, access to subsidised export marketing should be linked to the attainment of certified standards. And, finally, a consulting capability should be established to promote the export of fertigation technology and knowhow, similar to and linked with the animal breeding programme discussed above.

In these latter two areas of specialisation - animal breeding and fertigation - the ARI has a critical role to play. As noted above, it is constrained in this by a freezing of recruitment as part of a general ban on all further government employment. However it is also constrained by the same problem facing the Water Development Dept and other government agencies, notably the great difficulty found in allowing staff officers to work abroad. This is an especially great problem for the ARI since its staff is in great demand for foreign assignments. These assignments would contribute to the island's balance of payments and would also generate useful experience and thus reinforce Cyprus's technological strength. As in the case of the proposed Water Management Agency and AREC we believe that these problems could be resolved to a large extent by developing a

consulting capability which would lead the ARI to generate some of its own income by selling its institutional services, initially within Cyprus and subsequently in external markets. A formula could be developed in which government funding is important in the early years, is maintained at a moderate level (say 20 per cent) once the service is established and is partly financed by local industry (in this case perhaps to include plant breeders, plastics producers and software houses). As in the case of the Water Management Agency and AREC it is essential that the consulting group should work normal business hours rather than government hours, partly to move from a civil service mentality and partly to fit in with the working hours of its domestic and foreign clientele.

4.4. Venture Capital

We have already documented the absence of venture capital on the island, whilst at the same time noting the important role played by this sector in other countries' knowledge-intensive industries. The relative abundance of capital on the island should not be confused with its uneven distribution and there is clearly some role to be played by the provision of such funds.

It would appear that left to their own devices the commercial banks will be reluctant to introduce such loan facilities. Given the CDB's performance-requirements, it too is reluctant to lend funds without good security, although it is aware of the potential for this type of loan-facility. Therefore two proposals are suggested. First, the CDB should be allowed to assume a more developmental role in this respect and should therefore be relieved of some of its current performance-criteria which inhibit the development of venture capital activities. Second, a special loan facility should be provided by the Central Bank to the commercial banks at a reduced rate to facilitate the development of venture capital loans. Such loan activities should not however be seen as a purely financial arrangement since there is abundant evidence from elsewhere that the banks also need to assume a quasi-developmental role.

4.5. Monitoring

The monitoring of the strategy for the knowledge-based sector poses a particular difficulty in that unlike other sectors on the island, there is much less local capability available to determine whether the appropriate niches have been targeted and whether progress is proceeding at an acceptable level. Consequently some form of monitoring system should be developed which is allied to institutions abroad. This can be linked to market-surveys undertaken by specialists. Such links are likely to be relatively costly in relation to those in other sectors³³; but the costs of ignorance in fields where the knowledge-base is changing so rapidly are even greater.

Some suggestions have already been made with respect to the Water Management Agency, the Energy Services sector and the Biotechnology sector for the payment of retainers to leading-edge institutions for which an annual state-of-the-art survey is produced. These should be supplemented by consultancies and surveys to monitor the formulation of policy responses as well as their execution. For example, it may be that a niche exists in the computer software industry for software destined for small hotels. Not only can this only be determined through a survey of such hotel establishments in Cyprus, but the feasibility of extending this to the external market is also a subject for informed expert opinion. Similarly a survey needs to be undertaken on the extent of computerisation in the state sector, the pay-off from increasing its pace and the subsequent prospects for marketing the software and organizational improvements abroad.³⁴ Analogous procedures should of course be adopted where relevant for the other knowledge-intensive sectors identified in this report, or others which may emerge in future.

KNOWLEDGE BASED INDUSTRIES

SUMMARY OF RECOMMENDATIONS

1. Information Technology and the New Service Industries.

(a) Computer Software

- 1.1. A strategy should be adopted to encourage the development of Greek-based software.
- 1.2. This software should first be marketed in Cyprus, then on the Greek mainland and subsequently to Greek expatriate communities worldwide.
- 1.3. The Export Promotion Organisation should make its facilities available to the software industry.
- 1.4. Some form of coordination within the industry is also essential. This is most likely to be successful if organised through some combination of subsidies and firm contributions.
- 1.5. The computerisation of the state sector also represents an opportunity for software development.
- 1.6. If relevant, the software developed for the state sector should be exported, with assistance from the Export Promotion Organisation.

(b) The Offshore Sector.

- 1.7. There does not seem much need for the government to become actively involved in the marketing of Cyprus's offshore sector abroad.
- 1.8. The telecommunications sector should be encouraged to invest in the latest digital and data-transmission technology.

- 1.9. Despite major improvements international telephone services could be enhanced, especially on calls to the Gulf and to Europe.
- 1.10. The Offshore sector requires better regulation, either through an improved version of the existing Central Bank system, or via the introduction of a new Regulatory Body which will include representatives from the private sector.
- 1.11. A unified legal code should be introduced to govern this sector. Failing this a "one-stop shopping" office should be introduced.
- 1.12. International journalism and international conferences are targetted for expansion. The policy interventions required here are marginal, with particular emphasis placed upon the marketing of the island's attractions.

(c) A strategy for water management

- 1.13. Government Officials should be given more freedom to work on contract abroad.
- 1.14. A Water Management Agency should be established to seek out foreign markets for the collection, storage and controlled delivery of water. It should also coordinate inputs from all the relevant Cypriot parties, both in the private and public sector.
- 1.15. The Water Management Agency should be jointly financed by the state and private industry. In the early years the state would assume most of the financial burden, but after five years the private sector would be responsible for eighty percent of its operating costs. Some revenue will be derived from the sale of services abroad.

(d) Energy Services and Products

- 1.16. Too few resources have been devoted to AREC. Its efforts also need refocussing to incorporate the domestic sale and export of energy-conservation services.
 - 1.17. An agreement should be reached with two of the foremost renewable energy institutions in the world. For an annual retainer AREC should be provided with an annual state-of-the-art report on developments in the renewable energy field, or a selected subset of these (perhaps solar energy).
 - 1.18. AREC should begin to function as a Consulting Agency on Energy Conservation, with a financial package similar to that proposed above for the Water Management Agency.
 - 1.19. A special budget should be provided which will facilitate industrial R&D on energy conservation within Cyprus.
 - 1.20. AREC should reinforce its intended role of certifying quality standards, and in order to induce local firms to collaborate, this should be linked to assistance with export-marketing.
 - 1.21. Students and AREC and HTI staff should be sent abroad in a guided programme of post-graduate study, if possible at the two institutions providing state-of-the-art reports to AREC.
-
2. **Policies to Facilitate the Adoption of Appropriate Electronics-Based Automation technologies.**
 - 2.1. We have considered the possibility of recommending the establishment of a science park in Cyprus, but after careful thought have rejected the idea. The major focus of strategy should be on the further development of indigenous technological capability in manufacturing.
 - 2.2. Local purchasing policies - currently intended only for the utilisation of consulting services - should be strengthened and extended in a judicious manner to high-tech manufacturing firms.
 - 2.3. An incentive scheme should be introduced in Cyprus in relation to a specified list of consulting services

(especially with respect to inventory- and production-control), enabling automation technologies and design skills.

- 2.4. There is a need for purpose-built "intelligent" buildings of the sort which are now common in the USA and Europe.
- 2.5. It is advisable to consider a strategy around the development of pumping systems.

3. Preparing for the Biotechnological Revolution

- 3.1. Biotechnology represents a major opportunity for future development, but many of the gains are likely to be in the longer-term. Three major biotechnology-based niches are identified.
- 3.2. Fish Farming. Three policies are recommended to strengthen this activity.
 - go ahead with the existing fish-farming venture.
 - invest in the training required for Cyprus to become a regional leader in this field.
 - at a future date when the first two steps have been completed, it will be necessary to develop a wider programme which includes the promotion of fish exports as well as the sale abroad of fish-farming expertise.
- 3.3. Animal Husbandry.
 - additional PhD level expertise is required with respect to dairy cows, swine, poultry, sheep and goats.
 - additional technical staff will be required to back-up these researchers.
 - at a future date a purpose-built boat will be required to transport the animals.
 - some form of executing agency will be required to market the animals and the technical services abroad.
- 3.4. Fertigation.
 - there is the need for expanding the research cadre; these have been identified by the ARI.
 - there is an immediate potential for a productive link between the ARI, one or more of the local software

houses and a local firm manufacturing electronic displays.

- one of the problems of utilising local inputs is the poor quality of much of the plastic piping used in irrigation systems; efforts should be made to rectify this by linking quality to assistance with export promotion.
- a consulting capability should be established to promote the export of fertigation technology and knowhow.

3.5. As in the case of the proposed Water Management Agency and AREC these problems could be resolved to a large extent by developing a consulting capability which would lead the ARI to generate some of its own income by selling its institutional services, initially within Cyprus and subsequently in external markets.

4. Venture Capital

- 4.1. The CDB should be allowed to assume a more developmental role and should thus be relieved of some of its current performance-criteria which inhibit the development of venture capital activities.
- 4.2. Second, a special loan facility should be provided by the Central Bank to the commercial banks at a reduced rate to facilitate the development of venture capital loans.

5. Monitoring

- 5.1. Some form of system should be introduced to monitor the performance of individual knowledge-intensive sectors. Since local expertise is thin, this is most likely to involve foreign specialists.
- 5.2. This monitoring can be linked to market-surveys undertaken by specialists.

5.3. In the short-run it is suggested that such specialist surveys be conducted to determine the feasibility of the software strategy with respect to its Greek-orientation, its sale to the state sector and the possibility of selling software to the small-scale hotel sector.

1. Of course knowledge has always been important in production. However we are witnessing a transition to an increasing formalisation of this knowledge within scientific principles of procedure and discovery and in this sense we can loosely refer to "science-intensity" and "knowledge-intensity" as interchangeable phenomena.
2. L K Mytelka, 'Knowledge-Intensive production and the Changing Internationalization Strategies of Multinational Firms', in J A Caporaso (1987), A Changing International Division of Labor, Boulder, Lynne Rienner Publishers and London, Frances Pinter.
3. The relatively poor performance of these two economies is in part explained by their large investments in Defence-related R&D.
4. "Nevertheless", continues the report, "no type of industry has been abandoned, hence its spectacular surpluses for all three categories."
5. Indeed, it is precisely for this reason that some observers have seen the recent growth of parts of the service sector in the USA as a measure of its relative technological decline.
6. The Report continues this last comment in an illuminating manner: "As Lord Weinstock colourfully put it, '... what will the service industries be serving when there is no hardware, when no wealth is actually being produced. We will be servicing, presumably, the production of wealth by others. We will supply the Changing of the Guard, we will supply the Beefeaters around the Tower of London. We will become a curiosity". This obviously have wider implications for the extent to which Cyprus proposes to rely on its tourist sector as a source of income growth in the future.
7. This is sometimes referred to as a "cradle-to-grave" philosophy.
8. See R Dore, 'The Social Origins of the Will to Innovate', Technical Change Centre, London, 1984.
9. See a well-known article from the Harvard Business School by Hayes and Abarnathy, 'Managing our Way to Industrial Decline', Harvard Business Review.
10. For example, the typical solar water heater in Cyprus produces about 1,050 KWH p.a. compared to bench testing of new heaters in France of 1,440 KWH p.a. (SEMA-MATRA/DINOS KITTIS, 1985, Vol 4 p19). In some sense it may be considered unfair to compare the average good SWH in Cyprus with the best in France. However, since Cyprus has such a well-developed industry it might be thought that its products would be near the technological frontier. Additionally, there is a long history of debate between the MCI (Energy Group), the HTI and the industry about the thickness of insulation to be utilised in the heaters. The industry is still resistant to moving to the recommended thicknesses.
11. Although in general the quality of statistical data in Cyprus is high, there appear to be a series of substantial unexplained changes in the figures for the service sector. It is not

uncommon to find, when comparing year-to-year data, revisions on previously published figures which more than double the entries for previous years. For some reasons this is especially true for the data-processing figures. For example, the figures published in 1985 for value added in this subsector in 1984 were £380,000; these were revised in the 1986 census to £880,700, an increase of 132 percent.

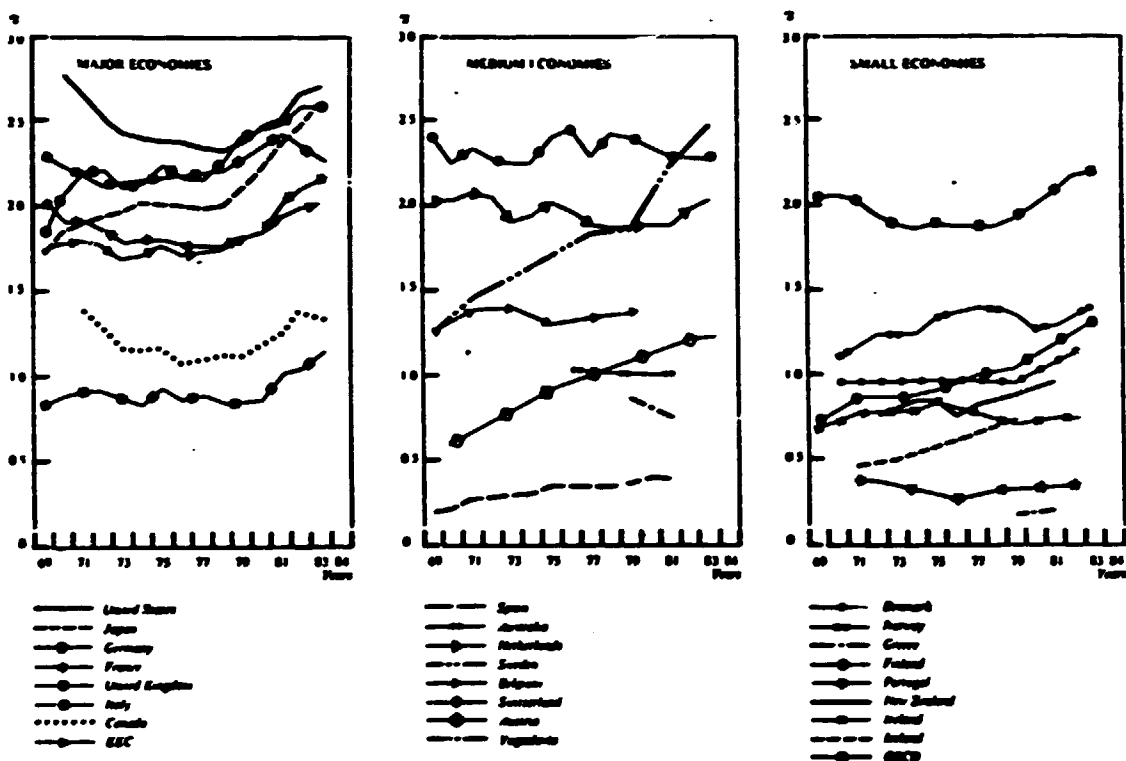
12. In 1986, when its billings were substantially lower than the height of the boom, this company was the 37th largest construction firm in the world.
13. Of these just over half were expatriates, and of these expatriates almost one-half were Lebanese.
14. MEMRB, 1986.
15. This excludes the 967 studying in Turkey, presumably all from the occupied zone. All figures from UNESCO Statistical Yearbook, 1985.
16. These courses are all of three years duration and provide an intermediate level education. With a further 2 years they obtain a B.A. in engineering and approximately one third of the HTIs graduates proceed to this level.
17. Estimate provided by Cyprus Computer Society.
18. It is interesting to note here that the Dept of Statistic's estimates of employment in the software sector was 264 in 1985 (see Table 5). We have no way of accounting for this variation.
19. This is reflected in the performance of one of Cyprus' major competitors in the international industry, South Korea. Its billings rose from \$2.5bn in 1976 to \$13bn in 1981 and in 1982, falling thereafter to \$6.5bn in 1984 and \$4.7bn in 1985.
20. Much as high cost steel inputs put American automobile manufacturers at a cost disadvantage.
21. Even though one study found this to be only the sixth most attractive feature cited by firms favouring Cyprus as a point of location. The others regarded as more important (ranging from the most favoured) were geographical location, international communications, telephone services, telex services and the cost of living.
22. There is no clearly accepted definition of either of these two types of transmission systems. But basically the ISN digitises narrow band-width information through the use of modems whilst ISDN involves the more intensive utilisation of digitised information carried via broad band-width fibre-optics cables and is consequently able to carry much more information of a better quality.
23. We interviewed one firm in the financial services sector which had left its Dutch base and set up in Cyprus - packing all its

data base and computers into a few large boxes - within less than two weeks.

24. Although it must be said that from the late 1970s savings have not been a major constraint in Cyprus.
25. Of course in the short run this would be difficult as new recruits would be unable to fill the places of the best and most skilled who have been offered secondments abroad. But this is a managerial problem since a cadre of substitutes could be built up over time and in the interim it will require management to ensure that not too many people would be working abroad simultaneously.
26. All figures from EEC, Third Party Financing Opportunities for Energy Efficiency in the European Community, Brussels, 1987.
27. As a point of reference it is estimated that these will account for between 20 and 30 percent of all savings.
28. For example, compare the experience of the Japanese videotape recorder manufacturers who have set the standard around VHS and the failure of the technically excellent Phenomenon system which failed to achieve critical mass.
29. The displays firm was paying £0.28/sq m./month versus the existing rate of the first purpose built buildings in the Industrial Estate in Nicosia of £0.31/sq m/month.
30. Modern micro-hydro plants have been shown to be profitable in many Third World economies operating on a head as low as 4m and producing as little electricity as 1KW. Although definitions differ, micro-hydro plants go up to around 200KW before they merge into the mini-hydro category. The cost of a micro-hydro is around Stg£1,000/KW of which around 40-50 percent is the turbine.
31. There is even talk in biotechnological circles of growing coffee trees in Scotland.
32. In fact the ARI has already appealed to the FAO for support to buy a computer since government cuts have ruled such purchases out. No reply has yet been received to this request.
33. Market reports in the high-tech sector often cost in excess of \$10,000.
34. Such a survey has been undertaken since the preparation of this report in connection with the preparation of a Master Plan for the Introduction of Computers and Information Technology. This survey showed that the Cyprus government had spent C£3 million on centralised software systems since 1969, and had computer hardware valued at C£2 million

Figure 1

Intensity of Research and Development Issues*

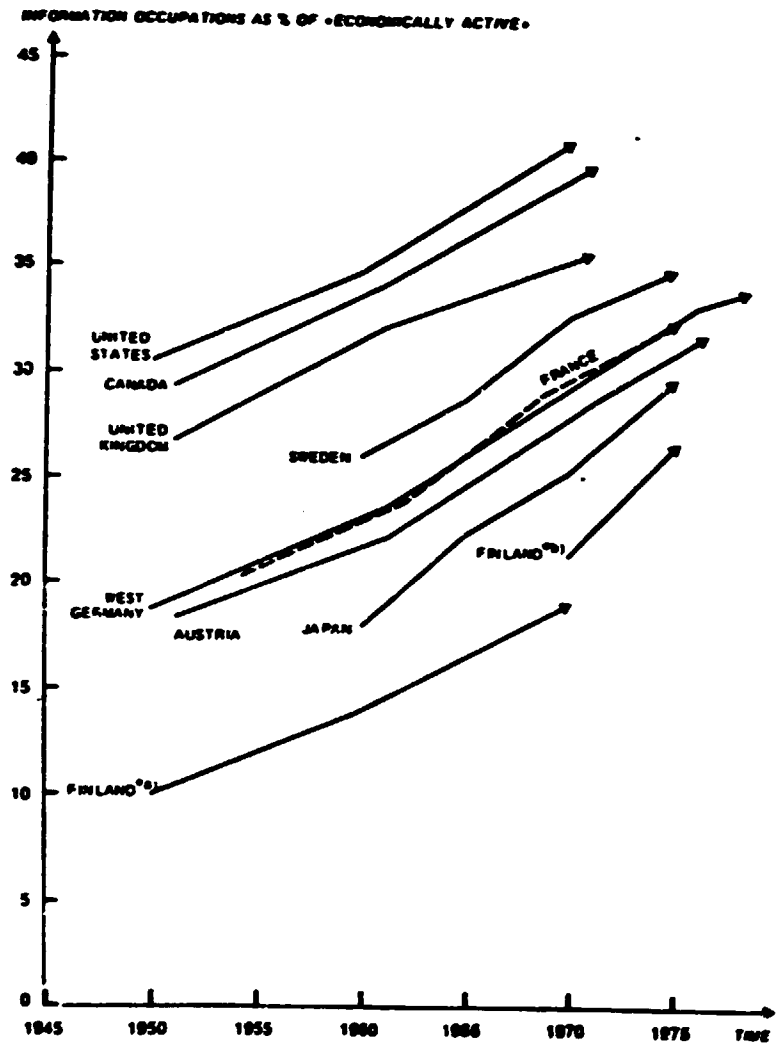


* Total R&D expenditure (all fields of research) as a percentage of Gross Domestic Product.
Source: OECD/STI Data Bank, November 1985.

Source: OECD Science and Technology Indicators: No 2; R&D, Invention and Competitiveness, Paris, 1986

Figure 2

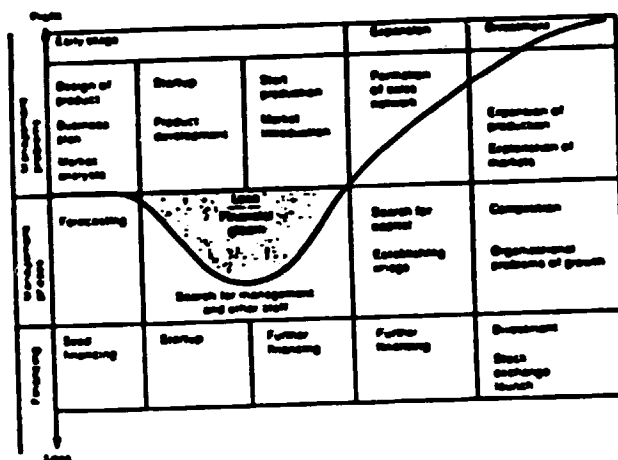
CHANGES IN THE SHARE OF INFORMATION OCCUPATIONS
IN ALL ECONOMICALLY ACTIVE OVER THE POSTWAR PERIOD



* Data for Finland was derived from two separate sources : (a) I. Pietarinen ; (b) The Central Statistical Office of Finland, both sources using a rather more restricted definition of information occupations than that of Table A1. Absolute values for any given year are, therefore, not strictly comparable with other countries, although the trend is still of interest.

Source: OECD, Microelectronics, Productivity and Employment, ICCP 2, Paris, 1981

Figure 3
Profile of a Company Startup by Venture Capital



Source: Nature, vol 307, February 3, 1984, p403

Figure 4
Value Added in the Business Service Sector

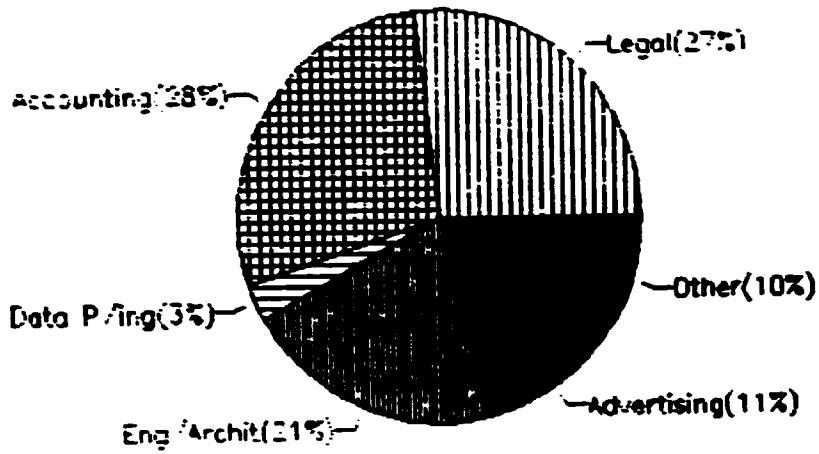
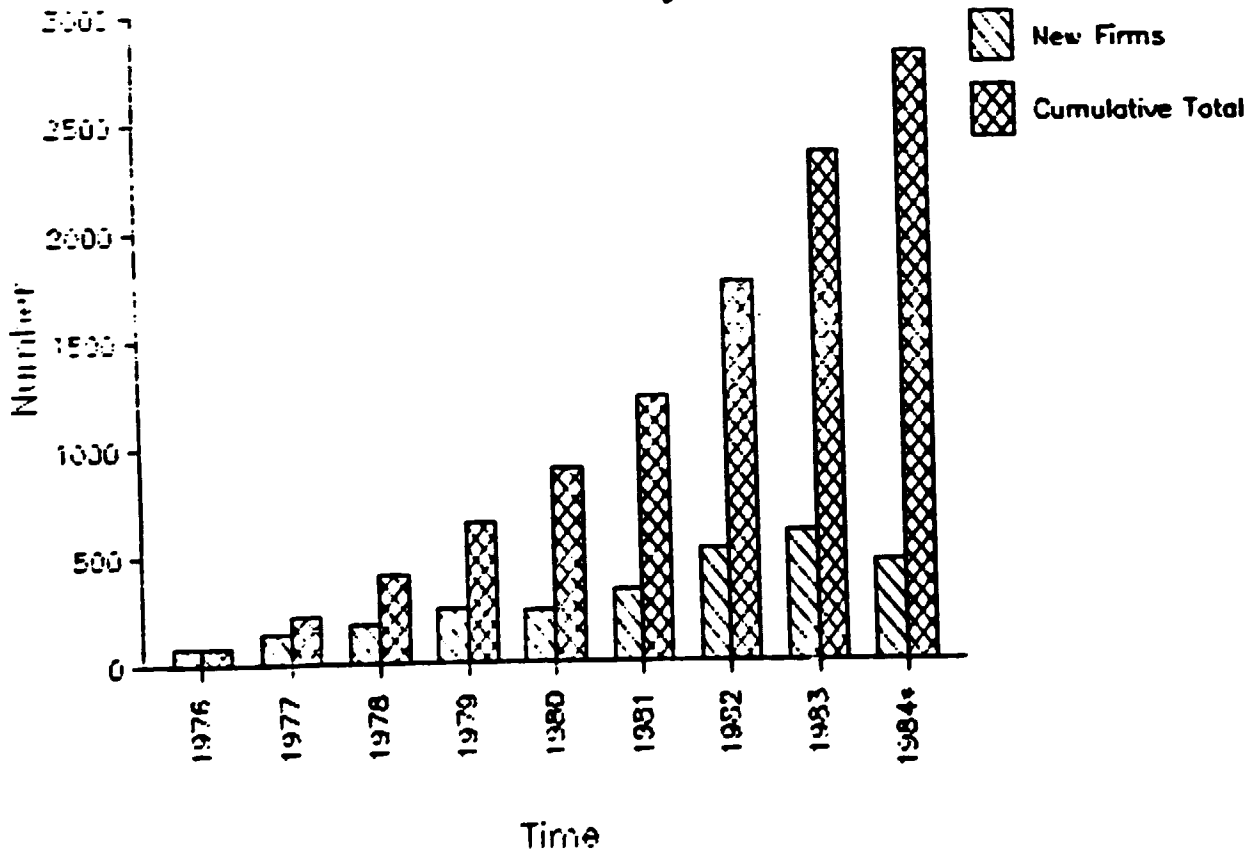
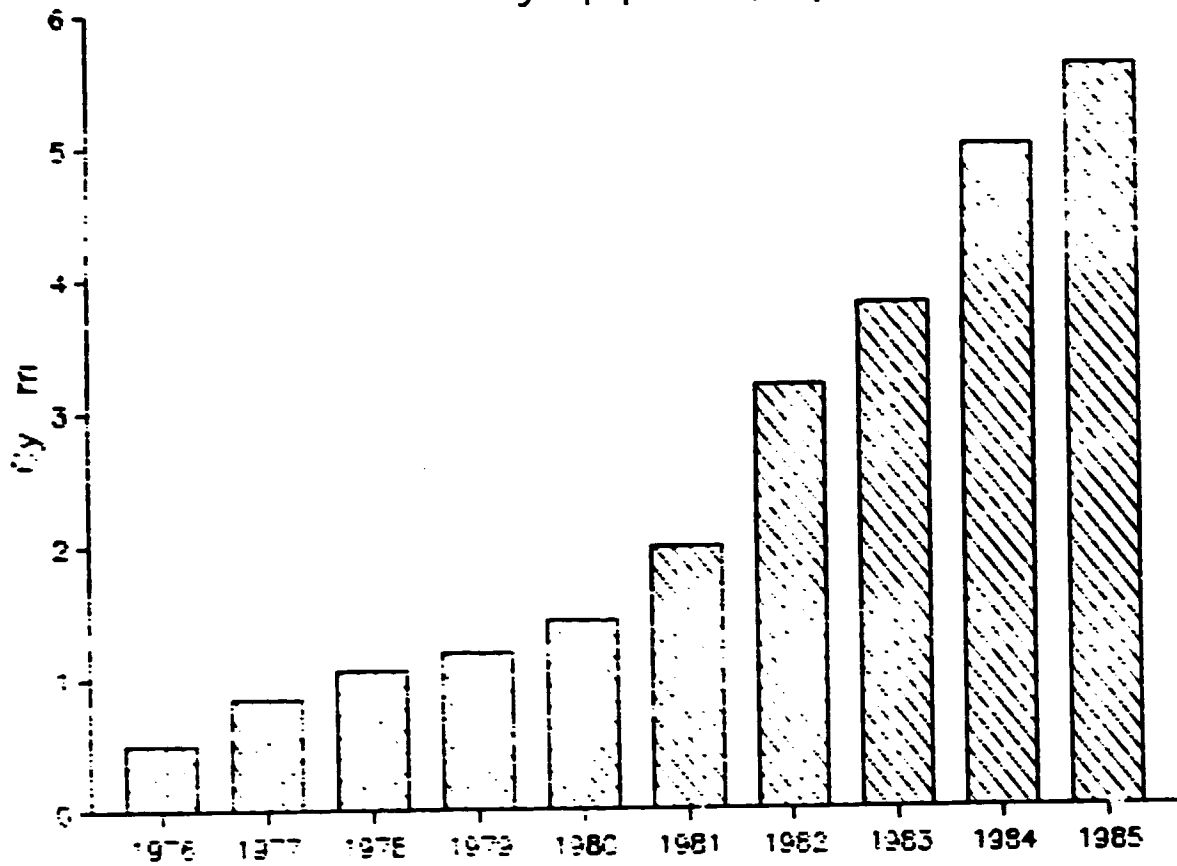


Figure 5
Offshore Companies in Cyprus
• To August

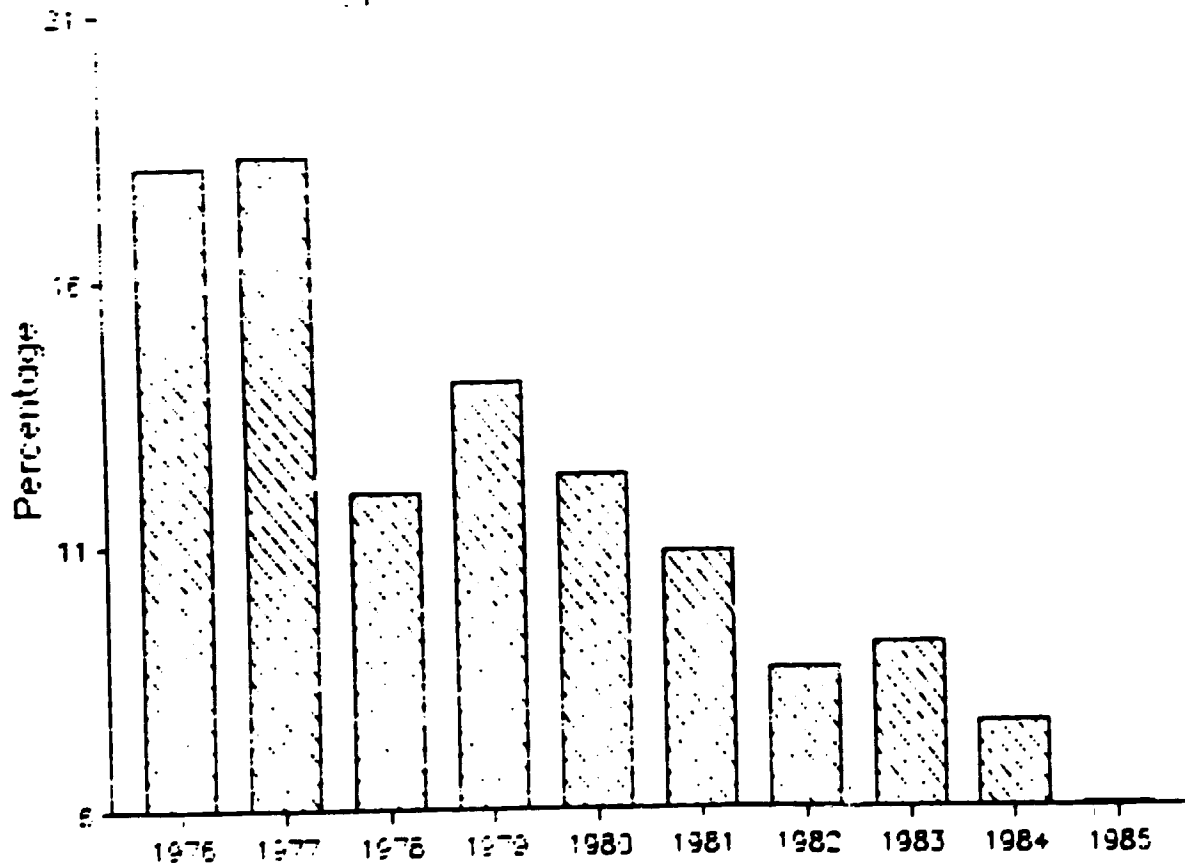


Source: Calculated from Republic of Cyprus, Business Services Survey and Industrial Statistics Survey

Fig 6. Imports of Office Machines and Automatic Data Processing Equipment (m) (SITC 75)

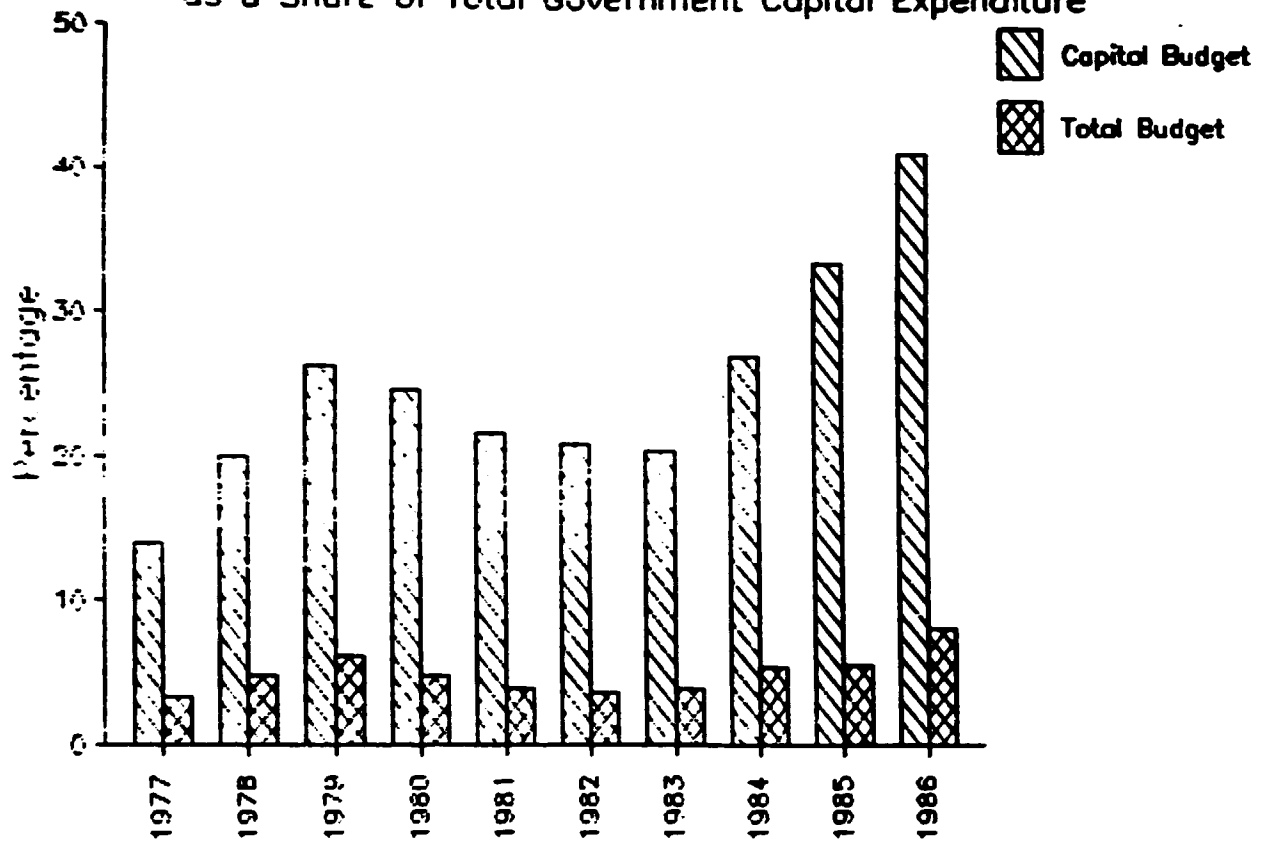


All typewriters as % of all office equipment



Source: Calculated from Government of Cyprus statistics on trade

**Fig 8. Water Development Expenditure
as a Share of Total Government Capital Expenditure**



Source: Calculated from figures provided by the Water Development Department

Table 1
R & D as a percentage of value added, 1980.

	USA	Japan
<u>Sectors in which Cyprus has high comparative advantage</u>		
Wood, cork and furniture	0.6	0.4
Textiles, footwear and leather ^(a)	0.2	0.7
Food, drink and tobacco	0.8	1.4
Machinery excluding computers and instruments	2.3	3.0
 <u>Sectors in which Cyprus has low comparative advantage</u>		
Electrical-electronic group	12.3	8.2
Chemical group	6.2	7.5
Motor vehicles	14.3	6.7
Computers	21.8	6.9

(a) This includes the textile sector in which Cyprus is poorly-represented and which is more science intensive than the garments sector in which Cyprus is well-represented.

Source: Adapted from UNIDO, Industry in the 1980s: Structural Change and Interdependence, 1985.

Table 2
List of New Technological Niches identified by Europe's largest venture capital firm.

Microelectronics and semiconductor applications
 Automations systems
 Processing technologies
 Advanced materials
 Biotechnology
 Health Care

Source: Interviews.

Table 3

The Japanese Next Generation Base Technologies Development Programme,
and the Resources Devoted to it (Sterling£)

	Stgfm
<u>Electronic Devices</u>	
Super-lattice elements	22
Three-dimensional integrated circuits	24
Integrated circuits fortified for extreme conditions	22
<u>New Materials</u>	
Fine ceramics	35
High efficiency separation membranes	27
Conductive polymers	13.5
Highly crystalline polymers	16
High grade alloys under crystal growth control	22
Composite materials	30
<u>Biotechnology</u>	
Bio-reactors	30
Large-scale stable oils	13.5
Recombinant gene engineering	27

Source: R Dore, The Case of Technology Forecasting in Japan: The Next Generation Base Technologies Development Programme, London, Technical Change Centre, 1983.

Table 4
Estimated Size of International Venture Capital Industry

	Total no of firms	Venture capital pool (\$m)
USA	550	20,000
UK	110	4,500
Canada	44	1,000
Japan	70	850
France	45	750
Netherlands	40	650
W Germany	25	500
Sweden	31	325
Norway	35	185
Denmark	14	120
Ireland	10	100
Australia	11	50

Source: Financial Times December 8 1986

Table 5
Distribution of US Venture Capital by Industry, 1985

	% of companies	% of investment
Communications	14	16
Computer-related	35	35
Other electronics-related	13	14
Genetic engineering	3	5
Medical/Health	11	10
Energy-related	2	1
Consumer-related	8	7
Industrial automation	4	4
Industrial products	4	2
Other	6	6

Source: Financial Times 8 December 1986.

Table 6: Employment in the Business Service Sector

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Legal services	533	578	622	667	712	740	800	890	960	1046
Accounting, auditing, bookkeeping	245	285	330	380	439	519	613	735	864	981
Data processing	28	40	60	80	102	108	125	136	194	264
Engineering, architecture and technical services	392	472	551	629	710	760	795	879	988	1100
Advertising and market research	81	102	123	145	168	169	217	243	275	325
Business Services n e c	132	126	122	140	205	257	310	381	499	589
Total Business Services	1411	1603	1808	2041	2336	2553	2860	3264	3780	4308
Total all services	18070	19207	20667	22081	23654	26236	28640	31216	34334	37908
Business services as % all services	7.81	8.35	8.75	9.24	9.88	9.73	9.99	10.46	10.94	11.34
Total Manufacturing Employment	28341	32075	35672	37897	39884	41733	42455	42625	43982	43677
Employment in All Services as % Manufacturing Employment	63.76	59.88	57.94	58.27	59.31	62.87	73.53	73.23	78.56	86.91

Source: Republic of Cyprus, Dept of Statistics, Business Services Surveys & Industrial Statistics Surveys

Table 7: Value Added in the Business Service Sector ('000)

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Legal services	608	880	1074	1361	1713	2226	2764	3515	4574	5497
Accounting, auditing, bookkeeping	402	470	670	1142	1750	2300	2900	3750	4823	6137
Data processing	78	129	217	306	382	500	653	881	1251	1604
Engineering, architecture and technical services	354	686	891	1145	1884	2346	2900	3750	4355	5383
Advertising and market research	79	122	188	374	545	615	988	1122	1479	1839
Business Services n e c	244	8	353	503	752	1038	1409	1980	2482	3189
Total Business Services	1965	2545	3393	4831	7026	9025	11614	14998	18964	23649
Total Employment in Business Service	1411	1603	1808	2041	2336	2553	2860	3264	3780	4305
Value Added/Job	1393	1588	1877	2367	3008	3535	4061	4595	5017	5493
Value Added/Job in Manufacturing	2195	2535	3057	3155	3611	3987	4406	4737	5283	
VA in services/VA in manufacturing	.63	.63	.61	.75	.83	.89	.92	.97	.95	
Total all services	20289	26735	33657	46309	60287	78883	109127	127627	160886	195020
Business services as % all services	9.69	9.52	10.08	10.43	11.65	11.44	10.64	11.75	11.79	12.13

Table 8

Distribution of computing machine
operators by industry 1985

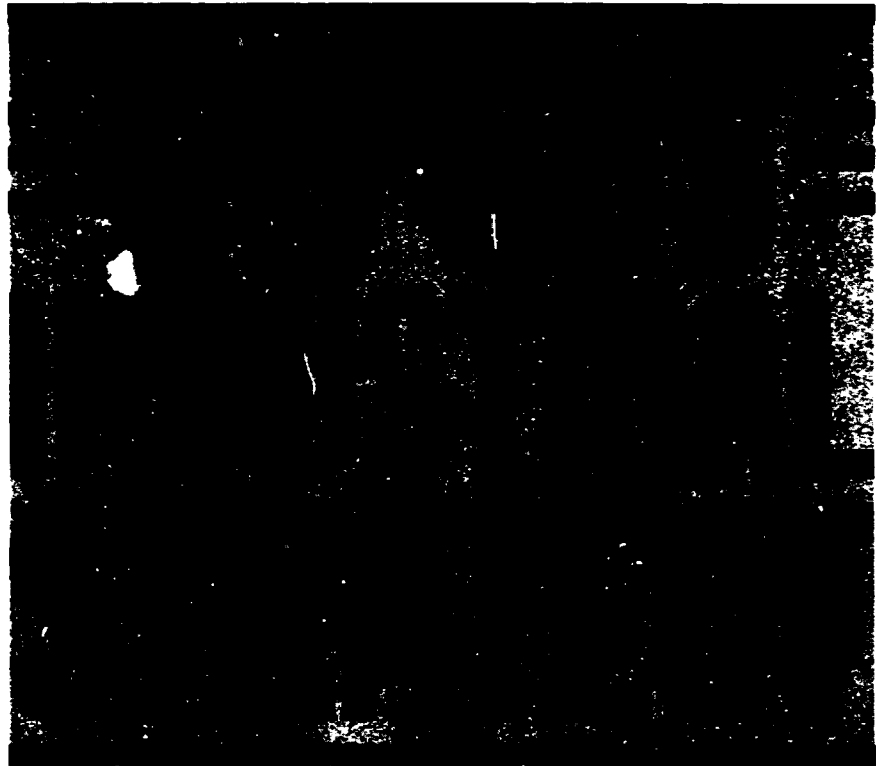
Industry	No. of operators
Wholesale trade	68
Real estate and business services	62
Financial institutions	48
Food, beverages and tobacco	19
Insurance	18
Transport and storage	15
Retail trade	12
Restaurants and hotels	9
Building contractors	8
Paper, print and publishing	7
British sovereign bases	4
Metal ore mining	3
Textiles, clothing footwear and leather	3
Wood and furniture	3
Chemicals, petroleum, rubber and plastic products	3
Metal products and machinery	2
Total	288
All Finance, Insurance, Real Estate and Business Services	128
All Wholesale and Retail trade, Restaurants and Hotels	89
All Manufacturing	37

Source: Registration of Establishments 1985

Table 9
Minutes of Conversation (thousands)

	1981	1982	1983	1984	1985
National	1,111	1,385	1,734	1,945	2,165
International	2,641	3,054	3,715	4,312	4,495
Total	3,752	4,439	5,449	6,247	6,660
% International	70.4	68.8	68.2	69.0	67.5

Source: Adapted from CYTA Annual Report, 1985.



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**CYPRUS INDUSTRIAL STRATEGY:
MODELLING ALTERNATIVE ECONOMIC POLICIES**

H.D. Evans

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SUMMARY

The aim of this study is to project the effects of the Customs Union and a productivity enhancing Industrial Strategy for the Cyprus economy. The 10-sector model and data base currently in use in the Planning Bureau provided the starting point for an extension of the model and data base to 15 sectors. Key additional data required were sectoral tariff data and an updated manufacturing input-output table. The extended data base permitted the inclusion of 6 manufacturing sectors in the model, 5 of which covered the mission's sector case studies.

The model used a new computer programme designed to achieve flexibility of data management, model size and model formulation on the available personal computers in the Planning bureau. It is known as a Computable General Equilibrium (CGE) model because it includes a large number of relationships which are responsive to price and income changes.

The tariff data was used to update the estimates of effective protection on import substituting and export industries, that is to say the protection on that portion of the value of a product added in Cyprus. The results confirmed the widespread view that there is high protection in the import substituting sectors, particularly in Textile and Wearing Apparel, Leather and Leather Products, Wood and Wood Products. This was underlined by the finding that in all three industries, there was negative value added at world prices. This means that, for the activities covered, it would be cheaper in terms of the direct foreign exchange cost to import the relevant finished products than to buy the necessary imported materials to produce them in Cyprus.

The model was used for four projections from 1984 to 1991 and 1996. The likely developments in the Cyprus economy under current policies were embodied in the Base Projection. Three economic policy alternatives were then examined to assess the consequences of the Customs Union, an Industrial Strategy, and the Industrial Strategy and Customs Union combined.

In considering the results of the model the following points should be kept in mind:

(i) the assessment of the prospects of the Cyprus economy in the main report is based on an analysis of Cypriot statistical data. The model is presented as an independent exercise which throws light on the statistical analysis by highlighting certain relationships within the Cyprus macro economy. It is not intended as an instrument for making short term forecasts.

(ii) Cypriot growth over the last decade has been primarily demand led. On the supply side the most important factor has been labour. The model reflects the above in the significance accorded to demand, and to the labour constraint - the latter being important for longer term forecasts.

(iii) The following were disaggregated at the sub-sector level: the input-output coefficients; the labour coefficients; value added shares; tariff rates and Armington elasticity estimates. There is incomplete disaggregation of non-competing input coefficients, productivity projections, export price projections, and export demand projections. The incomplete disaggregation is largely the result of the lack of adequate data, and as a result the model is necessarily limited in its capacity to produce robust detailed sub-sectoral projections. However, this does not seriously affect the macro results and the changes in resource allocation associated with the policy experiments conducted - which are the questions on which the

exercise concentrated.

(iv) There were no available perpetual inventory estimates of the capital stock. Instead we had to make indirect estimates as described in Appendix 3 of this report. In spite of the limitations of these data, and of the assumptions we were required to make, the overall macro projections and the alternative policy estimates are not unduly sensitive to them.

(v) Throughout the report, the results of the model are presented by rounding the numerical results to the first or second decimal place. The results should, however, be interpreted as giving only orders of magnitude of the quantitative dimensions of the operation of the economy captured by the model.

In sum the simulation model is necessarily limited by the model assumptions and the quality of the underlying data. The model is nevertheless useful in highlighting the elements to which the long run performance of the economy is sensitive. The model is less robust in the detailed sectoral projections than in the overall growth performance. The orders of magnitude of the changes in the macro and sectoral projections arising from the Customs Union and the Industrial Strategy are likely to be more reliable than the detailed Base Projection itself.

Bearing the above in mind, the principle macro findings of the model projections were:

(i) **Base Projections:** GDP will grow at slightly over 3.2% pa to 1991, weakening to a growth of 1.6% pa to 1996.

The principle reasons for this poor performance are:

- stagnant export markets,

- a declining growth of tourist income,
- a loss of the benefits of favourable oil prices on costs.

As a result of the projected slow growth of income, foreign capital and total capital requirements will also grow slowly, particularly after 1991.

(ii) **Customs Union:** The entry of Cyprus into the Customs Union is likely to slow national growth further. Up to 1991, GDP grows at a little over 2.8% pa, declining to 1.2% pa by 1996. Compared with the Base Projection, GDP declines by 2.8% by 1991 and 4.8% by 1996.

The principle reasons for the negative effects of the Customs Union are:

- the loss of dynamism in the economy through increased import penetration and a lowering of the multiplier effects on autonomous spending in the economy such as that of tourists,
- adverse terms of trade effects of export expansion as export prices are cut to compensate for the loss of domestic market shares.

(ii) **Industrial Strategy:** A productivity increasing Industrial Strategy is likely to have major positive effects. With productivity in manufacturing sectors growing at nearly 2% pa more with an Industrial Strategy (a conservative estimate), the GDP growth rate increases to 5.4% pa up to 1991 (up by 16% compared with the Base Projection) and by 4.5% pa by 1996 (up by 33% compared with the Base Projection).

One consequence of the productivity growth is an improvement in competitiveness leading to an expansion in exports, especially in the period after 1991, and in import substitution. Another consequence is a rapid increase in the rate of growth of foreign capital to nearly 6% pa up to 1991. This is required to finance the general increase in the rate of growth rather than the direct investment requirements of

the Industrial Strategy.

(iv) **Industrial Strategy and Customs Union Combined:** Up to 1991, GDP grows at nearly 5% pa to a level which is 12.2% more than in the Base Projection. By 1996, GDP grows at 4.2% pa to a level which is over 27% above the Base Projection. Thus the negative effects of the Customs Union are more than outweighed by the positive effects of the productivity enhancing Industrial Strategy. However, the Customs Union brings with it increased competition from imports in the manufacturing sectors.

Manufacturing Sectors

When the Customs Union is introduced without the productivity improving Industrial Strategy and compared with the Base Projection, the most heavily protected sectors, Textiles and Wearing Apparel and Leather and Leather Products, are severely hit by foreign competition, imports increasing by nearly 50% and over 100%, respectively by 1991. By 1996, imports increase by over 100% and nearly 200%, respectively, compared with the Base Projection. In this case, output also falls by 13% and 29%, respectively by 1991 and by 30% and 50%, respectively by 1996, compared with the Base Projection. However, when the Customs Union is combined with an Industrial Strategy, the output declines are much less, especially in the case of Textiles and Wearing Apparel. Thus, compared with the Base Projection, output declines in Textiles and Wearing Apparel and in Leather and Leather Products by just over 3% and by nearly 19% in 1991, respectively, and by 7% and just over 34% by 1996. These industries are therefore much better able to withstand the effects of the Customs Union with a productivity enhancing Industrial Strategy.

The other sectors are still able to grow substantially compared with the Base Projection. The output of Food, Beverages and Tobacco is 46% greater in 1996 compared in the Base Projection; Wood and Wood Products output is 7% greater than in the Base Projection; Metal

Products and Machinery output is 28% greater than in the Base Projection; Other Manufactures and Mining output is nearly 36% greater than in the Base Projection.

Sensitivity Tests

The sensitivity tests of the model showed that the rate of growth was highly sensitive to exogenous shocks such as oil price changes which affect import costs, and changes in the non-oil terms of trade. It was also sensitive to the projected rate of growth of tourist income, especially after 1991. It was less influenced by changes in the rate of growth of export markets or by increases in wages above the market clearing rates. In the latter case, the main effects were on the level of employment rather than the overall rate of growth of the economy. The dominance of the Industrial Strategy over the Customs Union was not altered by changing the estimated elasticity of demand for exports.

Conclusions and Summary of Recommendations

In conclusion, it is clear that a productivity increasing Industrial Strategy would significantly enhance the growth prospects of the Cyprus economy. The Industrial Strategy would help facilitate the adjustment of the most heavily protected manufacturing sectors to the Customs Union and would help protect the growth of income from uncontrollable shocks such as oil price changes.

The recommendations of the report focus on the need for policy makers to have strategically located economic policy models as an accessible tool within the Planning Bureau and available for outside users in other government departments, in the business community and in the trade unions. Specifically, the Report recommends the enhancement of the economic policy making capacity in the Planning Bureau through the hiring of additional qualified personnel and by

incorporating the mission's model into their work programme. The flexible and user friendly nature of the modelling software could facilitate the wider use of economic policy models in both the macro and industry sections of the Bureau.

The Report recommends a programme of model development work on three inter-related fronts:

- a series of seminars on economic policy modelling to cater to the needs of research economists, government ministries, the business community, and the trade unions.
- a series of one week training courses on the use of economic policy models for policy makers and research economists within government ministries
- a series of research projects to develop and extend the economic policy models.

It is also recommended that attention be given to the statistical requirements of economic policy modelling, and to the development of a more strategic perspective on the interaction between economic policy questions being asked, the information required to answer these questions, and the processing of the information obtained.

INTRODUCTION

1.1 Terms of Reference

The aim of this study is to project the effects of the Customs Union and a productivity enhancing Industrial Strategy on the economy of Cyprus. This aim is more formally put in the terms of reference for the simulation study, which were

- (i) The primary purpose of this Consultancy is to simulate the effects on the Cyprus economy of alternative scenarios of the competitiveness of Cyprus industry. This will either be done by using the input-output model currently being constructed in the Planning Bureau, or through the use of a model which is approximately equivalent

- (ii) Primary iterations are to consider the impact of various assumed patterns of innovation in the targeted sectors on
 - the balance of payments
 - the growth of output
 - employment
 - capital requirements

- (iii) Data points are to be provided not only by the sectoral consultants but also by the Planning Bureau. It is hoped that the Planning Bureau's data points will be available'

Some guidance on the considerations to be taken into account in considering the competitiveness of Cyprus industry are elaborated in the terms of reference for the sectoral studies:

- (i) To determine the competitiveness of Cyprus industry in the major markets in Europe with respect to price, product quality, design capabilities, product flexibility and production lead times

- (ii) To determine the competitiveness of Cyprus industry in the local market as tariffs and other forms of trade restrictions are lowered on goods of EEC origin.'

1.2 The Modelling Strategy

In order to fulfill the terms of reference for this study, it was essential that the model be capable of dealing with a disaggregated manufacturing sector. On arrival in Cyprus, it quickly became clear that the Planning Bureau's model could not easily be adapted for the task at hand. Not only was the model too aggregated to deal with the case studies within the manufacturing sector, but it could not be further disaggregated using the Planning Bureau's computing facilities. Since there were no other models available which could be adapted to our purposes, there was a choice between

- aggregation of some of the other sectors in the existing Planning Bureau model to make room for a disaggregated treatment of manufacturing sectors

- switching computing facilities and disaggregating the Planning Bureau model

- building our own model.

The first option was not possible given the heavy work load on the

one modeller in the Planning Bureau. It was also felt that this would involve an unacceptable degree of aggregation of the non-manufacturing sectors, requiring a great deal of effort with very little benefit.

The second choice was rejected not only because it would have overstretched Planning Bureau personnel, but because a switch to a main-frame computer without direct access from the Planning Bureau would mean that, without significant expense required to install a terminal in the Planning Bureau, the Mission's model could not be incorporated into the work of the Planning Bureau. In as much as one of the Mission's aims was to develop a flexible model which could run on the available Personal Computers at the Planning Bureau and receive data from the spreadsheet programmes in use both in the Planning Bureau and in the Statistics Department, it did not seem wise to revert to reliance on a main-frame computer.

In view of the above considerations, it was decided that a new model should be built using the Planning Bureau's Social Accounting Matrix (SAM) data base and model formulation as a starting point. For the most part, the mission's model was built on the same lines as the Planning Bureau's model, differing mainly in the degree of disaggregation, the treatment of protection and the length of the time horizon considered. The choice of the third option was possible given the availability of a new flexible modelling programme called ASAP for use on Personal Computers such as the standard IBM XT and AT machines available at the Planning Bureau.

1.3 Problems Encountered

Some of the difficulties encountered in building the Mission's model were exacerbated by the constraints imposed by the pre-arranged work programmes of the Planning Bureau and the Statistics Department clashing with the Mission's own timetable. However, not all of the problems described below could have been resolved through better co-

ordination between the work of the mission and the relevant Government Ministries.

The major hurdles which had to be over-come in building the mission's model were:

- (i) obtaining the necessary data to disaggregate the manufacturing sector of the existing SAM.
- (ii) preparing updated tariff data at the required level of aggregation
- (iii) estimating and incorporating a Linear Expenditure System (LES) in the model
- (iv) modifying the ASAP programme as necessary to deal with the particular data transfer and data management problems encountered.

The development of the model, its data base and its use in the work of this mission form the substance of this report. There is a great deal of scope for improving the capacity of the Planning Bureau and Statistics Department to the needs of economic policy modelling. It is hoped that one of the main contributions of this report to the Government of Cyprus will be to assist in this process by providing the basis for flexible data management and economic policy modelling on standard PC's. The full development of these possibilities will require a more strategic perspective on the role of economic policy modelling, the policy questions to be addressed, and the information required to answer these questions.

1.4 The Purpose of Economic Policy Modelling

The purpose of having a disaggregated economic policy model of the whole economy in the work of the mission is to focus quantitative attention on

- factors which influence the implementation of an a Customs Union and Industrial Strategy in a quantitative fashion
- the sensitivity of the behaviour of the model economy to key assumptions and parameter estimates.

It also facilitates

- the rapid adding up of the wider economic effects of the sector strategies
- the analysis of the consequences of external shocks on the economy which directly and indirectly affect the manufacturing sectors for which an Industrial strategy has been developed.

For example, changes in Cyprus' principal export markets and in the wider international economy affects the competitiveness of the Cyprus economy. Technical change, particularly in the main export sectors influences the international competitiveness of the Cyprus economy. Changes in economic policy particularly with reference to protection, are also potentially important for the competitiveness of the manufacturing sector. Changes in the terms of trade facing Cyprus, such as oil price changes, also have significant effects on the overall performance of the economy. In all of these cases, the model can be of assistance in establishing the quantitative orders of magnitude of the effects of different exogenous shocks and policy packages.

1.5 The Data Base

A pre-requisite for generating such an economy-wide model is a data base and modelling framework which can be quickly adapted to the purposes in hand. Both statisticians and planners in Cyprus have had experience with servicing multi-sectoral models, as in the case of the work of Bell and Devarajan (1982). More recently, experience has been developed in the assembly of the data base, managing computer hardware and software and training personnel for the running of a computable general equilibrium model (CGE) model within the Planning Bureau. This model was originally developed by Devarajan (1986) for macro policy consistency planning; fuller details of this model have been described in Dymiotou-Jensen (1987).

The Cyprus CGE model and the Social Accounting Matrix (SAM) data base are at an early stage in their development, and have not been extended for use in other types of policy modelling. The computer software is based on a CGE modelling package called GAMS which has been developed and supplied by the World Bank. For simplicity, the existing Cyprus CGE model will be referred to as the GAMS model. It was this model and data base which provided the starting point for the work described in this report. What was required for the Cyprus Industrial Strategy Mission was a version of the GAMS model in which manufacturing could be treated in a disaggregated fashion to model the proposed sectoral development strategies rather than as a single sector as in the present GAMS model.

There remain important areas where the capacity to respond quickly to new and disaggregated data requirements or model formulation is lacking. For example, the 1981 Input-Output table with a disaggregated manufacturing sub-sectors was not available at the time that this Mission began. Nor was work on the tariff data sufficiently well advanced for use either in up-to-date effective protection calculations or for use in a policy modelling framework. The data base for the GAMS model, which was assembled in a spread-sheet, still has to be transferred manually to the GAMS software for running the

CGE model. Finally, the GAMS and the related HERCULES software do not permit sufficient disaggregation for the purposes of this Mission on the available Personal Computer or PC's in use within the Planning Bureau. This report is therefore concerned with both the likely economy-wide effects of the sector industrial strategies described elsewhere in the main report, as well as with extending the statistical base and computer software to make more timely economic policy modelling available to policy makers.

1.6 The Structure of the Report

Section 2.1 of this report provides a description of the CGE model developed during the course of this Mission. The associated computer software used to manage the data base and solve the model is called ASAP (see Evans, Lucas and Thomson (1985)). For simplicity, the more disaggregated Cyprus Industrial Strategy model is referred to as the ASAP model in order to distinguish it from the existing GAMS model. The disaggregated SAMU (U for updated manufacturing input-output table included in the SAM) data base which encompasses the 5 broad manufacturing sectors of the economy covered by the case studies is described in sections 2.2 and 2.3, including a preliminary updating of a disaggregated manufacturing sector in the 1981 Input-Output table and the assembly of tariff data.

The length of the time horizon considered in this report is a medium to long run period of 5 to 10 years, a consideration which has important implications for the treatment of the capital stock and household expenditure discussed in section 2.4 and 2.5.

Section III discusses the application of this data base to the conventional measurement of effective protection and examines the implications of possible changes in tariff policies such as the proposed Customs Union with the European Community within this context. Section 4.1 sets out the alternative economic policy packages considered in the report. The exogenous variables, parameter

estimates and Base Projections are described in section 4.2. The way in which the Customs Union and Industrial Strategy was modelled is described in sections 4.3 and 4.4.

In section 5.1, the macro effects of the alternative economic policy experiments are described and the detailed effects on the manufacturing sectors are described in section 5.2. Some sensitivity tests which were carried out on the model are described in section 5.3. The recommendations of this report are set out in section VI. A mathematical statement of the model can be found in Appendix 1 and of the effective protection measures can be found in Appendix 2. The data sources and estimates of the exogenous variables are described in Appendix 3.

THE ASAP MODEL

2.1.1 Background to CGE Models

The central difference between the present-day CGE models and the earlier input-output and linear programming models is that they incorporate a large number of price-responsive relationships. The advantage of this approach to policy modelling is that it allows for far greater flexibility in the way in which the economy is modelled; it is not necessary to rely exclusively on fixed proportions assumptions which characterise input-output models, or a judicious combination of fixed proportions and perfect substitutability assumptions which characterise linear programming models.(1)

The CGE models inevitably place a greater burden on the data requirements. They may also invite the modeller to over-estimate the importance of those aspects of economic behaviour which can be readily modelled such as profit maximisation, competition and market clearance and underestimate the importance of less-well understood processes particularly market imperfections, institutional and organisational aspects of the real economy. The way in which such aspects of economic behaviour are incorporated into the economic policy analysis depend in part on a series of judgements which are inevitably made when modelling an economy. This is particularly important in projecting the magnitude of technical change.

The advantages of CGE models is their flexibility and the requirement that the judgements which often implicitly dominate policy making must be made explicit. These advantages far outweigh any disadvantages which might flow from the onerous data requirements. It is the modelling flexibility and sensitivity of the CGE models to these judgements which is their strength. The potential of the CGE

models can only be fully realised if the data base and model size can be easily altered for the purposes at hand. It is for this reason that so much stress was placed on the suitability of the modelling software for use on Personal Computers so that the strength of the CGE models for economic policy experiments can be more fully realised in the context of available computing facilities within the Planning Bureau.

2.1.2 The Use of CGE Models

Devarajan (1986, Section I) sets out in some detail the questions which might be answered with the help of a CGE model, and the particular questions which the Cyprus GAMS model is designed to answer in the short and medium run. These questions include

- consistency planning
- fiscal policy
- foreign debt
- export competitiveness
- wage policy
- structural change.

The ASAP model is able to help answer these questions in the medium to long run. However, the main focus of the policy experiments conducted with the ASAP model was trade policy and an industrial strategy.

2.1.3 How the ASAP Model Works

The typical CGE model is based on a set of supply and demand relationships for each commodity produced in any particular year. Each year in the model is connected through investment behaviour and the projection of exogenous variables or parameters. For example, some components of demand and supply such as government current expenditure and the supply of labour are often projected exogenously or outside of CGE models. If government current expenditure were to be determined endogenously within the model, it would be necessary to

include a new functional relationship which specified how government current expenditure behaves. One possible (though not necessarily plausible) functional relationship would be to set government current expenditure as a fixed proportion of Gross Domestic Product (GDP). Similarly, some of the parameters of the model which govern behaviour within the model such as the productivity of capital and labour will change over time; and these must be exogenously projected as well.

The growth characteristics of the model depend on the interaction between the exogenous determinants of demand and supply, technical change and the flexibility of response of the model to price and income changes which affect behaviour over time. In the case of the ASAP model as used by the mission, the main exogenous elements are world prices, tourist expenditure, the growth of export markets, technical change, the labour supply and government current and transfer expenditure. Productive investment is determined by the rate of growth of the capital stock.

A key linkage between the supply and demand relationships in a given year is the income and expenditure or institutional accounts of the economy. All relationships in the model are governed by typical economic variables such as prices and incomes. Consider for example the factors which determine the level of exports in the ASAP model.

Demand for exports from each sector is determined by a downward sloping export demand curve. Exports are determined for each sector by the degree of price competitiveness of the individual sector and by the extent to which the sector export markets are growing. Price competitiveness will be governed by likely changes in competitors prices in export markets, and by changes in the cost structure of the exporting industry. The latter will be affected by the cost of intermediate inputs, by wages, by exchange rate, by protection policy, and by the responsiveness of the sector to changes in the cost of various productive inputs. Most importantly, export competitiveness over time will depend on the exogenously given rates of technical change within the sector such as the radical technical

change encompassing both product and process technology recommended in this report. The rate of growth of export markets will be determined by the general growth or decline of particular export markets such as the Middle East markets, and by the effectiveness of both marketing and product development in increasing the share of exports in particular markets. These determinants of exports can be illustrated with the help of a standard demand diagram shown in Figure 2.1.

The quantity of exports is measured on the horizontal axis and the price of Cyprus exports relative to competitor prices are measured on the vertical axis. The export demand function traces the responsiveness of exports to changes in the relative price of Cyprus exports to competitors, and the position of the export demand function will be governed by the size of the export markets.

The shape of the export demand function is assumed to be governed by a constant price elasticity of export demand.(2) Once an estimate has been made for the price elasticity of demand, the exact position of the export demand function is determined by the requirement that the estimated function must be consistent with the base year of the model, in this case 1984.

Thus, the estimated export demand function for 1984 passes through the point B given by the observed base year fob price of Cyprus exports relative to competitors, OA and base year export quantities OC. For projections beyond the base year, the position of the export demand function is assumed to shift in line with the rate of growth of export markets and competitors export prices are also exogenously projected. The model determines endogenously the fob price of Cyprus exports which in turn determines the amount of exports which can be sold at that price.

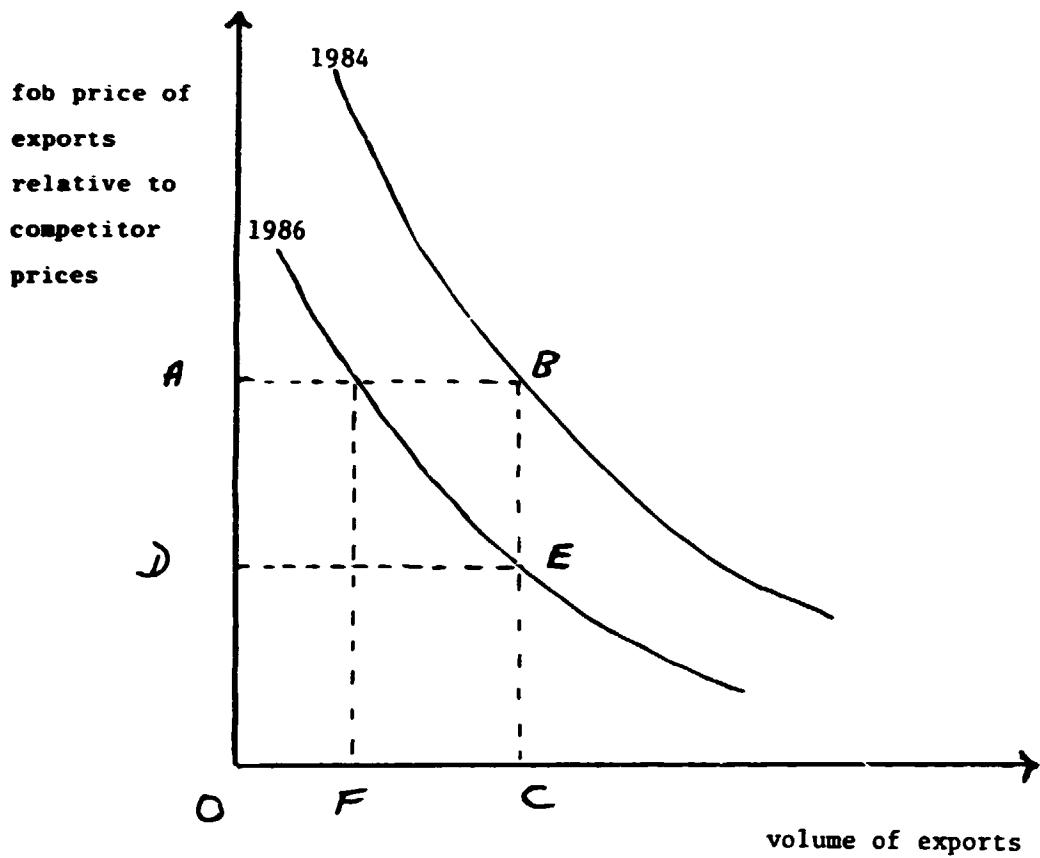


Figure 2.1: Export Demand Function

Consider example the year 1986 when there was a drastic fall in the size of Cyprus' principal Middle Eastern export markets due to the collapse of oil prices. In this case, the export demand function shifts inwards to the function labelled 1986, as shown in Figure 2.1, and the only way that 1984 export volumes could be maintained is by a fall in the fob price of Cyprus exports relative to competitors to OD. If domestic cost structures are such that there is no change in the fob price of Cyprus exports relative to competitors, then the 1986 export demand will fall to OF in line with the decline in export markets.

2.1.4 The ASAP and GAMS Models - Similarities and Differences

The ASAP model has the same basic structure as the GAMS model, the main modifications arising from the need to facilitate the analysis of the Customs Union and an Industrial Strategy in the medium to long run. These differences are reflected in:

(i) The level of disaggregation.

The disaggregation of the manufacturing sector was required to permit the identification of 5 of the 6 sectors studied by the Mission. These 5 manufacturing sub-sectors are the main activities which receive protection and which are central to an Industrial Strategy.

(ii) The analysis of protection.

The main incidence of protection in Cyprus is in the manufacturing sector. The analysis of protection required disaggregated information on the tariff structure on competing and non competing imports in the present situation and for alternative trade policies such as in the proposed Customs Union.

(iii) Medium to long run analysis and the treatment of capital.

The analysis of the Customs Union and an Industrial Strategy in the medium to long run required a modified treatment of capital in the ASAP model. Instead of projecting the size of the capital stock employed in each sector and allowing the model to determine the rate of profit as in the GAMS model (which is appropriate in the short run), the ASAP model takes as given the long-run rate of profit and the total capital requirements for each sector are determined endogenously within the ASAP model. However, this projected capital stock is only used in the model to provide a proxy for projecting the rate of growth of investment.

(iv) Medium to long run analysis and household expenditure.

The GAMS model at its present stage of development assumes that household expenditure patterns do not change in the short and medium run. The inclusion of a Linear Expenditure System (LES) allows the ASAP model to take into account medium and long-run changes in the composition of household consumption as household income grows.

(v) The projections of technical change.

The key aim of an Industrial Strategy is to accelerate the rate of adoption of new technologies which permit flexible specialisation and radical technical change. In both the GAMS and the ASAP models, the amount of technical change is assumed to be determined outside of the model or exogenously. The analysis of technical change by the mission goes beyond the standard econometric analysis based on statistical accounting of past technical change. The sector case studies consider technical change in the context of a wide variety of sector specific product and process technologies, of firm size and industrial structure.

Each of these specific characteristics of the ASAP model and the assumptions and judgements which inform it are discussed in greater detail below.

In addition to being able to address the same set of questions as the GAMS model in a medium to long-run context, the ASAP model is designed to assess the direct impact of the Customs Union and of an Industrial Strategy on manufacturing sector

- output
- employment
- exports
- import substitution
- total capital requirements
- the economy wide impact of these changes

as required in the terms of reference. The ASAP model takes as exogenous the possible outcomes of sector strategies, particularly as they affect productivity and market responsiveness, and analyses the impact of these changes on structural change, export competitiveness and foreign debt. Each of these sets of changes are affected by, and have implications for, macro policy.

2.1.5 The Projections and Policy Experiments

Both the GAMS and ASAP models use 1984 as the base year. Given estimates of the exogenous variables and parameters, the models are used to provide estimates of the endogenous variables for later years. The ASAP model solves directly for 1991 for a given set of projections of the values of the exogenous variables over the period of the 5th Emergency Plan, taking into account the known values of the exogenous variables for 1985 and 1986. This is done because the ASAP model is designed for medium to long-run projections. In

contrast, the GAMS model is more suited for short to medium run projections and is used to estimate values of the endogenous variables for 1986. The year 1986 then becomes the base year for estimates of the values of the endogenous variables for 1991. In the case of the ASAP model, the time period for the projections is extended beyond 1991 to 1996 to incorporate some of the effects of a possible accession to a Customs Union with the EEC.

The most important use of the ASAP model was to conduct a series of policy experiments in which the values of some of the exogenous variables and parameters are varied to see how the model economy responds to policy changes such as the sector Industrial Strategy and changes in external competitiveness induced by accession to a Customs Union with the EEC. These policy experiments can only establish orders of magnitude of the likely responses to policy changes and state of the world changes, a point which should be borne in mind when interpreting the model results. The extent to which the model is helpful depends more on the extent to which the model captures some of the strategic aspects of the economy and its behaviour (whether incorporated endogenously within the model or introduced exogenously) rather than on the detailed accuracy of the projections themselves.

The key results of the policy experiments are checked for sensitivity to the estimates of the exogenous variables and parameters which are most important in producing the results. In the case of the ASAP model, the performance of the economy is particularly sensitive to the dynamism of large expenditure items such as tourism, the terms of trade, and the particular types of technical change which might be introduced.

The central differences between the Cyprus GAMS and ASAP models stem from the different questions asked. These are reflected in the data base used, in the variables incorporated, in the choice of exogenous and endogenous variables. These issues are addressed in the next four sub-sections.

2.2 The Disaggregation of Manufacturing

Whilst the starting point for the data base of the ASAP model was the 11-sector 1984 FINALSAM constructed in the Planning Bureau in 1986 for the year 1984, this data base had to be considerably extended.

2.2.1 How Much Disaggregation

The sectoral disaggregation within manufacturing was chosen so that five of the six sector case study sectors were identified, shown in Table A3.1. The disaggregated Manufacturing sectors are far from homogeneous, somewhat blurring the relationship between the sectors of the SAMU and the case studies. For example, the Leather and Leather Products sector is dominated by the case-study sub-sector Footwear, and it was on this ground that the more aggregated Leather and Leather Products sector was used for the SAMU and the ASAP model. However, it would have been desirable to distinguish between Footwear, Leather, and Other Leather Products, particularly for the analysis of the effects of the Customs Union. However, further disaggregation of the Manufacturing sector for the ASAP model would have greatly increased the data requirements, particularly in regard to the input-output information. The chosen degree of disaggregation reflects our judgement of the best compromise between desirable disaggregation and the cost and time required to achieve it.

2.2.2 Valuation Conventions in the SAMU

In constructing the 1984 SAMU, the same valuation conventions were used as in the FINALSAM 1984. This corresponds to the factory door or producer price valuation of domestic output. Intermediate and final demands on the domestic market are valued at market or purchaser prices. Competitive imports and production for the local market combine as imperfect substitutes into composite commodities. The closeness of substitutability in use for the composite

commodities is governed by what is known as the Armington elasticity; perfect substitutes have an Armington elasticity of infinity whilst perfect complements have an Armington elasticity of zero.

Roughly speaking, the relationship between the degree of substitutability and the Armington elasticity is:

degree of substitutability	Armington elasticity
high substitutability	more than 6
low substitutability	less than 3
medium substitutability	between 3 and 6

2.2.3 The Method of Disaggregation

The 1984 FINALSAM was used to provide bench-mark totals for the manufacturing sector as a whole. Disaggregation of outputs, employment, value added, intermediate input use, imports and exports were obtained from standard statistical sources with the help of the Planning Bureau. The manufacturing input-output coefficients were obtained by up-dating the preliminary manufacturing Input-Output Table for 1981 provided by the Statistics Department. The updated input-output coefficients were obtained using the standard RAS method (see Bacharach, 1970 for a discussion).

The great advantage of using such mechanical routines as the RAS method for obtaining a set of consistent estimates of the input-output disaggregation for 1984 is that they permit one to use the best available information in a consistent fashion. However, the quality of the disaggregated SAMU depends critically on the quality of the underlying disaggregated information.

2.2.4 The Quality of the Disaggregated Data

At present, the 1981 Input-Output Table is being estimated in terms of producer prices and with no disaggregation of the trade and

transport mark-ups or margins. It was therefore not possible to convert the Input-Output Table back into purchaser prices, in line with the valuation convention used in the source data. Further, the input-output flow matrix is in terms of locally produced inputs. Imported inputs competitive with locally produced inputs which combine with similar locally produced inputs are only shown as totals and cannot be combined with the relevant disaggregated local inputs to form the required input-output coefficients. Similarly, non-competing imported inputs are only shown as totals without disaggregation to separate fuel from non-fuel non-competing imports.

From the perspective of the modeller, it is difficult to justify the use of local inputs as the relevant technical input requirement used in production where the same or very similar inputs are also available through imports. The relevant technical input-output coefficients are those for local and competing imports on the one hand (the composite commodity), and for non-competing imports on the other. In principle, the choice between local and competing imports for intermediate inputs will not be governed by technical considerations but by economic considerations such as relative prices and product characteristics. For this reason, the economic modeller must analyse how this economic decision is made in choosing between domestic and imported sources of supply. This analysis can only proceed if the relevant technical coefficients are available in the first place.

The mechanical RAS method had to be used to obtain the input-output flows consistent with a purchaser price valuation of 1984 intermediate usage of the composite commodity required for modelling purposes. This procedure is rather bizarre since the initial source material for intermediate input usage obtained from the Industrial Census is for disaggregated inputs valued at market or purchaser prices. It means that the normal discrepancies between the input-output coefficients arising from changes in relative prices and technical change are compounded by discrepancies due to measurement

error. Clearly, it would be much better to have the raw estimates of the 1981 input-output flows so that the modeller could estimate the input-output flows and coefficients according to the particular economic policy modelling exercise. As soon as more accurate input-output information is available, the 1984 SAMU can be quickly re-estimated.

2.3 The Analysis of Protection

A second area of major importance in the ASAP model is the analysis of protection in manufacturing. This is especially important since the height of protection varies enormously within manufacturing and between manufacturing and the rest of the economy. Thus the analysis of the effects of entry into a Customs Union on resource allocation within manufacturing and in the economy as a whole requires detailed information on the protective structure within manufacturing.

2.3.1 The Treatment of Protection in FINALSAM 1984

In the construction of the 1984 FINALSAM, tariffs enter as a part of government revenue associated with competing import and non-competing imports. No other aspects of the structure of protection, such as import licenses or controls, appear in the SAM. However, when basing an economic model on the SAM, it is important to give consideration to the way in which protection data in general can be incorporated into the accounting framework.

2.3.2 Accounting for Tariff Protection in a SAM

The tariff revenue is the amount of the relevant import valued cif multiplied by the cif tariff equivalent of specific import duties or the ad valorem tariffs themselves. It is straight forward to obtain an estimate of the height of the average tariff from the SAMU by

dividing tariff revenue by the cif value of imports. This is the import-weighted measure of the average level of the tariff in each importing category.

The import weighted tariff is not always a good measure of the height of a protective structure. For those items where protection is high, it is likely that the imports will be low but that there will be a large amount of domestic production. Conversely, for those items where tariffs are low, there will be a higher level of imports. Thus, the higher the level of protection, the lower will be the import weight assigned to any particular tariff sub-category within an aggregate import competing sector. This imparts a downward bias to the measure of the average height of the tariff. Ideally, the higher the tariff, the higher will be protected domestic production; the measure of the average height of the tariff structure should attempt to capture this effect.

The standard way in which the average height of the tariff is calculated in the protection literature is to use either a domestic output weighted measure of protection, or a domestic market supplies weighted measure of protection. It is widely accepted that either the output or market supply weighted measure gives a better estimate of the average height of domestic prices above world prices than the import weighted tariff. However, this cannot be so readily done within the SAM framework. As soon as the import-weighted tariff is dropped in favour of, say, an output weighted tariff, the whole basis of valuation in the SAM and the estimation of government revenue breaks down.

In principle, an output weighted tariff can be incorporated into the SAMU using a dummy account to adjust for the over-estimation of the tariff revenue and revaluing competitive imports in line with the output-weighted tariff. However, the tests of the ASAP model reported in section IV were carried out using the import-weighted tariffs since it was not possible to re-value competing imports in the SAMU in the time available. Whilst there is some compensation

for the under-estimation of the height of tariff protection through the estimation procedure used for the Armington elasticities described in Appendix 3, these measurement difficulties should be borne in mind when interpreting the results reported in section V.

2.3.3 Non-Tariff Protection in a SAM

In principle, the tariff equivalent of direct controls or restrictions can be approximately estimated by direct observation of the difference between the domestic and cif prices of restricted commodities. In terms of the SAM valuation procedures, a second dummy account could be added to allow for the premium over world prices accounted for by the protective structure. However, since there is no information available at present on the protective effect of non-tariff barriers, these effects cannot be incorporated at the moment.

2.3.4 The Measures of Protection Used

The tariff data for import-competing industries prepared for the EEC negotiations cover around 2/3 of domestic industrial production. The matching total domestic output figures are for 1984, so that it proved possible to calculate the average domestic import and output weighted tariff for the present situation and for the proposed Customs Union for the six manufacturing sectors identified in the SAM by blowing up the sample averages for each sector to the sector totals for 1984.

2.3.5 Protection of Productive Inputs

In the absence of the disaggregated competing and non-competing imports by sector of use and by import sector of origin, it is not possible to obtain an estimate of the tariff on productive inputs. However, in order to capture some of the effects of biases in the

pattern of import duties according to sector of use, only the import levy was applied to non-competing imports used in domestic production, investment or by tourists and other foreign bases and embassies. Any draw-back on these duties when the non-competing imports enter into export production is assumed to be taken into account in the structure of export subsidies.

2.3.6 The Estimated Levels of Protection

The resultant estimates of the 1984 tariffs on manufacturing compared with earlier estimates by Demetriades (1984) are shown in Table 2.1, and the estimated manufacturing protection at the level of aggregation used in the 1984 SAMU is shown in Table 2.2. Other tariffs on traded inputs are measured using the import weights directly from the 1984 SAMU in the effective protection calculations discussed in the next section.

It can be readily seen from Table 2.2 that the output weighted tariff TX is much higher than the import weighted tariff TM for 1984. However, at a lower level of disaggregation as shown in Table 2.1, this result does not always hold. Also, the nominal tariffs have increased between 1967 and 1984 for final goods such as Clothing and Footwear, but declined in some of the commodity groups which produce intermediate products such as Electrical Machinery. It can also be seen from Table 2.2 that the roughly estimated tariffs on non-competing inputs into domestic production, TMN, are much lower than the tariffs on final goods. As noted above, this is not a result

arrived at by detailed analysis of the tariff data, but is based on the judgement that all of the pressures within the business community and government have tended to increase protection on final goods and to lower it on producer goods. The final two columns shown in Table 2.2 are for the estimated export subsidies which cover part but not all of the export rebates paid to exporters using protected imported materials, and also the estimated external tariff should Cyprus go into a Customs Union with the EEC.

2.4 Capital Stocks in the Medium to Long Run

Within the GAMS model, the rate of profit on the capital stock in each sector is determined, but profitability has no role in determining the sectoral investment allocation. This is suitable for short-run analysis, but is less satisfactory for the medium-run. In effect, it is assumed that the planners know what the desirable sectoral allocation of the capital stock is, and the government has available to it the necessary policy instruments, for example grants and subsidies, to achieve the desired investment pattern.

The ASAP model makes the opposite polar assumption. The model projects the growth of gross profits in each sector, and the long-run demand for capital in each sector is determined endogenously, given the exogenous determination of gross real rate of profit set at 10%. The necessary investment required to satisfy the overall rate of growth of capital in the economy is determined by setting the rate of growth of the base year investment equal to the rate of growth of the total capital stock. By this means, a rough allowance is made for overall investment. However, there is no explicit mechanism connecting this to the sectoral investment requirements to total investment by commodity due to the data deficiencies discussed in Appendix 3.

2.5 Household Expenditure in the Medium to Long Run

The most important aspect of changes in pattern of consumer expenditure over the medium to long run are the income effects. These can be captured through a Linear Expenditure System (LES) which can be estimated from expenditure survey data. Thus, the estimates of the Engel elasticities or income elasticities for various sub-groups of commodities in the 1984 Household Expenditure Survey provided the basis for estimating the parameters of the LES incorporated into the ASAP model. The resultant estimates of the income elasticities of demand are shown in Table A3.4.

III

EFFECTIVE PROTECTION

3.1 The Usefulness of the Effective Protection Calculations

The various measures of the height of the protective structure discussed in this section capture the partial equilibrium effects of the existing structure of protection on resource allocation in both import substituting and export activities. Estimates of the partial equilibrium effects of a change in trade policy to a Customs Union with the EEC are also reported. These measures of the protective structure for 1984 facilitate a comparison with the earlier study of effective protection by Demetriades (1984) and provide a useful background to the general equilibrium policy experiments with and without a Customs Union using the ASAP model.

3.2 Measuring Effective Protection

The concept of effective protection has a long history in the trade policy literature. It measures the extent to which value added is raised above world value added by a protective structure. In focussing on value added protection rather than nominal protection, it takes into account the effects of tariffs on inputs as well as on outputs. Since there is typically escalation in the structure of tariffs, with low protection on productive inputs and much higher levels of protection on outputs, the rates of effective protection are usually much higher than the nominal rates of protection. As can be seen from Table 2.1, such an escalation is present in the structure of protection in Cyprus.

The easiest measure of effective protection to apply is the Balassa method which assumes that all the benefits of the protective

structure accrue to the protected trading sector and not to any of the suppliers of non-traded inputs. However, it is often the case in highly protected economies that value added at world prices is negative, so that the standard measures of effective protection need to be interpreted with great care. Negative value added at world prices can arise in both homogeneous productive activities and for the typical aggregates of heterogeneous productive activities which make up a typical industry. It is simplest to explain how the phenomenon could arise for the homogeneous activity.

3.3 Negative Value Added at World Prices

Consider the case of a domestic industry producing cars from imported kits. The direct foreign exchange costs of the activity are composed of the cost of the kits, the costs of imported machinery and other inputs such as energy. It is quite possible for the direct foreign exchange costs of the inputs used to be greater than the cost of importing the finished car. The cost of the components in the kits will often be much greater than the cost of the same components installed in a finished car on an assembly line. The utilisation of both imported machinery and energy may also be inefficient so that the total foreign exchange costs of the direct traded inputs is more than the cost of the directly imported car. The same phenomenon can arise when several different activities are aggregated into a single industry.

3.4 Measuring the Effects of Changing the Protective Structure

As a result of the problem of negative value added, it is more useful to measure the extent to which domestic unit value added changes with a change in the structure of protection. This measure does not suffer from the problems of a negative denominator, and is more readily interpretable from the point of view of the policy maker who is typically interested in partial rather than total removal of protection. The likely impact of such a change on resource allocation

and welfare is also facilitated by the measure of domestic unit value added changes. The same measure can also be applied to assess the impact on unit value added in export production from a change in the structure of protection. Since it is typical for industries in Cyprus to have a highly protected import competing sector and a competitive export sector, usually producing different commodities within the same industrial categories, it makes sense to have a comparable calculation of the change in unit value added for both components of each industry.

3.5 The Results

The detailed results of the effective protection calculations are reported in Tables 3.1 and 3.2, and the results are summarised in Figures 3.1 and 3.2.

For a mathematical statement of each measure of protection, the reader is referred to Appendix 2.

It is apparent from the detailed results in Tables 3.1 and 3.2 that there are several industries for which there is negative value added at world prices. This means, for example, that in the shoe industry, it would be cheaper to import finished higher quality shoes than to import the leather and other traded inputs used to make comparable shoes locally. This makes it impossible to use the standard measure of effective protection in a comparable way for each industry. It is for this reason that it makes more sense to follow the results of changes in domestic unit value added which would be induced by a change in the protection structure. These results are summarised in Figures 3.1 and 3.2. Figure 3.1 shows the level of nominal protection (measured with output weights) on import substituting activities, the % change in unit value added which would be induced by the complete removal of tariffs and export subsidies in import substituting activities and exporting activities. For example, it can be seen from Figure 3.1 that Textiles and Wearing Apparel has average

FIGURE 3.1:
EFFECTS OF PROTECTION (OUTPUT WEIGHTS)

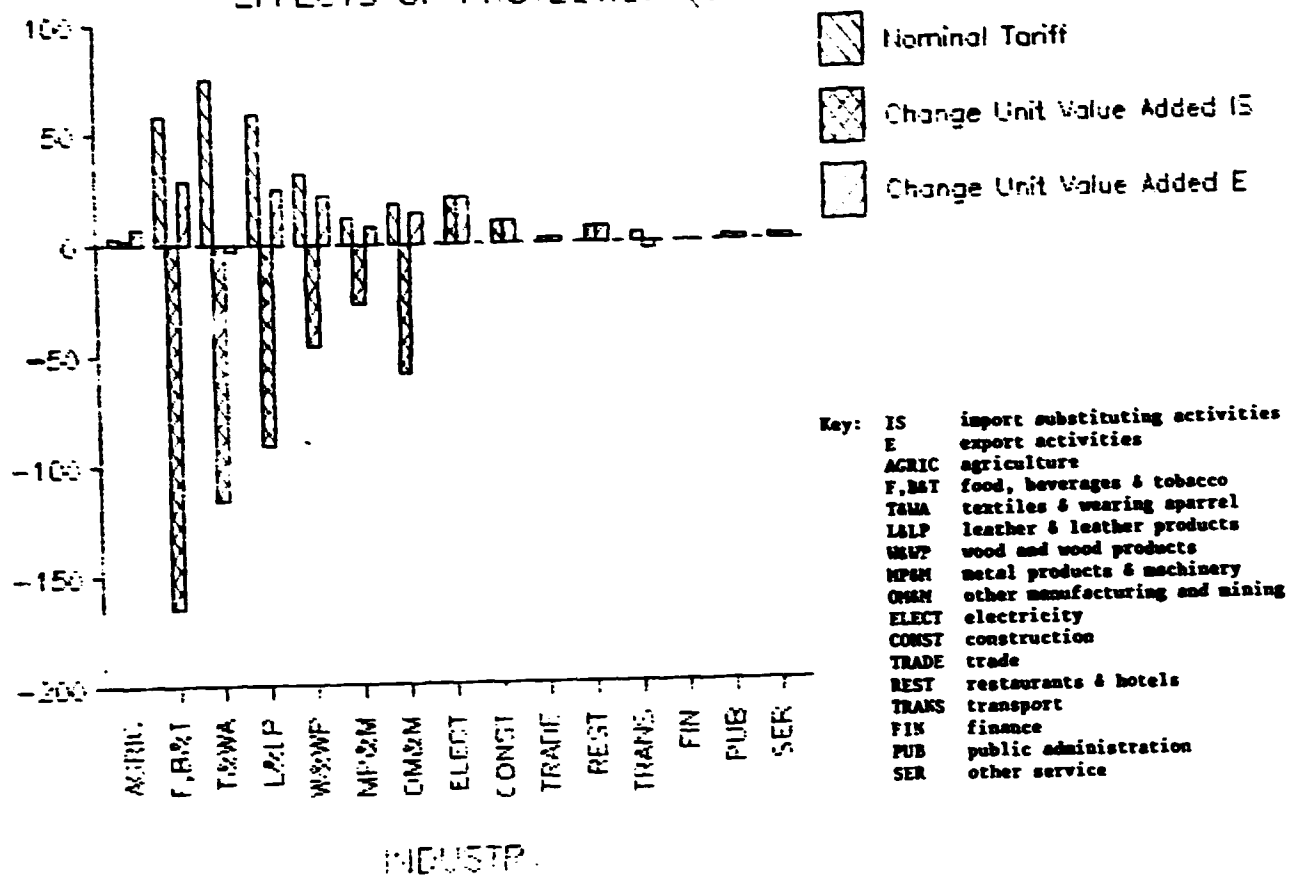
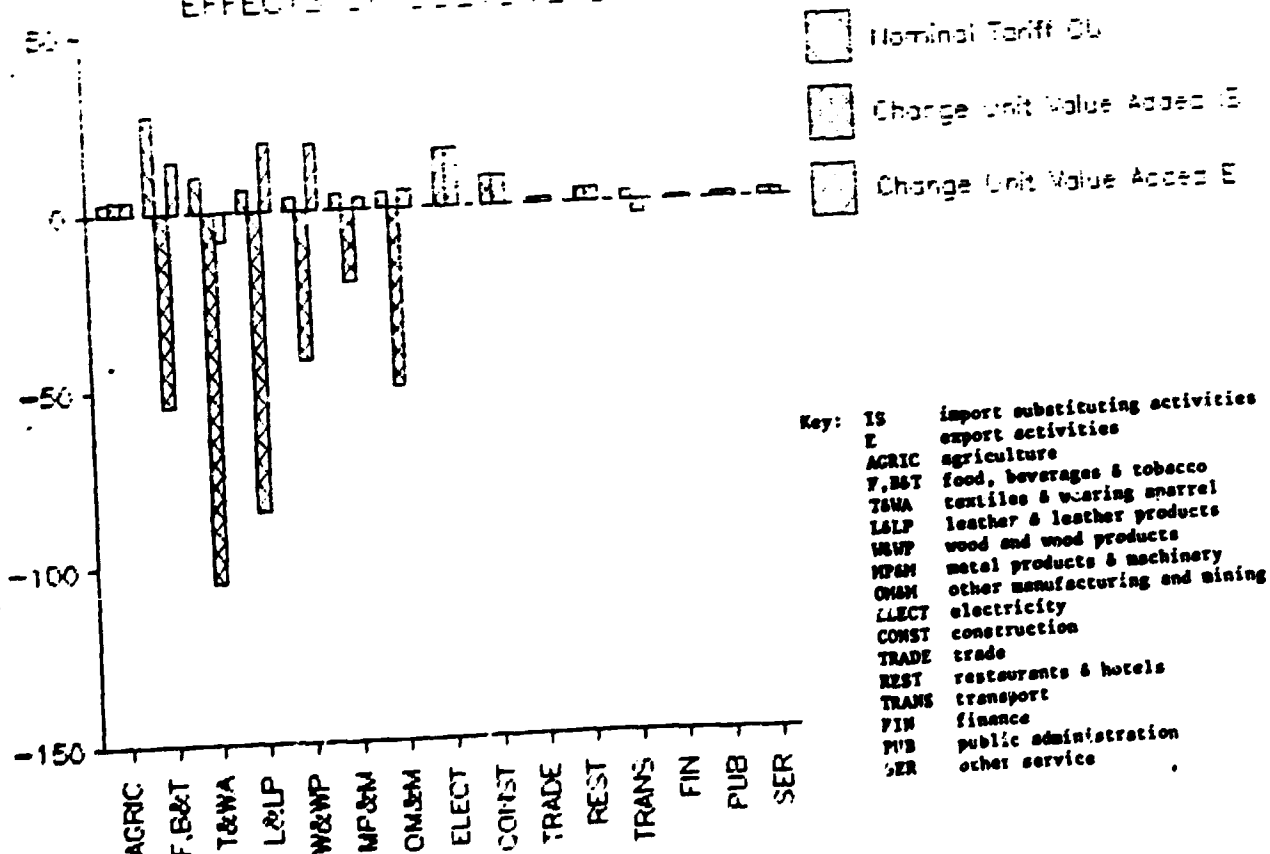


FIGURE 3.2:
EFFECTS OF CUSTOMS UNION (OUTPUT WEIGHTS)



nominal tariff on import substituting activities of well over 50%. Removal of this protection would lower domestic unit value added by over 150%. On the export side, the changes in domestic unit value added induced by the removal of protection show that there would be a boost to exporters with the full elimination of the effects of protection on their traded inputs, only some of which are captured in the present export rebate schemes. Finally, the estimates of the change in domestic unit value added which would result from the proposed Customs Union shown in Figure 3.2 show the extent to which import competing industries and exporting industries will be hurt by the Customs Union, taking into account the proposed changes recorded in the tariff change estimates.

It would be tempting to conclude, on the basis of the change in unit value added calculations, that all of the import competing production in the most highly protected industries, Textiles and Wearing Apparel, Leather and Leather Products, and Wood and Wood Products, would be eliminated by the removal of protection. It would also seem to follow that there would be immediate welfare gains to the economy from such a move which would far outweigh the losses of income to the firms and workforce employed in the industry. However, such a conclusion does not follow from the effective protection or change in value added calculations.

First, it is not possible to draw strong conclusions about the resource re-allocative effects of the removal of protection from measured effective protection without taking into account the general equilibrium responses in the economy which would follow from such a change. For example, in the case of Leather and Leather Products cited, there may be a fall in wages and a devaluation of the exchange rate which would be sufficient to allow some of the industry to survive without protection. In this case, the measured negative value added at world prices would be positive when all protection was removed. Since the measured unit value added at world prices is small (see Tables 3.1 and 3.2), it is not hard to imagine a cut in wages and a devaluation of the exchange rate sufficient to reverse the sign of value added at world prices.

Second, it is not possible to make any precise statements about the resource re-allocative effects of the removal of tariffs from the measure of effective protection. It is only possible to conclude that, on average, output would decline in industries with high rates of effective protection. This reinforces the first point, that no precise statements can be made about the resource re-allocative effects of the removal of protection from the effective protection measures.

Finally, the measures of effective protection refer to aggregate industries in which there is considerable product differentiation. Thus, it is possible that some of the domestic industry would survive the removal of protection provided that the domestically produced goods can only be imperfectly substituted for by imported products.

3.6 Effective Protection and the ASAP Model

Another way of looking at the change in unit value added estimates shown in Figures 3.1 and 3.2 is that they record the initial impact effects of the changes described which are fed into the ASAP model when making policy option experiments. Thus, given the high levels of tariff protection, it would seem that changes in the protective structure may have important effects on resource allocation in the economy. Even with the type of radical technical change possible with the implementation of an Industrial Strategy which might increase the rate of growth of total factor productivity by 2-4% per year, it would be between 5 and 10 years for the more highly protected industries to gain through technical change as much as they lose from protection on the import substituting side. However, if the same rate of technical change takes place on the export side, the effects would be more dramatic since there is not the same need for the radical technical change to offset the losses from the removal of protection. In so far as the sector strategies are directed towards enhancing export performance, the benefits to Cypriot exporters from the removal of protection to exporters is small compared with the likely benefits from improved competitiveness through a policy of radical

technical change. The balance of the effects of an Industrial Strategy and the removal of some protection through the Customs Union can be assessed in the context of the policy experiments with the general equilibrium ASAP model described in the next section.

SETTING UP THE ECONOMIC POLICY EXPERIMENTS

4.1 The Alternative Economic Policies

The ASAP model was used to generate projections for the whole economy for the years 1991 and 1996. The purpose of including the 1996 projections was to facilitate model runs with a Customs Union coming in over a 10 year period.

The policy packages considered were:

- (i) The Base Projections modified to allow for entry into a Customs Union, with half of the tariff adjustment taking place by 1991 and the remainder by 1996.
- (ii) Base projections modified to consider the effects of an Industrial Strategy with a major acceleration in the rate of technical change in manufactures.
- (iii) Base Projections modified to allow for both a Customs Union and an Industrial Strategy.

4.2 Exogenous Variable and Parameter Estimates for the Base Projection

The values of the exogenous variables and parameters for each year of the Base Projections were estimated as follows. For 1991, the values were based partly on the projections currently being used for the 5th

Emergency Plan by the GAMS model, taking into account the direct observation of the values of many of the exogenous variables to 1986. The most important variations from the Planning Bureau projections are as follows:

(i) Tourist Expenditure

Over the period 1983-6, tourist expenditure grew at an average rate of 9.4% pa in real terms, and in the initial runs of the GAMS model, tourist expenditure has been projected to grow at 10% pa to 1991 in terms of dollars. Since world prices were also projected to grow at around 4% pa over the same period, this reflects a projected real rate of growth of Tourist Expenditure of around 6% pa. However, there are grounds for believing that this rate of growth is too large beyond 1991.

The rate of growth of tourist expenditure is made up of two divergent trends - the rate of growth of the number of arrivals, and the average expenditure of each tourist whilst in Cyprus. The former grew from 620,727 arrivals in 1983 to 900,727 arrivals in 1986, an annual average rate of 13.2% pa. The latter declined from £CY249.3 to £CY225.1 in 1986 (measured in 1981 prices) an annual average rate of -3.3% pa. The World Bank has suggested that the number of arrivals will reach a medium term ceiling of 1,040,000 by 1991, implying an annual average rate of growth of 3% pa from 1986 to 1991. If per tourist expenditure continues to decline, there will be no net growth in tourist expenditure from 1986 to 1991. However, there is already some evidence that the ceiling will be exceeded. This, combined with efforts to at least hold per tourist expenditure constant and the growth of expenditure on foreign bases and embassies, suggests that a base projection of the real growth of tourist expenditure of 4.5% pa from 1986 rather than 6.0%, on top of a growth of 10% pa in 1985 and 1986, would be an appropriate base projection. The rate of growth of tourist and other foreign expenditure from 1991 to 1996 was set at 2.5% pa. If anything, these projections will be on the high side especially for the period for

1991 to 1996.

(ii) Government transfers to households

After rises of 13.9% and 16% in 1985 and 1986, the GAMS model assumes that government transfers to households will grow at 11.5% pa in real terms to 1991. Given the lack of dynamism in the economy and the threat of rising unemployment, it is likely that there will be pressure for government current expenditure to increase more rapidly than present Planning Bureau projection. Taking this into account, government current expenditure is projected to rise at 6% pa to 1996. It is assumed that government capital transfers will grow at 4.0% pa in real terms, rather than sharp declines as assumed in the GAMS model. However, it was assumed that the government current transfers to households are brought under greater control than current government expenditure and assumed to grow of 4.0% pa after 1986, in line with other transfers.

(iii) Substitutability of Domestic Goods and Competing Imports

The degree of substitutability of domestic goods and competing imports (the Armington elasticity) is one the most sensitive parameter estimates used in the model projections. However, in the absence of estimates of disaggregated import demand functions for the Cyprus economy, the GAMS model uses an across the board estimate of 6 for the Armington elasticity.

As discussed in the main report, direct estimates of the likely impact of the Customs Union were made on the basis of the case studies. These estimates took into account new sources of foreign competition, the degree of product differentiation, non-tariff protection and the structure of each manufacturing industry. The Armington elasticities estimates in the range of 2 to 24 are shown in Table A3.4. In the case of agriculture, the Armington elasticity was

set at 2, given the high level of non-tariff protection in this sector. This range of estimates straddles the GAMS model estimate of 6.

(iv) Export market growth

The rapid rate of growth of export markets of between 2% pa and 4.5% pa between 1984 and 1991 used in the GAMS model does not reflect the reality of a major collapse of Middle Eastern export markets of around 25% between 1984 and 1986. In view of this, export markets were assumed to recover 10% of the loss to 1986 by 1991 and thereafter to grow at 2% pa. This means that any net growth in exports up to 1991 is achieved in the base projections by changes in the degree of price competitiveness.

(vi) Investment growth

The GAMS model effectively treats all investment as exogenous. Whilst this makes sense for short and medium run consistency projections, the assumption is not appropriate for longer run projections. Thus, household investment in housing was assumed to grow from 1984 in line with projected household income whilst enterprise and government investment is assumed to grow from 1984 levels in line with the growth of the capital stock.

(vii) Household expenditure

At the present state of development of the GAMS model, all consumer expenditure is assumed to be spent on goods and services in the same proportions as in 1984. Whilst this may be an acceptable first approximation for short and medium run projections, this is not acceptable for the longer run. On the basis of the estimated income elasticities of demand for various categories of consumer expenditure reported in the 1984 Consumer Expenditure Survey, it is possible to estimate the parameters of a linear expenditure system. The adjusted estimates of the income elasticities of demand for the sectors of the ASAP model are reported in Table A3.4.

(viii) Labour Market

The labour market could be modelled along the lines of the GAMS model with endogenous increases in the wage over and above increased in the minimum wage. That is, any increase in the demand for labour over and above the market clearing wage is translated into a wage rise. Any fall in the demand for labour is translated into unemployment. For present purposes, a market clearing wage was assumed for 1984 levels of unemployment. Whilst this may mean that the model does not pick up increased unemployment in the Base Projection for white-collar and professional workers, it does not have a great deal of impact on the projections because of the Cobb-Douglas production function. With an elasticity of substitution between capital and labour of 1, any rise in the wage of a particular skill category is offset by a decline in employment whilst the total amount paid in wages stays the same.

(ix) Technical Change in the Base Projections

The stylised facts about the combined effects of both product and process innovation when measured as technical change suggest that, although there may be marked changes in the structure of the input-

output coefficients in the process of growth and structural change, the total input to gross output ratios do not change very much over time. In contrast, the labour to gross output ratio tends to fall dramatically whilst the changes in the capital to gross output ratios can go in either direction.

In the absence of detailed empirical investigation of technical change in Cyprus, the estimate of the rate of technical change used in the present GAMS model in part reflects these stylised facts in that the intermediate to gross output ratios are held constant. The GAMS model makes the simple initial assumption that the rate of technical change is 2% pa for both capital and labour inputs in all industries except agriculture, which is assumed to have a zero rate of technical change. This estimate of the rate of technical change based on the modified stylised facts is also taken as the background starting point against which the sector strategy of radical technical change is assessed.

(x) Terms of Trade

One of the major departures from the GAMS model were the exogenous terms of trade assumptions. The GAMS model assumes a declining exogenous terms of trade for the economy to 1991 when estimated using approximate 1984 trade shares. This assumption implies a sharp decline in the exogenous terms of trade from 1986 to offset the actual improvement in the terms of trade between 1984 and 1986 of over 6%, due largely to the decline in the price of oil.

The mission's view was that oil prices would recover to about 70% of the 1984 prices by 1991 relative to the price of industrial country manufactures. This projection of oil price changes, combined with the assumption that industrial country manufactured export prices would grow at 2% pa, implies that the price of non-competing imports into Cyprus will grow at about .7% pa to 1991. Thereafter, it was assumed that oil prices would move in line with industrial country

manufactured prices so that the price of non-competing imports is projected to rise at 2% pa to 1996.

Competitor export and competing import prices were assumed to grow at 2% pa in line with the price increase assumption for industrial country manufactures, except for 4 sectors. In the case of agriculture, there was no variation in the assumptions made in the GAMS model of a 15% decline in agricultural export prices to 1986 followed by no change. In Textiles and Wearing Apparel, Leather and Leather Products, and Wood and Wood Products, there is strong competition from imports due to a falling effective price of differentiated products due in part to design, product and process innovation, so the competitive import price for these sectors was assumed to have no change to 1991 and 1996. On the export side of these sectors, a 1% pa growth of competitor export prices was assumed on the grounds that there was some but less intense effective price competition because of the continued importance of Middle Eastern markets. However, in practice, some of the domestic productivity improvements are passed on to foreign customers in the ASAP model so that in the Base Projections, the endogenous fob price of exports fall by about 1% pa relative to competitor exports. Thus the combined endogenous and exogenous effects approximately add up to a 2% pa decline in the fob export prices in these sectors.

The complete set of values for the exogenous variables and parameters chosen for the base projections reported are set out in Table A3.4 together with some small variation in tax rates.

4.3 Modelling the Customs Union

In setting up the policy experiment to project the effects of a Customs Union on the model economy, it has been assumed that there will be two types of effects operating in addition to the projections of exogenous variables and parameter estimates for the Base Projection. The first effects will come from a change in the price of

competitive imports due to a lowering of import tariffs and improvement in export profitability due to the effects of lower competitive import prices on input costs; on the negative side, it is assumed that exporters will experience some loss due to the removal of export subsidies, partly offsetting the gains from cheaper inputs.

It is assumed that one half of the Customs Union tariffs and export subsidies come into place by 1991, and the remainder by 1996. Second, in some of the manufacturing sectors, the capacity to service export markets will be affected by the loss of protected domestic markets. It is not possible to capture these effects on the production side of the model. This is because the ASAP model treats production for the domestic market and export markets as perfectly substitutable. This undesirable feature of the model could be modified by including a Constant Elasticity of Transformation function between production for the domestic markets and exports along the lines of Dixon *et al.* (1982). However, in the time available, it was not possible to introduce such a functional specification into the ASAP model. One way of making some allowance for this effect would be to assume that the direct estimates of the loss of output with the Customs Union also implied a loss of capacity to service export markets. It was assumed that the export demand functions in the manufacturing sector would shift in line with the estimated direct effects of the Customs Union on output in one of the sensitivity tests of the model.

It was assumed that the Customs Union will have no effects on the growth of export markets or on the rate of technical change. Export industries already face the competitive pressures of the world market, and it is difficult to see what additional technical change might result from increased competition. On the import competing side where the major effects of increased competition will be felt, there may be a once-and-for-all increase in technical efficiency as firms close down those lines which face increased import competition, but it is difficult to think of ways in which this might be measured. To this extent, the policy experiment projecting the effects of the Customs Union may understate a possible benefit.

Although Cyprus is very small in relation to her trading partners, the Customs Union may alter the terms of trade. This may be the case for differentiated manufactured products especially those sold in the EEC. In the Middle Eastern markets, there may be some monopoly power in the distribution network for there to be a less than perfectly elastic demand curve for exports. Thus, to the extent that there is increased pressure to export to all markets within the Customs Union to offset the loss of employment in import competing activities, the Customs Union may induce adverse terms of trade effects. With the possible exception of the effects of increased import competition on technical change, it would seem that the effects of the Customs Union will come from a balance between the effects of the change in the structure of protection which will improve efficiency, and any adverse terms of trade effects.

4.4 Modelling the Industrial Strategy

4.4.1 Mass Production vs Flexible Specialisation

The key to the mission's approach to the understanding of technical change is that the micro-electronic revolution which is now dramatically affecting both product and process technologies all over the world requires for its successful introduction a change in the relations within firms and between them. For example, mass production on assembly lines which reap large economies of scale from purpose-built machinery requires a heavy concentration of technical knowledge and initiative in the hands of a relatively few skilled workers and management who control what is produced and how. The assembly line workers play a relatively passive role in the productive process itself but often have conflictive relations with management arising from their attempts to achieve more control over the conditions, pace and remuneration of their work. The organisation of marketing is geared to the dominant need to promote and sell those commodities which can be cheaply produced by mass production methods using purpose-built machinery. In contrast, the micro-electronic revolution permits the use of more flexible general-purpose machinery to produce

specialised products which are more closely linked to differentiated segments of the market.

The successful implementation of these new micro electronic technologies requires within the firm that workers gain new technological skills for multi-tasked work and greater control over their work process. It also requires much more specialisation and co-operation between firms to realise economies of scale in the acquisition of product, process and market information and the development of new skills by the workforce.

4.4.2 The Industrial Strategy, Conventional Economic Analysis and the ASAP Model

In the context of an economy such as Cyprus, the central role of an Industrial Strategy is to find co-operative ways in which the scale economies in the acquisition of technological and marketing information and in training can be realised by the small firms which prevail in the economy. In effect, the problem is to find sectoral and economy wide institutions to carry out the functions of the head-office of a large firm which has adapted to the new flexible specialisation.

Whilst the economics of flexible specialisation can be stated in conventional terms, these considerations and the associated economic policies required for their implementation are entirely absent from the technical specifications of a CGE model. Therefore the only way in which these considerations can enter into the model projections is through the exogenous variable and parameter shifts in the economic policy experiments designed to simulate some of the effects on an Industrial Strategy, and through the interpretation of the model results.

4.4.3 The Industrial Strategy Policy Experiment

The sector case studies provide an important source of information on the extent to which it is possible to accelerate the overall rate of technical change in manufactures. In spite of the considerable variation in the structure of each sector studied and the types of process and product innovations which could be implemented, it is striking that a general view emerges from the case studies that the order of magnitude of accelerated technical change possible given the implementation of an Industrial Strategy is between 2% pa and 4% pa applied to all inputs and treating product innovation as an enhancement of the unit price of the product. This implies a total additional technical change of just over 10-20% pa up to 1991, and of between just over 20% and nearly 50% pa up to 1996. In addition, the view emerged that, with attention to marketing and product innovation, the rate of growth of export markets could expand at comparable rates. However, in the Industrial Strategy policy experiments, only accelerated technical change was introduced and sensitivity tests were conducted on the effects of additional export market growth.

The policy experiment to simulate the Industrial Strategy assumes a modest increase in the rate of improvement in the productivity of capital and labour in manufactures of 1% pa and 2% pa for intermediate input coefficients. Roughly speaking, the intermediate input coefficient usage reflects the requirements for working capital, in contrast with fixed capital which is taken into account in the capital input component of the model. This assumed increase in the rate of technical change is modest compared with the possible orders of magnitude of accelerated technical change discussed in the sector case studies. Insofar as it assumes a higher rate additional technical change for the intermediate input coefficients or working capital rather than for fixed capital and labour, it reflects the judgement of the sector studies that there are immediate and substantial productivity improvements which can result from better organisation of production of existing products. It is also assumed that the Industrial Strategy has no immediate impact on the rate of

growth of access to export markets, reflected in the assumption that there is no increase in the rate of shift of the export demand curve.

The Projections

5.1 The Macro Effects of Alternative Policy Experiments

The results presented in Section V should be interpreted in the light of the caveats noted earlier. Attention is drawn to the sensitivity of the results to the consequences of particular assumptions and data limitations.

5.1.1 The Base Projection

The ASAP model was used to generate projections for the whole economy for the years 1991 and 1996. Two aspects of the projections should be borne in mind when interpreting the results. First, each set of projections provides an estimate of levels of activity and rates of growth of various economic aggregates over time. Second, each set of projections can be compared at any point in time for a given set of changes in exogenous variables or parameters. Thus, once the exogenous variables and the parameters were chosen for the Base Projections, these parameters and exogenous variables were varied to examine the effects of the 3 different policy packages, the Customs Union (CU), the Industrial Strategy (IS) and the Industrial Strategy combined with the Customs Union (IS&CU). The Base Projections to 1991 and 1996 and the macro effects of the policy experiments are set out in Table 4.1 and in Figures 4.1 to Figure 4.6.

It is immediately apparent from the macro results of the Base Projection that the combination of exogenous variables and parameters interact with the endogenous variables to produce a picture of a sluggish economy up to 1991 and a deterioration in economic performance to 1996 with declining real wages.

The main features of the 1991 Base Projection are

Figure 4.1:
Projections, GDP

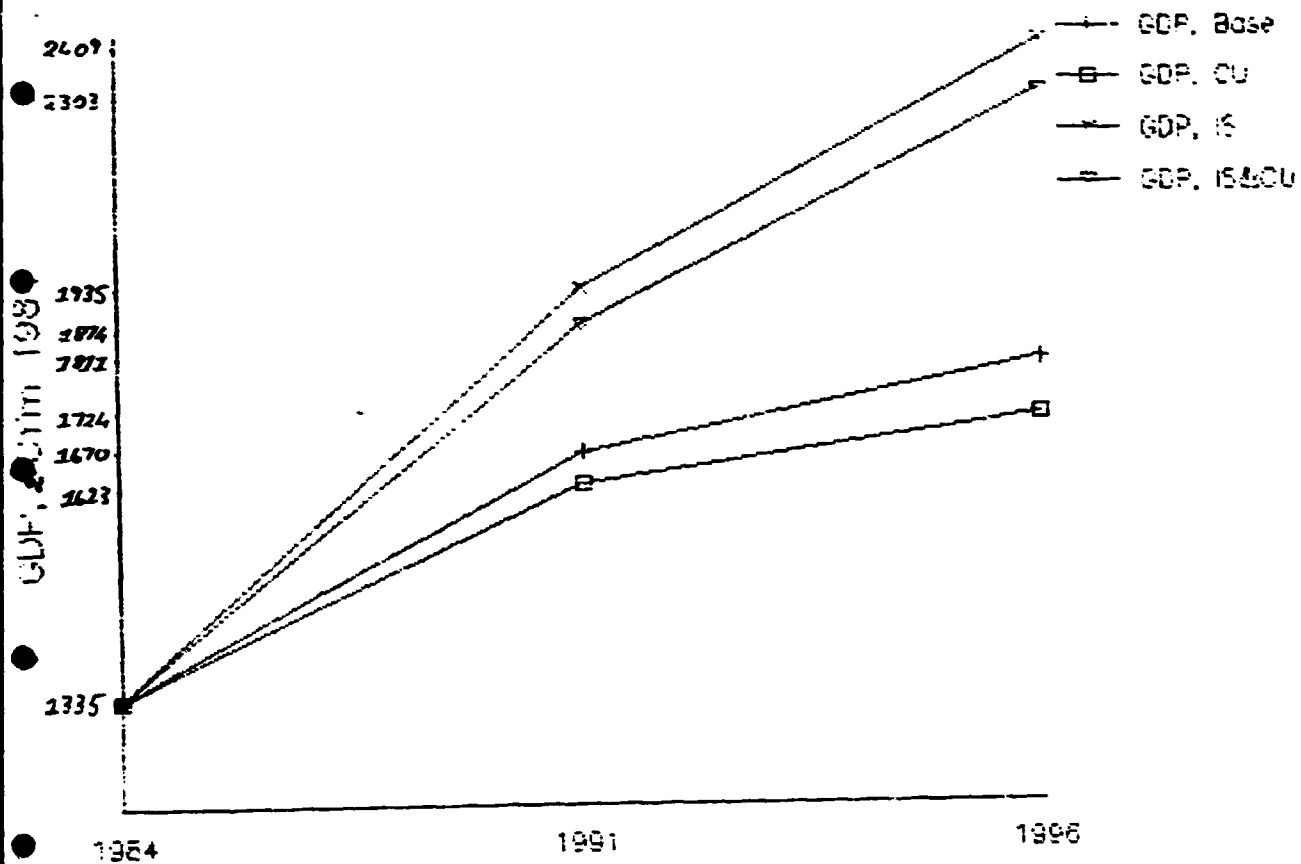


Figure 4.2:
Projections, Average Wage

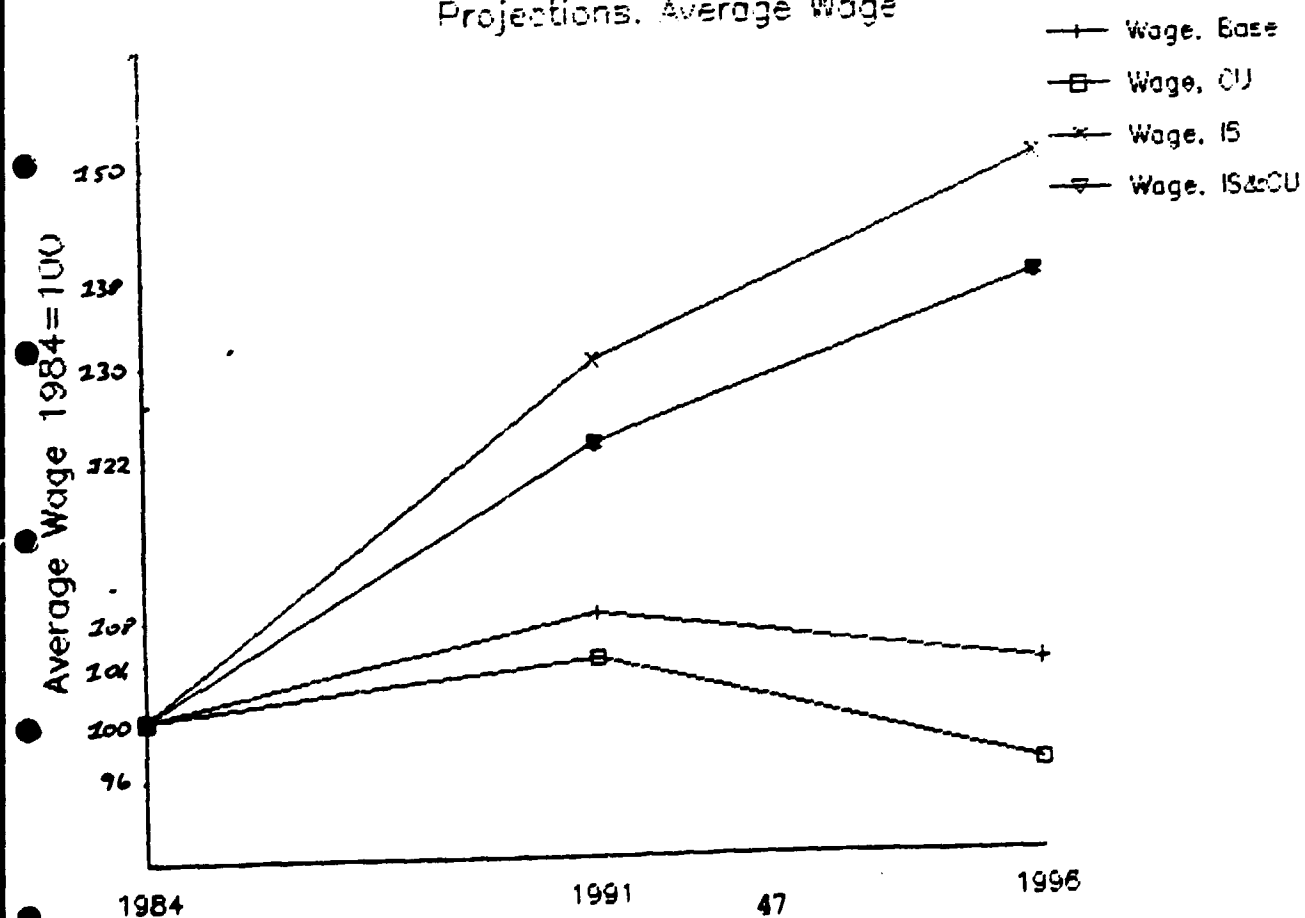


Figure 4.3:
Projections, Consumption

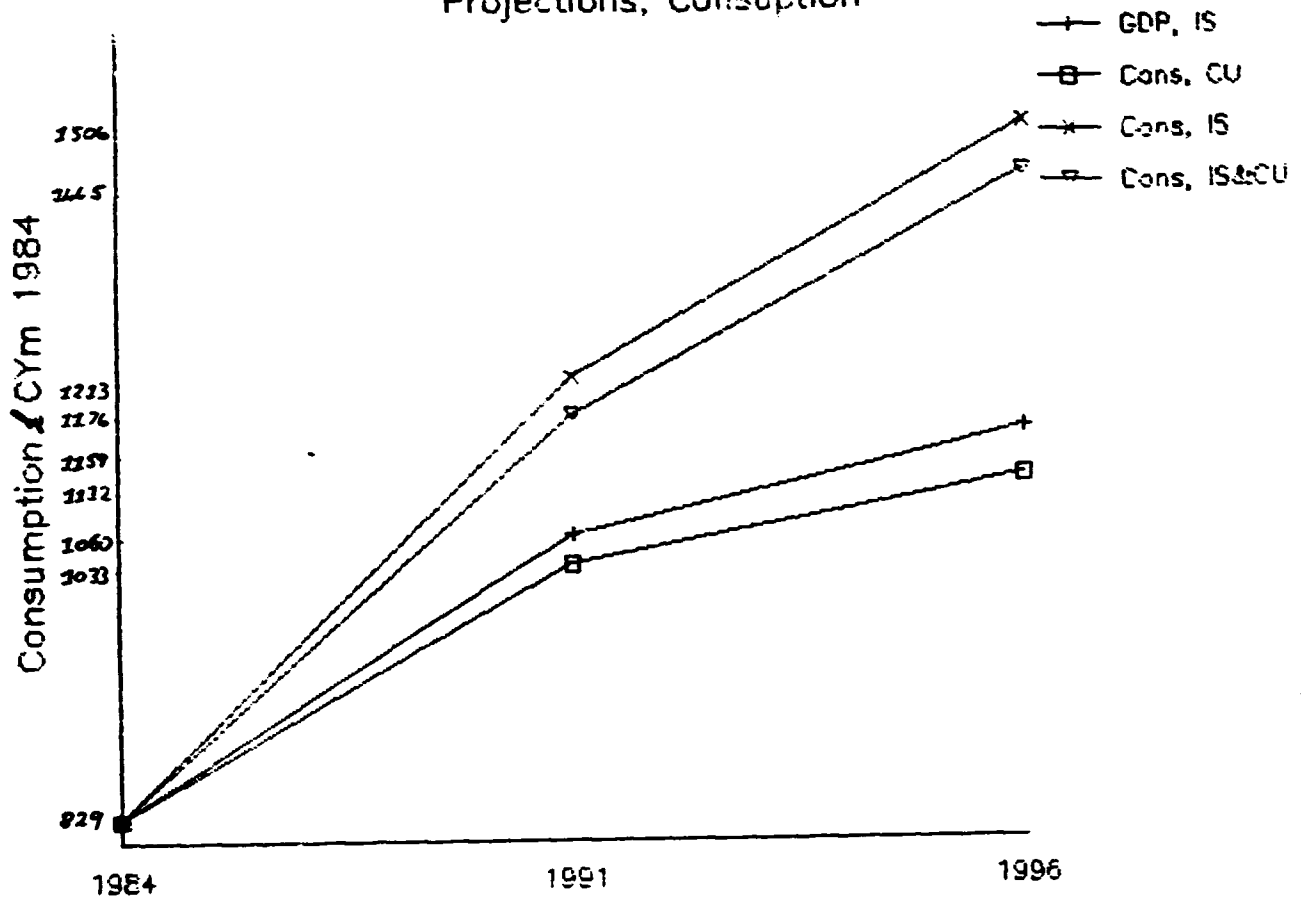


Figure 4.4:
Projections, Exports & Imports

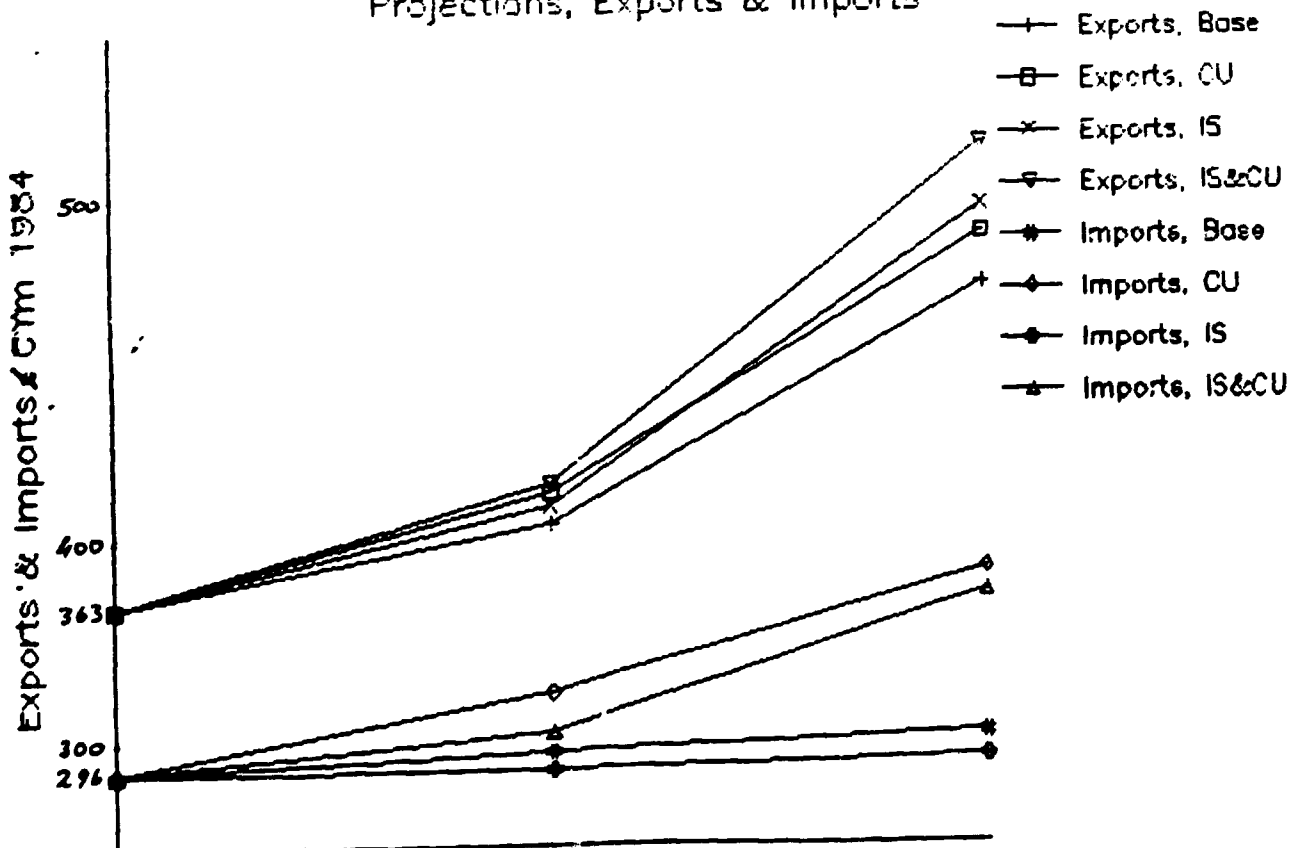


Figure 4.5:
Projections, Foreign Capital Inflow

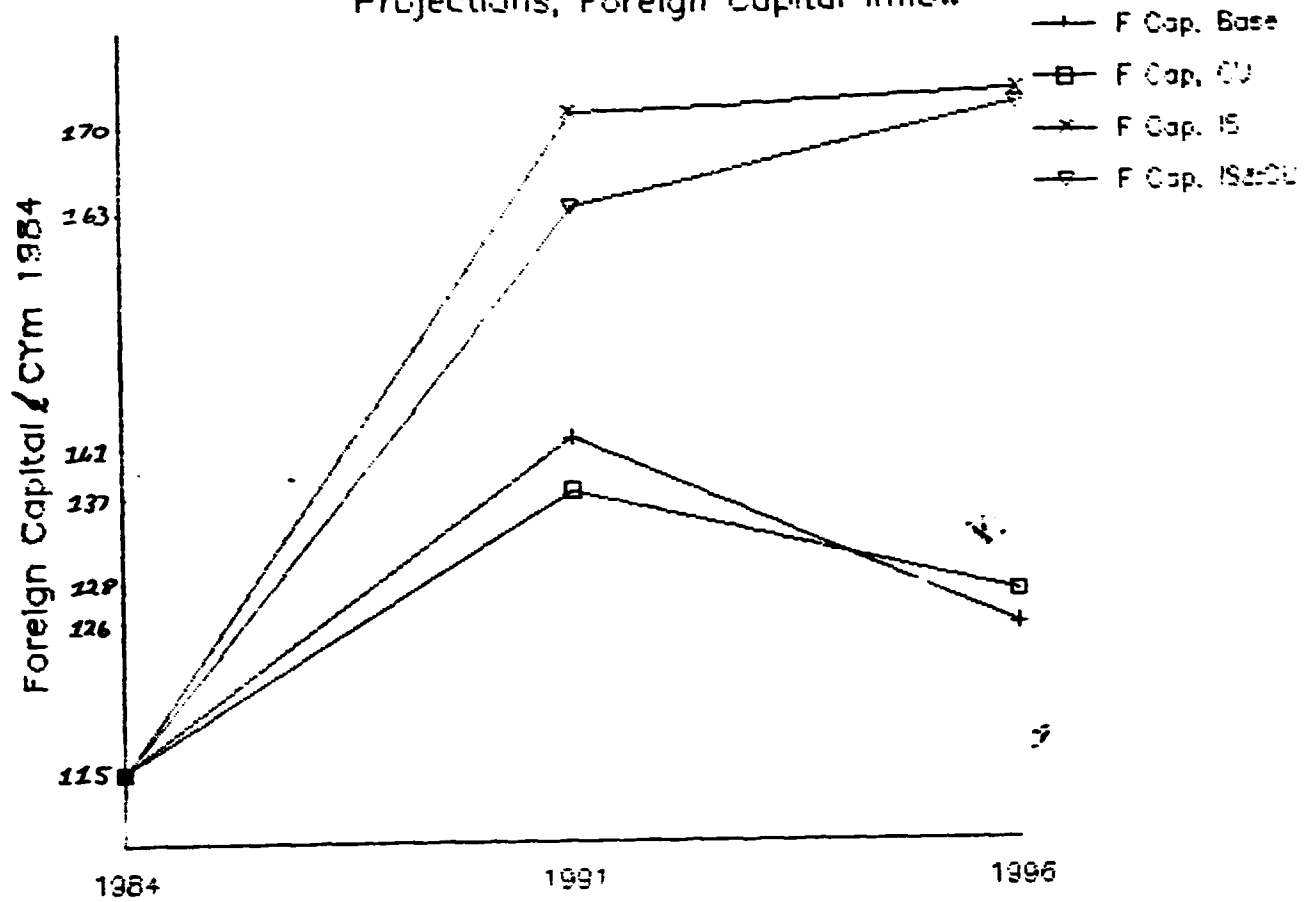
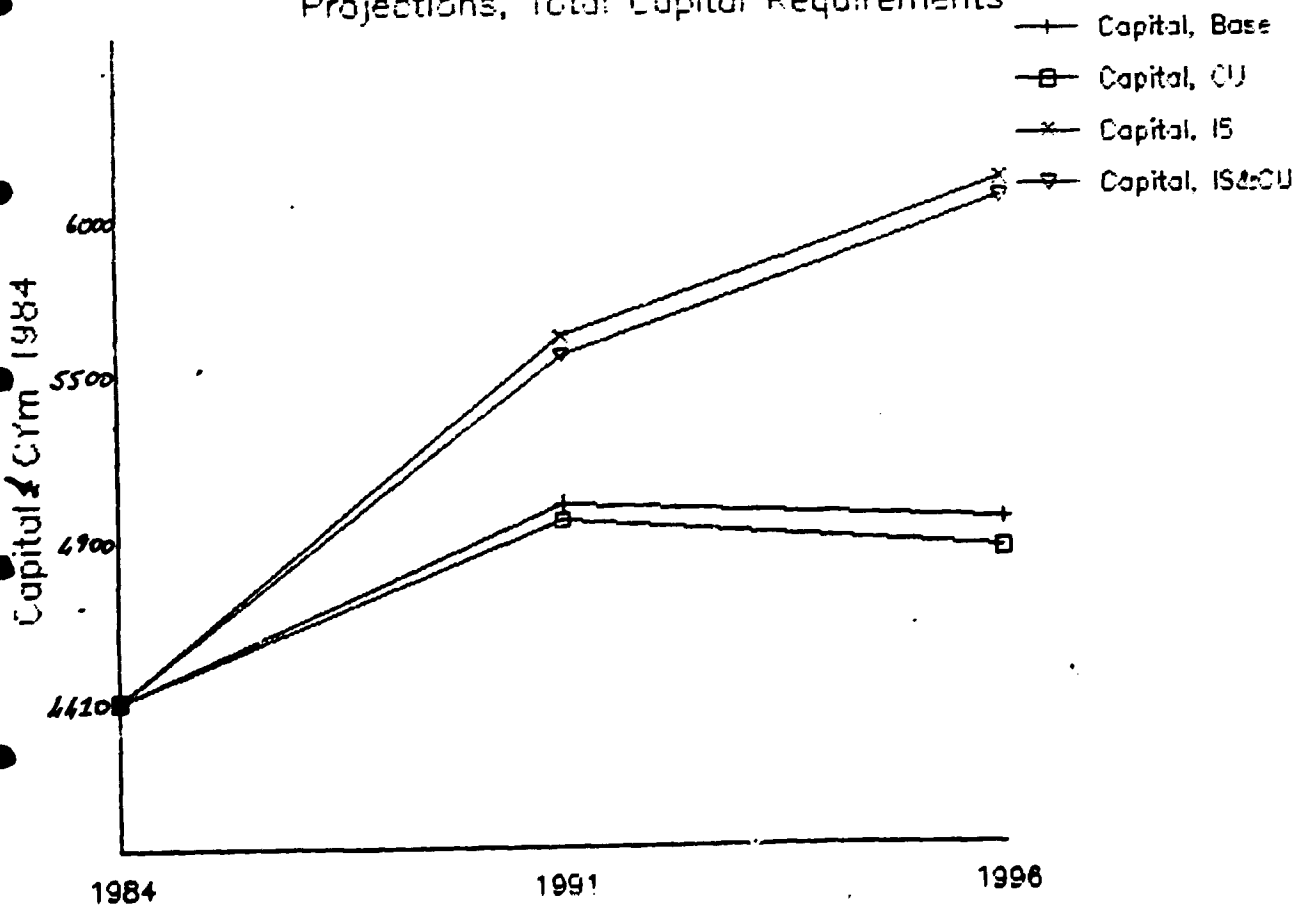


Figure 4.6:
Projections, Total Capital Requirements



- real wages increase by 8% from 1984 to 1991 and household consumption grows by this amount plus the increase in employment and transfers. Since real wages grew by about the same amount between 1984 and 1986, the results imply no growth in real wages from 1986 to 1991.
- exports grow at under 1.5% pa in volume terms and slightly less in value terms.
- competitive imports grow at just under .4% pa implying a slight increase in over-all import substitution.
- non-competing imports (not shown in the summary results) grow in line with GDP.
- foreign debt grows at just under 3% pa
- total capital requirements grow at slightly less than the over-all rate of growth of employment of 1.8% pa.

From 1991 to 1996, the projected economic performance is weak. The main features of the projection from 1991 to 1996 are:

- GDP grows at just over 1.6% pa
- real wages decline by 4% and aggregate household consumption increases by only 1.8% pa, made up of the growth of employment and transfers less the real wage decline.
- exports grow at just over 6% pa in volume terms and slightly less in value terms.
- competing imports continue to grow at just over .4% pa.
- non-competing imports grow in line with GDP.
- foreign capital requirements decline by 2.3% pa.

- total capital requirements decline by just over .1% pa

The three most important causes of the projected poor performance of the economy are:

(i) the loss of dynamism in the growth of tourist expenditure compared with the early 1980's. As already noted, the high rates of growth of tourist expenditure of around 10% pa experienced in the mid 1980's have given way to a projected rise of only 4.5% pa from 1986 to 1991 and 2% pa thereafter.

(ii) It has been projected that export markets will hardly recover to the 1984 levels over the whole of the projection period. The export growth that does take place is at the expense of a lowering of the unit cost of exports relative to competitors exports of about 1% pa for Textiles and Wearing Apparel, Leather and Leather Products and Wood and Wood Products. For other non-agricultural exports, the projected decline in the unit value of exports relative to competitors is about 2% pa. In the case of Agriculture exports, there is a 15% terms of trade loss because of the collapse in agricultural prices between 1984 and 1986 with no recovery of agricultural prices projected.

(iii) The projected rates of change of world prices imply that the favourable terms of trade effects of the oil price fall between 1984 and 1986 will have run out by 1991.

The projected rate of improvement in capital and labour productivity of 2% pa is not enough to overcome these adverse trends and provide the dynamism in the economy in the early 1980's, described in the main report. In fact, there are ground for believing that some aspects of the Base Projection are optimistic.

As noted in Section 4.3, the present formulation of the ASAP model assumes that production for the local market can be switched to export markets without cost. This means that, in the context of the general equilibrium requirement that the work-force be employed with unemployment at 1984 levels, the Base Projection suggests that there will be some increase in exports and continued import substitution. However, as noted in the main report, it is unlikely that exports will grow above 1984 levels by 1991 and import penetration will increase.

It should be remembered that although there are some ways in which the Base Projection does not accurately capture the mission's view of the likely performance of the economy to 1991 and 1996, the main insights to be obtained from the ASAP model do not come just from a particular set of projections but from the over-all set of policy experiments and the sensitivity tests which can be conducted with the model.

It is against the background of the pessimistic Base Projections that the macro effects of the two major policy options, the Customs Union with the EEC and an Industrial Strategy leading to accelerated technical change should be considered.

5.1.2 The Customs Union Projection

The ASAP model captures three types of effects of a Customs Union on the model economy.

(i) The direct effects on import substituting local production of the loss of tariff protection, and on exporters from a loss of export subsidies.

(ii) The indirect benefits to import substituting local production and exports from a change in the price of competitive imports due to a lowering of import tariffs on productive inputs.(3)

(iii) In some of the manufacturing sectors, the capacity to service export markets will be severely affected by the loss of protected domestic markets. In a sensitivity test, it was assumed that the direct estimates of the loss of output with the Customs Union also implied a loss of capacity to service export markets. That is, it was assumed that the export demand functions in the manufacturing sector would shift in line with the estimated direct effects of the Customs Union on output.

The simulation of the proposed Customs Union shows a decline of the projected performance of the economy compared with the Base Projection. The principal macro effects in 1991 and 1996 shown in Table 4.1 and in Figures 4.1-4.6 are:

- GDP grows at just over 2.8% pa to 1991 and by 1.2% pa to 1996. Compared with the Base Projection, GDP declines by nearly 3% by 1991 and nearly 5% by 1996.
- real wages rise by .6% pa to 1991 and decline by just over 1.1% pa to 1996. Compared with Base Projection, real wages decline by just over 3% pa by 1991 and by just over 7% pa by 1996. The fall in overall consumption (compared with the Base Projection) is cushioned in both periods by transfer payments which increase their relative importance with the Customs Union.
- exports grow by 2% pa to 1992 and by 6.5% pa to 1996. Compared with the Base Projection, exports increase by nearly 4% in volume in 1991 and by nearly 6.5% in 1996.
- competing imports grow by 1.4% pa to 1991 and by nearly 2.2% pa to 1996. Compared with the Base Projection, competing imports increase by 7.5% in 1991 and by over 22% in 1996.
- non-competing imports continue to grow in line with GDP.
- foreign capital requirements grow at 2.5% pa to 1991 and by 2.2% pa to 1996. Compared with the Base Projection, foreign capital

requirements decline by .5% in 1991 but increase by nearly 2% in 1996.

- total capital requirements grow by 1.6% pa to 1991 and fall by nearly .4% pa to 1996. Compared with the Base Projection, total capital requirements decline by just 1% in 1991 and by 1.8% in 1996.

The finding that most of the economic indicators worsen with the Customs Union requires some explanation.

The standard argument for lowering protection is that, by increasing the efficiency of the operation of a fully employed economy through the reduction of tariff protection, there will be substantial gains in consumer welfare. However, at a given exchange rate, the Customs Union leads to an increase in net import penetration, thus lowering the level of economic activity generated by the given levels of the exogenous variables. It is this change in the multiplier effect of a given level of exogenous expenditure which underlies part of the explanation of the lower level of activity, employment and consumption with the Customs Union. There are also powerful negative terms of trade effects.

In Table 4.2, the export structure and terms of trade effects are shown for 1996 for Agriculture, Manufactures and the Rest of Exports. Compared with the Base Projection, the unit value of all exports declines by about 2% with the Customs Union in 1996. Similar but less powerful effects operate in 1991, because only 50% of the tariff reduction is assumed to be in place by 1991. Since the exchange rate and the price of competing and non-competing imports remain unchanged, this implies an overall terms of trade loss of about 2%.

Offsetting this loss to some extent is the lowered foreign and total capital requirement. If the economy were constrained by the availability of capital, rather than able to obtain all capital requirements at a fixed rate of return and fill any domestic savings gaps by borrowing on the world market at a fixed exchange rate, there

would be a lower rate of profit and an increased level of output. It is not possible to tell whether such a positive output effect would be sufficient to outweigh the terms of trade loss and the effects of increased import penetration on the overall multiplier effects of the exogenous injections into the economy, but in principle this would be possible.

The simulation results for the Customs Union need to be interpreted with caution. However, for the purpose of contrasting the effects of the Customs Union with the Industrial Strategy, it is the small absolute size of the over-all effects of the Customs Union which is more important than the direction of change in the macro economic variables.

5.1.3 Industrial Strategy Projection

The Industrial Strategy Projections shown in Table 4.1 and in Figures 4.1-4.6 illustrate the dramatic effects of accelerated technical change. The main features of the macro effects are:

- GDP grows at 5.4% pa to 1991 and by 4.5% pa to 1996. GDP increases by nearly 16% above the Base Projection by 1991 and by 33% above the Base Projection by 1996.

- real wages grow at 3.8% pa to 1991 and by 3.0% pa to 1996. Real wages increase to 20% over the Base Projection by 1991 and by just over 45% by 1996. The overall rise in consumption is a little less than the combined effects of the rising real wage and growth in total employment, reflecting a slower rate of growth of non-wage income compared with wage income.

- exports grow at 2.2% pa to 1991 and by 19.1% pa to 1996. Compared with the Base Projection, exports increase by over 5% in volume in 1991 and by over 10% in 1996.

- competing imports grow at .06% pa to 1991 and by .26% pa to 1996. Compared with the Base Projection, competing imports fall by over 2% in both 1991 and 1996.
- non-competing imports continue to grow in line with GDP.
- foreign capital requirements grow at 6% pa to 1991 and by .24% pa to 1996. Compared with the Base Projection, foreign capital requirements increase by over 22% in 1991 and by nearly 39% in 1996.
- total capital requirements grow at 3.2% pa to 1991 and by 1.9% pa to 1996. Compared with the Base Projection, total capital requirements increase by over 10% in 1991 and by over 23% in 1996.

Whereas accession to a Customs Union would require a series of price adjustments to transform the initial impact of increased import penetration into long-term efficiency gains, the productivity enhancing Industrial Strategy has immediate effects given that everything else in the model economy remains unchanged. Compared with the base projections, the rate of growth of gross output increases by 2/3 and real wages rise at over 3% pa in both periods. The contrast between the Base Projections and the Industrial Strategy Projections is most marked in the period after 1991 when the dampening effects of the loss of oil terms of trade improvement and slow growth of tourism begin to take effect, leading to a decline in economic performance and declining real wages.

The magnitude of the response to the Industrial Strategy requires some explanation. One of the central messages from the sector case studies is that there is considerable scope for improvement in the productivity of all inputs. Since the manufacturing sectors all have a relatively small value added to gross output ratios, the impact of the additional technical change covering all intermediate inputs is large.

Only a small part of the dramatic transformation of the economy is

reflected in increased exports to 1991. This is partly because no additional growth of export markets was assumed as a result of the Industrial Strategy, in spite of the fact that an important part of the technical change is in product development with associated policies to increase the rate of growth of export markets. Export growth plays a much more important role in the period from 1991 to 1996.

Other effects include increase import substitution and an expansion of the domestic market as wages rise. In fact, the rate of growth of skilled wages to 1996 increases from 2.7% pa in the Base Projections to 6.2% pa with the Industrial Strategy. Thus, part of the explanation for the initial lack of export response to the Industrial Strategy is the rise in wages induced by labour scarcity.

5.1.4 The Customs Union and Industrial Strategies Combined

Table 4.1 and Figures 4.1-4.6 summarise the results of the Industrial Strategy and Customs Union combined. The main features of the macro effects are:

- GDP grows at nearly 5% pa to 1991 and by 4.2% pa to 1996. Compared with the Base Projection, GDP falls by 12.2% in 1991 and by 27.2% in 1996.
- real wages grow by 2.9% pa to 1991 and by 2.5% pa to 1996. Compared with the Base Projection, real wages are 13.3% greater in 1991 and 33% greater in 1996.
- exports grow by 2.2% pa to 1991 and by 8.7% pa to 1996. Compared with the Base Projection, exports are 5.1% higher in 1991 and 18.9% higher in 1996.

- competitive imports grow at .7% pa to 1991 and by 3.5% pa to 1996. Compared with the Base Projection, competitive imports are 2.4% higher in 1991 and 19% higher in 1996.

- non-competing imports continue to grow in line with GDP

- foreign capital requirements grow at 5.1% pa to 1991 and by 2.2% pa to 1996. Compared with the Base Projection, foreign capital requirements are just over 15% greater in 1991 and nearly 38% greater in 1996.

- total capital requirements grow at 3.1% pa to 1991 and by 1.9% pa to 1996. Compared with the Base Projection, total capital requirements are 9.6% greater in 1991 and nearly 28% higher in 1996.

These results show that the adverse effects of the Customs Union on economic growth are swamped by the positive effects of productivity enhancing Industrial Strategy.

5.2 The Effects on Manufacturing Industries

5.2.1 The Effects of the Customs Union on Manufacturing

The effects of the Customs Union on manufacturing industries are shown in greater detail in Table 4.3. The main results of the Customs Union Projection on manufacturing, excluding the effects of the decline in the export capacity as a result of the Customs Union, were:

- small positive output responses in Food, Drink and Tobacco and Metal Products and Machinery and negative output responses in the remaining 4 manufacturing sectors.

- positive export responses in all but Textiles and Wearing Apparel.

- increased import penetration in all sectors except Food, Drink and Tobacco.

- an employment response which closely mirrors the output response.

The main effects of the Customs Union in manufacturing are concentrated in Textiles and Wearing Apparel, in Leather and Leather Products and in Wood and Wood Products. Each of these industries show an estimated decline in output of up to 14% relative to the Base Projection by 1991 and of 14% to 20% by 1996. In both Textiles and Wearing Apparel and in Leather and Leather Products, the Customs Union projections show an increase in imports compared with the Base Projection penetration of nearly 50% and over 100%, respectively, by 1991 and of slightly more than 110% and 180% by 1996, respectively.

The estimated effects of the Customs Union are rather less than the direct effects estimated in the main report. This is partly because, in a general equilibrium context, there are some indirect effects which offset the initial direct effects.

The general equilibrium effects are best illustrated in the case of Wood and Wood Products, where the combination of aggregation effects, a small import price change estimate based on the import weighted tariff, and a relatively higher wage to output ratio meant that the effects of the rise in wages and other price changes almost offset the direct effects. In Textiles and Wearing Apparel and in Leather and Leather Products, similar but less powerful offsetting forces are at work. The remaining manufacturing sectors have output changes of less than 10%.

These results ignore an important aspect of the likely response of individual manufacturing industries to the Customs Union, namely the effect of the loss of protection on the capacity to service export markets. When roughly accounted for by an inward shift in the export demand curve equivalent to the estimated direct effect of the output loss, the output losses in Textiles and Wearing Apparel, Leather and Leather Products and Wood and Wood Products is between 13% and 28% in 1991 and 30% and 50% in 1996. In these industries, the estimated effects of the Customs Union match much more closely the estimated direct effects discussed in the main report.

Thus, the main transition costs of joining the Customs Union would be born by the Textile, Leather and Wood firms and workers employed in these industries. Any benefits from the Customs Union through increased efficiency would be widely dispersed in the rest of the economy through the benefits of cheaper productive inputs and a lowering in the cost of consumer goods. In fact, the effect of the Customs Union on the overall price level is to cut the rate of growth of the consumer price index over 3% by 1996 or less than .3% pa. However, as already noted in section 5.1.2, the adverse terms of trade effects and the loss of dynamism in the economy from increased import penetration out weighs these efficiency effects.

5.2.2 The Effects of the Industrial Strategy on Manufacturing

In contrast to the Customs Union, the effects of the Industrial Strategy are dramatic. The results shown in Table 4.3 illustrate powerfully the virtuous effects of policies which enhance the rate of technical progress, compared with changes in trade policies which affect price efficiency. At best, a change in trade policy has concentrated costs and highly dispersed potential benefits from enhanced price efficiency so that there will always be some losers who may or may not be compensated by those who gain.

The main projected effects of the Industrial Strategy on manufacturing industries were:

- increased output of all manufacturing industries by between 5% and 32% of the Base Projections by 1991 and by 10% to 35% in 1996
- increased exports over the Base Projections in four of the manufacturing sectors
- a sharp fall in imports in three of the manufacturing sectors
- employment effects which mirror the output effects

Whilst the overall impact of the Industrial Strategy is to increase output and exports, and to increase import substitution, Wood and Wood Products is an exception because of the difficulties encountered in measuring the Armington elasticity already discussed in the Customs Union case. Wood and Wood Products has the same benefits of accelerated technical change with the Industrial Strategy, but offsetting effects of the rise in wages has more impact because of a higher labour intensity. Since the Armington elasticity is very high, this means that import substitution increases greatly.

5.2.3 The Effects of a Customs Union and the Industrial Strategy on Manufacturing

The final projection shown in Table 4.3 is for the combined policies of a Customs Union and the Industrial Strategy. The effects on manufacturing output, exports, imports and employment can be summarised:

- the positive output effects of the Industrial Strategy are not always powerful enough to offset the negative effects of the Customs Union in 1991. By 1996, the over-all position of manufacturing is improved when compared with the Base Projection in spite of the swamping effects of the Customs Union without an Industrial Strategy.

- the export performance in all except one manufacturing industry is enhanced compared with both the Base Projection and the Industrial Strategy case
- import penetration is increased in four out of the six industries compared with both the Base Projection and the Industrial Strategy.
- employment changes follow closely the changes in output.

These general observations are exemplified in the case of Textiles and Wearing Apparel and Leather and Leather Products. Compared with the Base Projection, these industries show a decline in output by 1991 in spite of the benefits of the Industrial Strategy and no account of the loss of the capacity to export with the loss protection. In contrast, by 1996, these industries produce at a higher output than in the Base Projection, but not by much. The increased exports in these industries are more than offset by the increase import penetration with the Customs Union in 1991. Only by 1996 is it projected that the beneficial effects of the Industrial Strategy outweigh the negative effects of the Customs Union.

Thus, in summary, the effects of the Industrial Strategy on manufacturing offsets the swamping effects of the Customs Union by 1996.

5.3 Sensitivity Tests

5.3.1 Exogenous Terms of Trade Effects

A striking aspect of the results reported is the sensitivity of the model economy to the exogenous terms of trade assumptions. Thus, one of the sensitivity tests was to re-run the Base Projection with an improvement in the exogenous terms of trade of .7% pa operating on

the price of non-competing imports, equivalent to over .4% pa improvement in the exogenous terms of trade over the projection period.

The effects of the improved terms of trade have a marked impact on the rate of growth of GDP up to 1991, increasing the annual rate of growth by over .6% pa. However, the effects between 1991 and 1996 are much stronger, increasing the rate of growth of GDP from 1.63% pa to 2.8% pa. Considering the size of the terms of trade improvement of over 6% between 1984 and 1986, the importance of the terms of trade assumptions in the medium to long run growth projections is clear.

5.3.2 Increasing the Growth of Tourist Income

When the rate of growth of tourist income is increased from 6% pa to 1991 to 8% pa, and from 2% pa to 1996 to 8.0% pa the performance of the economy improves markedly. In relative terms, this is much greater after 1991. The rate of growth of GDP increases from 3.2% pa in the Base Projection to 3.8% pa to 1991, and from 1.6% pa to nearly 2.1% pa in 1996.

In both periods, the rate of growth of the whole economy varies by about .5% pa with each 2% pa change in the rate of growth of tourist expenditure, or in elasticity of overall growth to tourist expenditure of .25.

5.3.3 Accelerated Growth of Export Markets

A third sensitivity test was conducted on the assumed rates of growth of export markets in the Industrial Strategy projections. Thus, when the rate of growth of export markets was assumed to be 2% pa from 1986 to 1996, the rate of growth of GDP up to 1991 increased from 5.44% pa up to 5.64% pa. For the period 1991 to 1996, the rate of

growth of GDP increased from 4.5% pa to 4.75% pa. Thus, although there was some effect on the rate of growth of GDP, the increased rate of growth of manufactured export markets did not have as large effect on over-all economic growth as the improvement in tourist income.

5.3.4 Increased Elasticity of Demand for Exports

It was argued in section 5.1.2 that adverse endogenous terms of trade effects played an important role in the Customs Union projections which showed a significant decline in GDP and the other main macro economic variables. The sensitivity of the results to the elasticity of demand for exports was therefore tested by doubling the elasticities from 4 for manufactures and 2 for the rest to 8 for manufactures and 4 for the rest.

The effect of the increased elasticity of demand for exports on the rate of growth of GDP can be summarised as follows:

- for the Base Projection, the rate of growth of GDP to 1991 increased from 3.25% pa to nearly 4.5% pa, and to 1996 the rate of growth of GDP increased from 1.63% pa to 2.6% pa.
- for the Customs Union Projection, the rate of growth of GDP to 1991 increased from 2.83% pa to over 4.2% pa, and to 1996, the rate of growth of GDP increased from 1.2% pa to 2.8% pa.
- for 1991, the Customs Union Projection implied a decrease in the rate of growth of GDP of .25% pa compared with the Base Projection, but for 1996 the rate of growth of GDP increased by over .2% pa compared with the Base Projection.
- for the Industrial Strategy Projection to 1991, the rate of growth of GDP increased from 5.44% pa to 6.45% pa compared with the Base Projection. For 1996, the rate of growth of GDP increased from 4.5% pa to nearly 5.2% pa compared with the Base Projection.

- the introduction of the Customs Union and the Industrial strategy increased the rate of growth of GDP for 1991 from nearly 5% pa to nearly 6.6% pa compared with the Base Projection. For 1996, the rate of growth of GDP increased from 4.2% to 4.9% pa compared with the Base Projection.

To summarise, the Industrial Strategy still dominates the Customs Union in terms of the impact on the rate of growth of GDP, but the increased elasticity of demand for exports reversed the sign of the terms of trade effect in 2 out of the 4 cases. Thus, the over-all results are not affected by the across the board increase in the elasticity of demand for exports. However, it is obvious that changes in the industry pattern of the elasticities of demand for exports would have a significant effect. It is also true that the model economy, particularly exports, are more responsive to relative price changes.

5.4 The Demand For Capital

The highest rate of growth of the foreign debt is in the projections with an Industrial Strategy. The reason for this is that, given the high proportion of non-competing imports, any policy which makes the economy grow faster will increase the amount of foreign borrowing at a constant exchange rate. For this reason, the rate of growth of foreign capital is closely related to the rate of growth of the economy as a whole.

The other side of coin is that the capacity to service increased foreign borrowing is increased when the rate of growth of the economy is high and less subject to the impact of exogenous changes such as the terms of trade. Similarly, domestic capital requirements grow roughly 2% pa less than the rate of growth of GDP on account of the assumed productivity improvements.

RECOMMENDATIONS

6.1 General Remarks

Economic policy making, even in a small economy such as Cyprus, can be considerably aided by the strategic location of economic policy models within the information gathering and policy making system. Models are no substitute for research or judgement, but should be seen as an accessible tool both within the Planning Bureau and for users outside the Planning Bureau in other government departments, in the business community, and in the trade unions.

In order to meet the above requirements, the economic policy models and their information systems must be flexible, updatable and user friendly. Economic policy models are always built to answer a particular set of questions. This implies that the policy makers themselves must be able to ask the kind of questions which the models are designed to help answer. Technical staff are also required to be able to run, modify and update the models. It is crucial that the whole process, from the formulation of the policy questions, to the information gathering necessary to answer these questions, to the running, modification and development of the models, be in the hands of Cypriots.

The existing Planning Bureau model, based on the CAMS system and designed for macro policy purposes, meets some of the above requirements. Its information base, the 1984 FINALSAM, was generated entirely within the Planning Bureau (with considerable assistance from the Department of Statistics). It can be run and have minor modifications made within the Planning Bureau and is being built into the policy formulation process for the preparation of the 5th Emergency Plan. However, the size limitations on the operation of

the GAMS model when used with the standard MSDOS operating system, the lack of full integration of the model to a flexible and easily updatable information system, the under-resourcing of the technical staff capable of running and modifying the model, and the limited integration with the policy making process, place serious limits on the use of the GAMS model for economic policy purposes. The recommendations which follow are based upon this assessment of the present situation.

6.2 Alternative Ways of Achieving Modelling Flexibility

Greater flexibility in terms of model size could be achieved with the existing GAMS system by discarding the standard MSDOS operating system for all information gathering and modelling work. This would pave the way for the eventual incorporation of the 35 sector input-output table under construction into the Planning Bureau's modelling activities. It would mean discarding the existing IBM AT PC for use on the GAMS model and using a MacIntosh or equivalent PC and operating system so that the GAMS programme could be used to run much larger models. Such a choice would immediately create compatibility problems with existing statistical work carried out in both the Planning Bureau and within the Department of Statistics using spreadsheets based on the MSDOS operating system.

An alternative would be to incorporate the ASAP model and operating programme along side the existing GAMS model for use within the macro section. The ASAP programme could then be used for running the mission's model, and because of its user friendliness, could also play a major role in data management (which cannot easily be carried out within a spreadsheet programme) and for other modelling work. This would not require the purchase of an additional PC, but could be run on existing IBM XT or other PCs available within the Planning Bureau. The operating speed of the ASAP programme could be increased by a minor upgrading of the IBM XT to include a Mathematics Co-Processor, but this is not essential. The ASAP model data base uses the Super-Calc 3 spreadsheet, which is also widely used within the

Statistics Department. The 1984 FINALSAM is set up with a Lotus spreadsheet, but this can be readily transferred into Super-Calc-3 for use by the ASAP programme.

It is recommended that the ASAP programme and model be incorporated into the work of the macro section, and that the available IBM XT pc be upgraded with a Maths Co-processor.

6.3 Technical Staffing

At the present time, there is only one Planning Officer familiar with the GAMS model and capable of running and modifying the model. Not only is there a considerable over-load on this Planning Officer for model development and up-dating, but there is no other Officer within the Planning Bureau familiar with the operation of economic policy models. This means that there is no Officer who can be called on for discussion and assistance with the typical conceptual, mathematical, programming, empirical and interpretive problems which arise in the day-to-day modelling work. The reliance on visiting experts for this function is far too great. Moreover, if the economic policy modelling work is to expand to manage and run the ASAP model with its greater sectoral detail, there is a clear need for an additional Planning Officer to work on economic policy models.

It is therefore recommended that an additional person be recruited to work with the ASAP model along side the existing GAMS model. This person could be most usefully located within the macro section.

6.4 Sector Modelling

It is frequently necessary to undertake more detailed sectoral modelling, as in the case of this Mission which focused on the manufacturing sector. Should the ASAP model be incorporated into the

work of the macro section, there will be an immediate benefit to the work of the sectoral divisions of the Planning Bureau, most immediately for the manufacturing sector. Even without creating sectoral sub-models which could be incorporated into the ASAP model, there would be an immediate use to both the economic policy modellers and to the sector specialists if the latter could become familiar with the specification of their sector within the ASAP model and to work interactively with the economic policy modelers. Given the user friendliness of the ASAP programme, it should also be possible for sector specialists to be able to develop a capacity to modify and run the model with alternative sectoral specifications and projections.

It is recommended that the sector specialists be given the necessary training to become familiar with the way in which their sector is specified within the ASAP model so that they can play a more constructive role in the day to day modification and management of the model, and eventually to be able to run and modify the model themselves.

6.5 Model Development

An intensified programme of model development within the policy making process will require action on three inter-related fronts. First, a series of seminars on the present GAMS model and the ASAP model should be organised with a view to meeting the needs of several different audiences. These seminars would have to cater to the needs of research economists and policy makers within Government ministries to familiarise them with the present levels of development of policy modelling in Cyprus, to potential users of economic policy models in the business community and the trade unions, and to provide a forum for the discussion of the priorities for model development.

Second, a series of one week training courses for research economists such as the sector specialists within the Planning Bureau who are actively involved in using information or results from the economic

models, and for policy makers who need to learn how to use the economic models as a policy making tool, should begin as soon as possible.

Third, given the priorities for model development, a series of research projects should be undertaken to develop and extend the capacity of the economic models.

On the basis of the experience of this Mission, it is recommended that the most urgent research priorities for model development include

- (i) The incorporation of a linear expenditure system (LES) within the GAMS model and improvement of the specification of the LES system in ASAP model.
- (ii) The inclusion of a constant elasticity of substitution production function in both the GAMS and ASAP models
- (iii) The inclusion of a constant elasticity of transformation function between production for the domestic market and for exports in the ASAP model.
- (iv) The full specification of inventory holding in both models
- (v) The endogenous determination of investment by sector of use in both the GAMS and ASAP models, taking particular account of the need to be able to quickly transform behavioural characteristics of the models from short to medium to long-run modes of operation

- (vi) The inclusion of non-tariff protection in both the ASAP and the GAMS models and the incorporation of the output weighted tariffs
- (vii) The identification of the complete range of government assistance to enterprises, particularly in relation to depreciation allowances and export rebates.

6.6 Statistical Requirements

Attention has already been drawn to the need for a more strategic perspective to be taken on the interaction between the economic policy questions being asked, the information required to answer these questions, and the processing of the information obtained. It is recommended that urgent attention be given to the statistical needs for economic policy modelling including:

- (i) The provision of input-output tables which give fully disaggregated information on the break-down of inputs into competing and non-competing components, and of the trade and transport margins paid on those inputs.
- (ii) The use of the above input-output information in the estimation of the tariffs, subsidies and rebates on all productive inputs in current production, and in investment.
- (iii) The quantification of non-tariff protection and the extent to which such forms of protection raise domestic prices above world prices.

- (iv) The identification of the complete range of government assistance to enterprise, particularly in relation to depreciation allowances and export rebates.

- (v) The provision of more disaggregated information from the Household Income and Expenditure survey to facilitate the estimation of the LES system for household expenditure, and up-to-date information on the composition of tourist expenditure.

- (vi) The incorporation of the available estimates of capital stocks using the perpetual inventory method into the estimation of base-year capital stocks and into the estimation of the long-run capital-output matrix.

- (vii) The systematic collection of case-study and time-series estimates of sectoral rates of technical change.

In relation to recommendations (i), (v) and (vi), the most important requirement is the utilisation and re-direction of on-going statistical work. Only recommendations (ii)-(iv) and (vii) require more basic statistical work to be undertaken. In all cases, an essential re-orientation of the statistical work towards servicing a flexible economic policy modelling is the automatic provision of up to date information at the user-determined levels of disaggregation in a form which can easily be used in a spread-sheet programme.

1 Typically, a combination of fixed proportions and perfect substitutability produce what is sometimes called 'flip-flop' behaviour in linear programming models. This arises because of the all-or nothing combinations of perfect substitution and no substitution. For a discussion of some of these issues, see Evans (1972).

2 It would be possible to use other functional forms for the export demand function. For example, it may make sense to have a functional form which has an increasing elasticity of response. In this case, for relatively small changes in export prices, the response would be much smaller than for a much larger increase or decrease in export prices. In the latter cases, the response of export demand to price changes would correspond more closely to the small country assumption used in trade theory where it is usually assumed that small countries can export as much as they choose without affecting their export prices.

3 Due to the unavailability of separate estimates of input tariffs, there is no account taken of some cases of increased cost of productive inputs with the Customs Union. This is particularly important for Textiles and Wearing Apparel.

4 See Krueger (1982) and Lucas (1983).

5 In principle, it would have been possible to make some adjustment for relative price changes, but this was not done at this stage. Once estimates of the 1981 Input-Output table is obtained using the desired valuation conventions, it would make sense to incorporate an adjustment for relative price changes.

6 I am grateful to Sherman Robinson for advice on this point. See also Dervis, de Mello and Robinson (1982).

7 The experience of the accession of Spain and Portugal to the EEC suggest that there may be a considerable amount of trade diversion. To the extent that this also happens should Cyprus join a Customs Union with the EEC, the estimated tariffs with the Customs Union will be over-stated and no account will be taken of the increased cif price of diverted inputs from the EEC. This over-estimate of tariffs on account of trade diversion works in the opposite direction to the downward bias in the import weighted tariffs, but it is impossible to know the extent to which the two errors will cancel out. The failure to account for it over cif price changes means that the welfare costs of the Customs Union will be understated.

8 Whilst this is a useful starting point, it could easily be modified if more information were available on the pattern of technical change by industry. This may lead to a modification of the assumption that the same rate of technical change applies to the value added shares in service as well as to manufacturing, and to the very bleak view of technical change in agriculture. In the latter case, the typical rates of technical change experienced in agriculture in a wide range of temperate countries has been close to the rates observed for the manufacturing sectors for most of the post-war period. See Evans, (1987).

TABLE 2.1

NOMINAL PROTECTION 1967 AND 1984

SECTOR	OUTPUT WEIGHTS TX 1967	IMPORT WEIGHTS TM 1984	OUTPUT WEIGHTS TX 1984
FOOD	13.8	17.39	20.93
BEVERAGES	29.3	204.37	70.08
TOBACCO	281.9	173.99	173.99
TEXTILES	40.0	65.67	53.86
CLOTHING & FOOTWEAR	45.0	69.70	71.93
LEATHER & LEATHER PRODUCTS	15.5	30.64	55.66
OOD & WOOD PRODUCTS	15.8	1.01	.98
FURNITURE	41.6	62.76	62.76
PAPER & PAPER PRODUCTS	17.8	14.21	12.86
CHEMICALS & CHEMICAL PRODUCTS	37.5	4.06	9.05
RUBBER & RUBBER PRODUCTS	23.2	19.33	19.61
NON METAL MINE PRODUCTS	16.5	13.17	13.63
METAL & METAL PRODUCTS	18.8	5.74	10.65
MACHINERY EXCL. ELECTRICAL	13.7	6.05	6.59
ELECTRICAL MACHINERY	31.8	13.59	10.48
TRANSPORT EQUIPMENT	20.9	25.35	15.23
MISCELLANEOUS	29.9	33.97	78.98

TABLE 2.2

NOMINAL PROTECTION, 1984 TARIFFS

	IMPORT WEIGHTS	OUTPUT WEIGHTS	NON-COM- PETING IMPORTS	EXPORT SUBSIDIES	CUSTOMS UNION
	TM	TX	TMN	TE	TXCU
AGRICULTURE	2.89	2.89	2.63	.00	2.89
FOOD, BEVERAGES & TOBACCO	29.76	58.08	2.63	-.05	37.28
TEXTILES & WEARING APPAREL	46.15	75.07	2.63	-5.41	9.69
LEATHER & LEATHER PRODUCTS	50.71	59.12	2.63	-1.92	5.87
WOOD & WOOD PRODUCTS	13.61	32.55	2.63	.00	3.20
METAL PRODUCTS & MACHINERY	10.42	12.57	2.63	-.25	4.10
OTHER MANUFACTURING & MINING	10.89	18.02	2.63	-.29	4.24
ELECTRICITY	.00	.00	2.63	.00	.00
CONSTRUCTION	.00	.00	2.63	.00	.00
TRADE	.00	.00	2.63	.00	.00
RESTAURANTS & HOTELS	.00	.00	2.63	.00	.00
TRANSPORT	.00	.00	2.63	-3.57	.00
FINANCE	.00	.00	2.63	.00	.00
PUBLIC ADMINISTRATION	.00	.00	2.63	.00	.00
OTHER SERVICES	.00	.00	2.63	.00	.00

TABLE 3.1: EFF. VALUE PROTECTION (IMPORT WEIGHTS)

	ALL TARIFF PROTECTION				CUSTOMS UNION		
	UNIT VALUE ADDED WORLD PRICES	EFFECTIVE PROTECTION	UNIT VALUE ADDED DOMESTIC PRICES	CHANGE VALUE ADDED IMPORT SUBSTITUTES	CHANGE VALUE ADDED EXPORTS	CHANGE VALUE ADDED IMPORT SUBSTITUTES	CHANGE VALUE ADDED EXPORTS
	VAMM	EPRM	VA	DVAM	DVAEM	DVACM	DVACEM
AGRICULTURE	.47	-.02	.60	.01	4.18	.96	.96
FOOD, BEVERAGES & TOBACCO	-.24	-100.63	.20	-73.13	15.77	26.69	3.94
TEXTILES & WEARING APPAREL	-.07	-619.74	.32	-76.41	-5.91	-63.09	-10.95
LEATHER & LEATHER PRODUCTS	-.01	-4149.95	.31	-71.71	18.02	-66.01	12.61
WOOD & WOOD PRODUCTS	.26	33.23	.37	-17.71	10.20	-14.54	6.80
METAL PRODUCTS & MACHINERY	.23	34.34	.30	-19.95	5.80	-14.10	1.18
OTHER MANUFACTURING & MINING	.12	68.65	.20	-30.58	9.37	-22.45	1.37
ELECTRICITY	.59	-7.98	.35	13.32	13.32	8.02	8.02
CONSTRUCTION	.70	-4.76	.51	6.56	6.56	3.90	3.90
TRADE	.76	-1.13	.68	1.26	1.26	.59	.59
RESTAURANTS & HOTELS	.66	-3.71	.53	4.64	4.64	.13	.13
TRANSPORT	.73	-2.13	.59	2.62	-3.38	1.19	-4.82
FINANCE	.82	-.18	.77	.19	.19	.08	.08
PUBLIC ADMINISTRATION	.82	-1.15	.75	1.26	1.26	.64	.64
OTHER SERVICES	.85	-1.01	.79	1.09	1.09	.62	.62

The symbols used are as follows:

VAMM: unit value added at world prices, import-weighted tariffs (M).

EPRM: effective protection (Balassa method), import weighted tariffs.

VA: unit added in 1984.

DVAM: change in unit value for import substituting activities import weighted tariffs.

DVAEM: measure change in unit value to export activities, import weighted tariffs.

DVACM: change in unit value added for import competing activities with the Customs Union, import weighted tariffs.

DVACEM: change in the value added for activities with the Customs Union, import weighted tariffs.

TABLE 3.2: EFFECTIVE PROTECTION (OUTPUT WEIGHTS)

	ALL TARIFF PROTECTION				CUSTOMS UNION		
	UNIT VALUE ADDED WORLD PRICES	EFFECTIVE PROTECTION	UNIT VALUE ADDED DOMESTIC PRICES	CHANGE VALUE ADDED IMPORT SUBSTITUTES	CHANGE VALUE ADDED EXPORTS SUBSTITUTES	CHANGE VALUE ADDED IMPORT SUBSTITUTES	CHANGE VALUE ADDED EXPORTS
	VANX	EPRX	VA	DVAX	DVAEX	DVACX	DVACEX
AGRICULTURE	.48	-2.58	.60	2.08	6.94	3.45	3.45
FOOD, BEVERAGES & TOBACCO	-.32	-155.88	.20	-165.02	28.61	-55.06	14.08
TEXTILES & WEARING APPAREL	-.15	-451.61	.32	-116.14	-3.13	-104.40	-8.36
LEATHER & LEATHER PRODUCTS	-.03	-1694.20	.31	-90.88	25.23	-84.71	19.16
WOOD & WOOD PRODUCTS	.19	114.34	.37	-45.71	21.86	-42.71	18.21
METAL PRODUCTS & MACHINERY	.22	43.26	.30	-27.40	8.12	-20.79	2.83
OTHER MANUFACTURING & MINING	.08	175.99	.20	-59.36	13.70	-50.86	4.61
ELECTRICITY	.61	-12.07	.35	20.74	20.74	15.69	15.69
CONSTRUCTION	.71	-7.17	.51	10.04	10.04	7.49	7.49
TRADE	.76	-1.67	.68	1.87	1.87	1.23	1.23
RESTAURANTS & HOTELS	.67	-5.63	.53	7.18	7.18	3.16	3.16
TRANSPORT	.74	-2.90	.59	3.64	-2.44	2.22	-3.86
FINANCE	.82	-.25	.77	.26	.26	.16	.16
PUBLIC ADMINISTRATION	.82	-1.57	.75	1.72	1.72	1.12	1.12
OTHER SERVICES	.85	-1.59	.79	1.73	1.73	1.29	1.29

The symbols used are as follows:

VANX: unit value added at world prices, output-weighted tariffs (X).

EPRX: effective protection (Balassa method), output weighted tariffs.

VA: is unit value added in 1984.

DVAX: change in unit value added for import substituting activities, output weighted tariffs.

DVAEX: change in unit value added for export activities, output weighted tariffs.

DVACX: change in unit value added for import competing activities with the Customs Union, output weighted tariffs.

DVACEX: change in unit value for export activities with the Customs Union, output weighted tariffs.

TABLE 4.1: MACRO PROJECTIONS TO 1991 AND 1996

	1984	1991				1996			
	BASE YEAR	BASE PROJECTION	CUSTOMS UNION	INDUSTRIAL STRATEGY	INDUSTRIAL STRATEGY & CUSTOMS UNION	BASE PROJECTION	CUSTOMS UNION	INDUSTRIAL STRATEGY	INDUSTRIAL STRATEGY & CUSTOMS UNION
GDP ECYH 1984	1335	1670	1623	1935	1874	1811	1724	2409	2303
% DIFFERENCE BASE PROJECTION			-2.81	15.87	12.19		-4.81	33.03	27.20
% GROWTH PA		3.25	2.83	5.44	4.96	1.63	1.21	4.48	4.22
EMPLOYMENT 1984 WAGE UNITS	797	909	909	909	909	1013	1013	1013	1013
% GROWTH PA		1.88	1.88	1.88	1.88	2.20	2.20	2.20	2.20
AVERAGE WAGE 1984=100	100	108	104	130	122	104	96	150	138
% DIFFERENCE BASE PROJECTION			-3.24	20.38	13.29		-7.17	45.09	32.94
% GROWTH PA		1.07	.59	3.79	2.89	-.77	-1.14	3.01	2.46
HOUSEHOLD CONSUMPTION	829	1060	1033	1213	1176	1159	1112	1506	1445
% DIFFERENCE BASE PROJECTION			-2.56	14.43	10.94		-4.05	29.90	24.66
% GROWTH PA		3.57	3.19	5.59	5.12	1.82	1.50	4.43	4.22
EXPORTS, VOLUME	363	401	417	410	422	538	573	593	640
% DIFFERENCE BASE PROJECTION			3.92	2.22	5.09		6.47	10.15	18.92
% GROWTH PA		1.45	2.01	1.77	2.17	6.04	6.55	7.63	8.69
COMPETITIVE IMPORTS, VOLUME	296	304	327	297	311	310	379	301	369
% DIFFERENCE BASE PROJECTION			7.51	-2.12	2.40		22.37	-2.84	19.05
% GROWTH PA		.37	1.41	.06	.71	.41	2.16	.26	3.48
FOREIGN CAPITAL 1984 PRICES	115	141	137	172	163	126	128	174	173
% DIFFERENCE BASE PROJECTION			-.47	22.12	15.25		1.99	38.79	37.66
% GROWTH PA		2.99	2.51	5.97	5.10	-2.30	-1.27	.24	1.24
TOTAL CAPITAL 1984 PRICES	4410	4967	4917	5505	5444	4916	4828	6051	5986
% DIFFERENCE BASE PROJECTION			-1.00	10.84	9.62		-1.79	23.10	21.76
% GROWTH PA		1.71	1.57	3.22	3.06	-.15	-.36	1.91	1.91

TABLE 4.2: EXPORT STRUCTURE AND TERMS OF TRADE EFFECTS: 1996

SECTOR	BASE PROJECTION	CUSTOMS UNION	INDUSTRIAL STRATEGY	INDUSTRIAL STRATEGY & CUSTOMS UNION
AGRICULTURE:				
VOLUME £CYM 1984	10.46	11.47	7.25	7.99
VALUE £CYM 1996	12.43	13.32	9.45	10.16
UNIT VALUE BASE=100	100	98	110	107
MANUFACTURES:				
VOLUME £CYM 1984	265.03	285.20	378.79	413.46
VALUE £CYM 1996	276.87	292.52	362.11	386.58
UNIT VALUE BASE=100	100	98	92	89
REST:				
VOLUME	262.49	276.11	206.53	218.32
VALUE £CYM 1996	238.56	244.54	211.59	217.43
UNIT VALUE BASE=100	100	97	113	110
TOTAL:				
VOLUME £CYM 1984	537.98	572.79	592.57	639.78
VALUE £CYM 1996	527.87	550.39	583.15	614.17
UNIT VALUE BASE=100	100	98	100	98

TABLE 4.3: PROJECTIONS TO 1991 AND 1996: MANUFACTURES

	1984		1991								1996							
	BASE YEAR	BASE GROWTH % PA	BASE GROWTH % PA	CU % BASE	CU GROWTH % PA	IS % BASE	IS GROWTH % PA	IS&CU % BASE	IS&CU GROWTH % PA	BASE GROWTH % PA	BASE GROWTH % PA	CU % BASE	CU GROWTH % PA	IS % BASE	IS GROWTH % PA	IS&CU % BASE	IS&CU GROWTH % PA	
	OUTPUT £CYM 1984																	
FOOD, DRINK & TOBACCO	199	255	3.61	2.67	4.00	10.78	5.14	14.56	5.65	297	3.14	5.07	3.61	27.84	6.13	36.04	6.74	
TEXTILES & WEARING APPAREL	122	135	1.49	-8.54	.20	21.84	3.07	-1.98	1.20	147	1.28	-20.60	-1.04	28.11	4.68	5.70	3.35	
LEATHER & LEATHER PRODUCTS	45	48	.84	-14.30	-1.35	32.24	2.66	-2.12	.54	55	1.90	-18.38	1.67	33.10	6.02	4.82	4.08	
WOOD & WOOD PRODUCTS	58	62	.77	-3.19	.31	5.55	1.08	6.10	1.63	69	1.70	-14.29	-.08	10.46	3.99	-2.07	.76	
METAL PRODUCTS & MACHINERY	78	111	5.16	.30	5.21	11.98	6.92	13.73	7.11	132	2.55	.80	3.69	25.99	5.99	29.49	6.31	
OTHER MANUFACTURES & MINING	268	420	6.60	-2.31	6.24	20.83	9.15	16.34	8.93	503	2.62	-4.25	3.27	35.09	6.52	33.09	6.51	
	EXPORTS £CYM 1984																	
FOOD, DRINK & TOBACCO	38	53	4.86	7.58	5.96	13.29	7.87	33.44	9.27	75	5.16	12.68	8.30	54.48	12.51	76.75	13.50	
TEXTILES & WEARING APPAREL	61	62	.16	-2.58	-.21	12.77	1.51	-2.04	-.14	72	2.19	-6.93	2.15	25.65	5.89	18.96	7.17	
LEATHER & LEATHER PRODUCTS	23	23	.26	11.57	1.84	-1.42	1.63	19.83	2.89	29	3.16	26.04	7.03	25.24	7.20	54.48	9.89	
WOOD & WOOD PRODUCTS	1	1	.25	16.03	2.40	-16.10	-.14	16.37	2.44	1	4.54	30.18	8.89	-2.77	6.38	28.53	8.54	
METAL PRODUCTS & MACHINERY	15	20	4.03	8.00	5.18	1.66	5.42	20.69	6.86	28	5.13	13.26	8.28	25.96	10.24	46.03	11.41	
OTHER MANUFACTURES & MINING	34	46	4.23	4.43	4.87	21.62	7.85	33.68	8.64	60	3.95	6.92	6.07	66.60	11.46	80.70	12.11	

1984 BASE YEAR	1991								1996								
	BASE	BASE	BASE	CU	CU	IS	IS	IS&CU	IS&CU	BASE	BASE	CU	CU	IS	IS	IS&CU	IS&CU
	GROWTH	GROWTH	GROWTH	GROWTH	GROWTH	GROWTH	GROWTH	GROWTH	GROWTH	GROWTH	GROWTH	GROWTH	GROWTH	GROWTH	GROWTH	GROWTH	GROWTH
% PA	% PA	% PA	% BASE	% PA	% BASE	% PA	% BASE	% PA	% BASE	% PA	% PA	% BASE	% PA	% BASE	% PA	% BASE	% PA

IMPORTS ECYM 1984

FOOD, DRINK & TOBACCO	36	35	-.40	-7.02	-1.43	3.94	-.88	-10.97	-2.04	34	-.80	-12.62	-2.34	-7.60	-2.00	-20.03	-3.2
TEXTILES & WEARING APPAREL	16	22	5.17	46.55	11.07	-32.49	5.01	42.85	10.66	28	3.32	111.39	12.64	-5.18	3.79	112.14	13.3
LEATHER & LEATHER PRODUCTS	6	9	6.32	109.53	18.17	-58.84	4.10	93.02	16.80	12	4.01	186.21	12.46	-30.20	1.28	203.84	15.6
WOOD & WOOD PRODUCTS	16	31	9.81	3.53	10.35	16.35	12.77	11.63	11.55	32	.55	24.67	4.59	31.39	2.54	54.63	7.9
METAL PRODUCTS & MACHINERY	48	43	-1.57	.15	-1.55	1.77	-1.30	.32	-1.52	37	-2.14	4.00	-2.25	-2.31	-3.80	.83	-2.8
OTHER MANUFACTURES & MINING	115	77	-5.59	7.50	-4.61	-31.61	-9.65	-22.43	-8.96	65	-2.34	21.25	-.91	-51.56	-11.01	-41.34	-8.5

EMPLOYMENT ECYM 1984 WAGE UNITS

FOOD, DRINK & TOBACCO	24	26	1.01	4.34	1.62	-5.87	.75	3.42	1.49	28	1.11	8.21	2.31	1.26	2.19	10.38	2.9
TEXTILES & WEARING APPAREL	27	26	-1.06	-7.32	-2.12	8.01	-1.04	-10.63	-2.63	26	.02	-18.61	-2.54	4.00	.79	-12.45	-.
LEATHER & LEATHER PRODUCTS	10	9	-1.61	-13.34	-3.60	18.29	-1.26	-10.30	-3.12	10	.61	-16.56	.10	9.55	2.21	-12.21	.
WOOD & WOOD PRODUCTS	17	15	-1.67	-2.30	-2.00	-4.79	-2.68	-2.30	-2.00	15	.28	-12.43	-1.78	-8.05	.16	-17.17	-2.
METAL PRODUCTS & MACHINERY	17	20	2.56	1.69	2.81	-.70	2.70	3.76	3.10	22	1.31	3.24	2.15	2.46	2.14	7.38	2.
OTHER MANUFACTURES & MINING	35	46	4.06	-.99	3.92	6.80	4.90	5.64	4.88	50	1.40	-1.77	1.80	8.56	2.50	8.97	2.

KEY:

CU: Customs Union

IS: Industrial Strategy

IS&CU: Industrial Strategy & Customs Union

TABLE A3.1

SECTORAL DISAGGREGATION

1984 SAMU		FINALSAM 1984	ISIC
NO	SECTOR	ABBREVIATION	
1	AGRICULTURE	AG R	1
2	FOOD, BEVERAGES & TOBACCO	FB&T	3 31
3	TEXTILES & WEARING APPAREL	T&WA	3 321,322
4	LEATHER & LEATHER PRODUCTS	L&LP	3 323,324
5	WOOD & WOOD PRODCUTS	W&WP	3 33
6	METAL PRODUCTS & MACHINERY	MP&M	3 38
7	OTHER MANUFACTURING & MINING	OM&M	2 & 3 34,35, 36,39
8	ELECTRICITY	EL	4
9	CONSTRUCTION	CONS	
10	TRADE	TRA	5
11	RESTAURANTS & HOTELS	HOT	6
12	TRANSPORT	TRP	7
13	FINANCE	FIN	8
14	PUBLIC ADMINISTRATION	PUB	9
15	OTHER SERVICES	SER	10

	L_PROFES	L_MITEC	L_BLUE	L_LINK_A	CAPITAL	M_RURAL	M_URB_LO	M_URB_UP	TOUR	ENTERPR	GOV	L_CAP
L_PROFES	.00	.00	.00	.00	.00	.00	.00	.00	1.64	.00	.00	.00
L_MITEC	.00	.00	.00	.00	.00	.00	.00	.00	8.98	.00	.00	.00
L_BLUE	.00	.00	.00	.00	.00	.00	.00	.00	8.76	.00	.00	.00
L_LINK_A	.00	.00	.00	.00	.00	.00	.00	.00	.22	.00	.00	.00
CAPITAL	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_RURAL	16.69	44.42	90.30	73.76	64.21	.00	1.00	4.50	.00	2.37	20.06	.00
M_URB_LO	10.78	.10	68.71	7.40	37.75	.00	.00	4.00	.00	2.29	24.56	.00
M_URB_UP	149.18	.55	118.71	.82	83.97	1.00	.50	.00	.00	6.37	19.23	.00
TOUR	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ENTERPR	.00	.00	.00	.00	278.01	2.16	1.46	8.61	.00	31.28	4.49	.00
GOV	.00	.00	.00	.00	11.26	30.25	20.82	92.48	.99	41.47	.00	.00
M_CAP	.00	.00	.00	.00	.00	51.44	-1.88	64.29	.00	.00	.00	.00
EC_CAP	.00	.00	.00	.00	.00	.00	.00	.00	.00	223.18	.00	6.72
GOV_CAP	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	9.83	2.21
I_AGR	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
I_MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
I_FBST	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
I_TAMA	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
I_LSLP	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
I_MAMP	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
I_MP&H	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
I_ON	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
I_EL	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
I_CONS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
I_TRAD	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
I_HOT	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
I_TRP	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
I_FIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
I_PUB	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
I_SER	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
D_AGR	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
D_MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
D_FBST	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
D_TAMA	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
D_LSLP	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
D_MAMP	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
D_MP&H	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
D_ON	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
D_EL	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
D_CONS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
D_TRAD	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
D_HOT	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
D_TRP	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
D_FIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
D_PUB	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
D_SER	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_AGR	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_FBST	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_TAMA	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_LSLP	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_MAMP	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_MP&H	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_ON	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_EL	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_CONS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_TRAD	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_HOT	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_TRP	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_FIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_PUB	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_SER	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
M_N	.00	.00	.00	.00	.00	25.02	39.22	101.00	35.18	.00	.00	.00
EXPO	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
RE_EXPO	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Q_AGP	.00	.00	.00	.00	.00	29.47	24.81	33.35	10.37	.00	7.06	.00
Q_MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Q_FBST	.00	.00	.00	.00	.00	35.42	27.43	50.71	50.31	.00	.00	.00
Q_TAMA	.00	.00	.00	.00	.00	13.56	10.37	19.14	19.99	.00	.00	.00
Q_LSLP	.00	.00	.00	.00	.00	3.71	2.84	5.24	5.20	.00	.00	.00
Q_MAMP	.00	.00	.00	.00	.00	6.09	4.66	8.60	8.53	.00	.00	.00
Q_MP&H	.00	.00	.00	.00	.00	1.65	1.26	2.33	2.31	.00	.00	.00
Q_ON	.00	.00	.00	.00	.00	22.64	17.32	31.97	31.71	.00	.00	.00
Q_EL	.00	.00	.00	.00	.00	5.43	5.12	8.21	8.30	.00	.00	.00
Q_CONS	.00	.00	.00	.00	.00	2.89	2.36	4.50	.00	.00	2.20	115.2
Q_TRAD	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Q_HOT	.00	.00	.00	.00	.00	14.24	12.84	30.60	26.50	.00	.00	.00
Q_TRP	.00	.00	.00	.00	.00	9.01	8.15	19.64	16.30	.00	1.09	.00
Q_FIN	.00	.00	.00	.00	.00	19.02	25.13	41.75	13.50	.00	.31	.00
Q_PUB	.00	.00	.00	.00	.00	.20	.18	.16	.00	.00	29.54	.00
Q_SER	.00	.00	.00	.00	.00	15.52	14.49	42.08	.00	.00	26.45	.00
GOV_D	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ROW	2.70	.00	.00	.00	.14	.00	.00	.00	.00	29.08	20.14	.00
TOTAL	179.35	290.07	277.72	91.98	475.34	321.01	219.16	573.26	297.79	336.03	94.75	127.00

SECTION 1

TABLE A3.2 DISAGGREGATED 1984 CYPRUS SAMU

TABLE A3.3

CAPITAL STOCKS, 1984, 1986 AND 1991

	RATE OF PROFIT	CAPITAL STOCKS		
	1984	1984	CYEM 1986	1991
AGRICULTURE	.15	207	250	316
FOOD, BEVERAGES & TOBACCO	.065	232	211	170
TEXTILES & WEARING APPAREL	.065	176	160	129
LEATHER & LEATHER PRODUCTS	.065	57	51	42
WOOD & WOOD PRODUCTS	.065	71	64	52
METAL PRODUCTS & MACHINERY	.065	105	96	77
OTHER MANUFACTURING & MINING	.065	305	277	225
ELECTRICITY	.5	22	41	108
CONSTRUCTION	.1	192	178	158
TRADE	.1	923	902	849
RESTAURANTS & HOTELS	.1	294	316	339
TRANSPORT	.3	176	295	454
FINANCE	.1	1295	1393	1472
PUBLIC ADMINISTRATION	.1	6	9	14
OTHER SERVICES	.1	141	140	136

TABLE A3.4: EXOGENOUS VARIABLES AND PARAMETERS

1. PARAMETERS	ASAP MODEL*	GAMS MODEL	
(I) ARMINGTON ELASTICITIES			
AGRICULTURE	2.0	6.0	
FOOD, BEVERAGES & TOBACCO	2.0	6.0	
TEXTILES & WEARING APPAREL	5.7 (3.8)	6.0	
LEATHER & LEATHER PRODUCTS	13.0 (11.6)	6.0	
WOOD & WOOD PRODUCTS	24.3 (8.4)	6.0	
METAL PRODUCTS & MACHINERY	4.4 (3.4)	6.0	
OTHER MANUFACTURES & MINERALS	7.7 (3.7)	6.0	
TRANSPORT	2.0	6.0	
(II) PRICE ELASTICITY OF DEMAND, EXPORTS			
AGRICULTURE & MANUFACTURES	4.0	5.0	
REST	2.0	5.0	
(III) ADJUSTED INCOME ELASTICITIES, LINEAR EXPENDITURE SYSTEM			
HOUSEHOLD TYPE & INCOME GROUP	RURAL	URBAN LOW	URBAN HIGH
AGRICULTURE	.26	.25	.23
FOOD, BEVERAGES & TOBACCO	.26	.25	.23
TEXTILES & WEARING APPAREL	.85	.82	.77
LEATHER & LEATHER PRODUCTS	.85	.82	.77
WOOD & WOOD PRODUCTS	1.26	1.21	1.13
METAL PRODUCTS & MACHINERY	1.26	1.21	1.13
OTHER MANUFACTURES & MINING	1.26	1.21	1.13
ELECTRICITY	.37	.35	.33
CONSTRUCTION	.48	.46	.43
TRADE	.00	.00	.00
HOTELS & RESTAURANTS	1.62	1.56	1.46
TRANSPORT	1.47	1.41	1.32
FINANCE	1.62	1.56	1.46
PUBLIC ADMINISTRATION	1.62	1.56	1.46
OTHER SERVICES	1.62	1.56	1.46
NON-COMPETING IMPORTS	1.26	1.21	1.13

2. BASE PROJECTIONS & PA

	1984-1991	1991-1996
(I) TECHNICAL CHANGE BASE, CAPITAL & LABOUR		
AGRICULTURE	0%	0%
REST	2.0%	2.0%
RADICAL TECHNICAL CHANGE MANUFACTURES		
ADDITIONAL CAPITAL & LABOUR	1.0%	1.0%
INTERMEDIATE INPUTS	2.0%	2.0%
REST	0%	0%
(II) GROWTH IN EXPORT MARKETS	-15.0%	2.0%
(III) WORLD PRICES		
COMPETITOR EXPORTS		
AGRICULTURE	-2.1%	0%
MANUFACTURES	1.0%	1.0%
TRANSPORT	2.0%	2.0%
PUBLIC ADMINISTRATION	2.0%	2.0%
REST	2.0%	2.0%
COMPETITIVE IMPORTS		
AGRICULTURE	-2.1%	0%
TEXTILES & WEARING APPAREL	0%	0%
LEATHER & LEATHER PRODUCTS	0%	0%
WOOD & WOOD PRODUCTS	0%	0%
REST	2.0%	2.0%
NON-COMPETING IMPORTS	.7%	2.0%
(IV) FACTOR RETURNS		
RATE OF PROFIT	10.0%	10.0%
(V) GOVERNMENT CURRENT EXPENDITURE & CAPITAL TRANSFERS		
GOODS & SERVICES	6.0%	6.0%
CURRENT TRANSFERS TO HOUSEHOLDS	7.0%	4.0%
TO ENTERPRISES	0%	0%
TO & FROM FOREIGN GOVERNMENTS	.9%	.9%
CAPITAL TRANSFERS TO HOUSEHOLDS	4.0%	4.0%
ENTERPRISES TO GOVERNMENTS	6.0%	4.0%
GOVERNMENTS TO ENTERPRISES	6.0%	4.0%

(VI) OTHER TRANSFERS		
LABOUR TO & FROM FOREIGNERS	4.0%	4.0%
CAPITAL TO & FROM FOREIGNERS	4.0%	4.0%
(VII) TOURISTS & FOREIGN BASES	6.0%	2.0%
(VIII) LABOUR SUPPLY		
PROFESSIONAL	4.1%	5.1%
WHITE COLLAR	2.8%	2.7%
SKILLED BLUE COLLAR	0%	0%
AGRICULTURAL	-1.2%	-1.6%
(IX) EXCHANGE RATE	0%	0%
(X) PERSONAL TAX RATES		
RURAL	10.5%	10.5%
URBAN LOWER INCOME	10.16%	10.16%
URBAN UPPER INCOME	17.22%	17.22%

*The items in brackets are the Armington elasticity estimates using output weighted Tariffs.

APPENDIX 1

THE ASAP MODEL SPECIFICATION

A1.1 The ASAP Model in Words

A1.1.1 The Demand and Supply of Commodities

The easiest way to view the model of an economy is to think about the way in which the demand for goods and services are built up in any given year, and then to examine the ways in which these commodities are produced. Domestic demand for goods and services are satisfied by two types of commodities.

(i) Competitive imports and production for the local market combine as imperfect substitutes into the 15 different types of composite commodities listed in Table 2.1 which are measured and sold at market or purchaser prices. The closeness of substitutability in use for the composite commodities is governed by what is known as the Armington elasticity; perfect substitutes have an Armington elasticity of infinity whilst perfect complements have an Armington elasticity of zero.

(ii) There are a large number of imported commodities which are specified as non-competing since there is no competing domestic production. The non-competing imports therefore enter directly into productive or personal consumption, only requiring local transport and trade services to bring them from port to site of final use.

There are five types of commodity demands identified in the model.

(i) productive consumption or intermediate inputs of composite

commodities and non-competing imports. (ii) households demand for composite commodities and non-competing imports for personal consumption. (iii) Government current expenditure which is entirely spent on composite commodities. (iv) investment demand from households (mainly for housing), enterprises (productive investment in fixed capital), government investment, in infrastructure, and enterprise demand for inventories. (v) Tourists and personnel on foreign bases and in the diplomatic services are identified as a separate final demand category.

The export of goods and services is obviously an important source of final demand, but these demands do not enter into the supply and demand relationship for the composite commodity. Rather, domestic production in the 15 sectors (which have a one-for-one correspondence with the commodity classification and are measured at producer prices) are used in several ways. (i) they satisfy the demand for commodities sold to the local market where they are combined with competing imports to make up the composite commodity. (ii) they meet the demand for transport and trade services for all domestically produced and imported commodities. (iii) domestic production meets the direct demand for exports.

The long-run supply side of the model allows for domestic production in the 15 sectors, using intermediate inputs, fixed capital which is fully mobile between sectors, and four different skill categories of labour: professional; white-collar and technical; blue collar; and unskilled agricultural labour. At present in the ASAP model, there is an implied demand for capital at a given long-run rate of return. The level of investment is projected by using the rate of growth of the aggregate capital stocks as a proxy for the rate of growth of investment. Strictly speaking, the investment requirements in 1991 and 1996 should be related to the increment in the capital stock taking into account the capital coefficients, capacity utilisation and depreciation rates. In fact, the estimated capital stocks could not be used for this purpose since no reliable estimates of capital coefficients were available. The estimated total capital stocks were based on the gross returns to capital and an assumed gross rate of

profit of 10%. For this reason, the estimated capital stock can only be taken as a rough proxy for the true rate of growth of total capital requirements.

The 1991 and 1996 investment requirements were based on a projection of the 1984 levels of investment. However, 1984 investment was at a peak, about 11% higher than the average of the 1982-84 levels. Further, the rate of growth of output in the first half of the 1980's was very much higher than in the base projections. Since the rate of growth of investment and the rate of growth of the capital stock will only be the same in steady state growth, the projected levels of investment are likely to be overstated on both counts. On the other hand, the assumption of Hicks-neutral technical change between capital and labour, also assumed by the GAMS model, understates the investment requirements for growth since the evidence from other countries suggests that Harrod-neutral technical change between capital and labour fits the measured technical change more accurately. On balance, the upward and downward biases in the projected investment requirements described are likely to entirely offset each other.

The domestic supply of commodities is generated by a split level production function. At the lower level, the four types of labour and fixed capital are combined to produce net output or value added. This is specified by a Cobb-Douglas production function. The value added output can be thought of as an input into the higher level of the production function where the value added input combines in fixed proportions with intermediate inputs of the composite commodity and non-competing imports to produce gross outputs.

The production function in the ASAP model implies a long-run elasticity of substitution between general capital and labour of 1 (the Cobb-Douglas production function). There is some controversy in the literature about the appropriateness of this assumption for medium and long-run economic policy experiments.(1)

It would be preferable to use a constant elasticity of demand production function with an elasticity of substitution between capital and labour significantly less than 1 at the lower level of the production function. This formulation is different from the Cyprus GAMS model at the time of this study. It operated in a short run framework, in spite of the high elasticity of substitution implied by the exogenous 'guessimate' of the sector-specific capital stocks. These sector-specific capital stocks are projected for each sector for each year and the implied investment demands which were determined through a matrix which specifies the share of each type of composite commodity in the sectoral capital stocks. In this case, the sector-specific rates of return to capital are endogenously determined, but it is assumed that these sectoral rates of return have no influence on the pattern of investment demand.

It is assumed that production for the domestic market and for export is perfectly substitutable. This is not a good assumption for sectors where there is considerable product differentiation between domestically sold and exported commodities. Ideally, a constant elasticity of transformation function could be specified to allow the modeller to introduce as a parameter the degree of substitutability between supplies for domestic and export sale.

A1.1.2 The Rest of the World

All supplies which are not produced domestically are obtained from the rest the world at a fixed prices and a fixed exchange rate. For both competitive and non-competitive imports, it is assumed that Cyprus is a price-taker so that all commodities supplied by the rest of the world are perfectly elastic in supply. These imports are financed from two basic sources: commodity exports and transfers between institutions in the Cyprus economy and the rest of the world, particularly foreign private and public capital inflows and invisible exports through tourism and the expenditure on foreign bases. For commodity exports, is it is assumed that exporters face less than perfectly elastic demand schedules. The remaining foreign exchange is

supplied by net transfers between the four main sets of institutions identified in the model, households, enterprises, tourists (including foreign bases and embassies) and government, and the rest of the world. It is assumed that the smaller institutional transfers are given exogenously, whilst for the purposes of projections, the perfectly elastic supply of foreign exchange might be assumed to be financed by foreign savings in the form of the inflow of capital from the rest of the world to enterprises and to the government.

A1.1.3 The Institutional Accounts

The income and expenditure accounts of the institutions provide a picture of the circular flow of income in the model. There are three types of households, namely rural, low income urban and high income urban. Their income is obtained from the sale of labour services of different kinds, their ownership of capital, and from intra-institutional transfers of various kinds. The income so generated is spent on current consumption of composite commodities and non-competing imports, invested in housing, and taxed or lent to the government. Household current consumption expenditure is specified by a Linear Expenditure System (LES).

Enterprises obtain their income from their ownership of capital and a number of small exogenously specified intra institutional transfers. Enterprise income is spent on a small number of exogenously specified intra-institutional transfers plus taxation and investment. Their investment, spent on composite commodities and non-competing imports, is financed by their own internally generated savings, some by borrowing from households, by government allowances, and the residual by a capital inflow from the rest of the world.

Government income is generated from income tax on households and enterprises, from net indirect production and excise taxes on locally sold commodities, from tariffs on competitive and non-competitive imports, from net export taxes on export production, and from net

exogenously specified intra-institutional transfers. Government savings on its current account net of expenditure on goods and services (spent on composite commodities only) and on transfers contribute to the finance of its investment programme. Government savings on the current account net of capital grants to households and enterprises is supplemented by foreign borrowing to finance the government investment programme, spent on composite commodities and non-competing imports.

Finally, tourist and other foreign income, which is exogenously specified, is spent on the composite commodities, non-competing imports, directly employed labour in bases and foreign embassies and a very amount of indirect taxation.

A1.1.4 Price Formation

The final dimension of the model which requires elaboration is price formation. In line with standard CGE modelling practice, it is assumed that there is maximising behaviour in both households and enterprises. This assumption combined with the assumption of constant returns to scale, no identified externalities and perfect competition, permits the generation of competitive pricing relationships in both consumption and production.

The demand for the four types of labour is governed by the requirement that the marginal revenue product of labour employed is equal to the wage. Similarly, implied demand for capital is governed by the marginal revenue product of capital at the exogenously specified rate of profit.

The assumption of maximising behaviour also permits the derivation from the Armington function of a set of marginal conditions govern the relationship between the relative price of competing imports and the price of domestically produced commodities, and the proportions

between the domestic and competitive import components of the composite commodity. For non-competing imports, domestic prices are given by the world prices paid for the imports plus tariffs, excise taxes and the trade and transport margins. The domestic price of competing imports is similarly determined.

The influence of the price of competing imports on the price of domestically produced substitutes is governed by Armington function as described above. For exports, the fob supply price is determined by domestic producer prices plus trade and transport margins plus net export taxes and subsidies. Export demand is governed by the domestic supply price relative to the competitor prices in the export markets, given the constant elasticity of demand function for exports.

A1.1.5 The Model Assumptions and the Real Economy

In terms of the operation of the real economy, the model assumptions should not be taken literally. For example, the level of skill of the labour force, the productivity of capital and material inputs, and the social and institutional arrangements which govern the organisation of work are taken as given at any point in time. To the extent that these relationships change, they must be introduced exogenously into the model. It is assumed that the input-output coefficients are relatively fixed but that there is sufficient flexibility in the use of machinery (possibly through excess capacity) for a considerable variation in the amount labour which might be profitably applied as relative prices change. Some of this variation in the use of labour with an existing capital stock might reflect changes in the level of capacity utilisation. It is also assumed that, for the policy changes considered, the existing capital stock and investment over the period from the base year to the projection year can be re-allocated to accommodate for the changes in the use of capital. This assumption is plausible for the sector strategy policy changes since much of the productivity improvement can be achieved through organisational change and re-direction of

existing levels of investment. The investment requirements for induced growth which flows through to the rest of the economy, or for the major changes in trade policy which are considered are captured through the relationship between the aggregate capital stock and over-all investment. Clearly there is scope for additional work to specify the connection between sectoral investment allocation, investment demand and the rate of profit. In the case of major changes in the organisation of work which affects productivity, the nature of the products produced and technical change, it is assumed that these are introduced into the model exogenously.

A1.2 The Mathematical Specification of the ASAP Model

The exposition of the model uses the notation of the ASAP programme used for computation of the model. The command 'let' specifies that a sequence of matrix operations are to be performed. The matrix product operation is indicated by the symbol (:). The standard arithmetic operators (+,-,/) act in an element by element fashion between two matrices. The arithmetic operators (*,^) for multiplication and raising to a power also operate in an element by element fashion. The symbols (',%,!) are for three unary operators transpose, matrix inversion and diagonalisation of a row or a column vector. The command 'open n filename' associates the logical unit number n with the specified file name. The command 'repeat n m check .001' allows iterations to be performed by directing that a set of commands in a file associated with logical unit n be performed m times unless the scalar variable check has reached the value of .001 when the iterations will stop. The commands cmove and remove copies columns or rows, respectively, from one matrix to another. Thus 'cmove absorb absorba activities acta' will compare each integer in the set 'activities' with the integers in the set 'acta'. If any are found to be equal, the associated column of the matrix 'absorb' is copied into the column of the matrix 'absorba' indexed by that integer. The command works in a similar fashion for 'remove'. The commands 'row' and 'column' perform the arithmetic operations (+,-,* ,/) combining the elements of each row (column) of a matrix with the corresponding elements of a row (column) vector. The command

'heading1' inserts the label which follows to label output indicated by the command 'print(n) make activities commodities' which prints to n decimal places the matrix make using the label defined by the sets 'activities' and 'commodities'. The symbol I indicates a unit matrix of any desired dimensions and 1 is a row or column vector of any desired dimensions.

(1) composite commodity balance equation

$$\text{let } Q = W+C+G+Z_h+Z_g+Z_e+F$$

where Q is a (15x1) vector of composite commodity supply made up of competitive imports and domestic supplies, measured in purchaser prices. The composite commodity is defined in equation (23) below.

W is a (15x1) vector of intermediate demands for the composite commodity

C is a (15x1) vector of private household consumption demand for the composite commodity

G is a (15x1) vector of government consumption demand for the composite commodity

Z_h is a (15x1) vector of household investment demand for the composite commodity

Z_g is a (15x1) vector of government investment demand for the composite commodity

Z_e is a (15x1) vector of private investment demand for the composite commodity .

F is a (15x1) vector of tourist and other foreign demand such as bases for the composite commodity

(2) intermediate demand by commodity

$$\text{let } W = a:X'$$

where a is a (15x15) matrix of intermediate input-output coefficients measured in 1984 purchaser prices

and X is a (1x15) vector of domestic output measured in 1984 purchaser prices

(3) labour demand

let $L = (1/w) \cdot \alpha : (P_n \cdot v_a \cdot X)$

let $L_k = L : 1 + L_t$

where L is a (4x15) matrix of labour demand in domestic production measured in wage units

w is a (4x1) vector of money wage rates

α is a (4x15) matrix of labour shares in value added; also the exponents of labour inputs into the Cobb-Douglas production functions

P_n is a (1x15) vector of the price of net output as defined in equation (20) below

v_a is a (1x15) vector of the ratio of value added to gross outputs

L_k is a (4x1) vector of total labour demands measured in wage units

L_t is a (4x1) vector of demand for labour on British bases and foreign embassies measured in standard wage units

Equation (3) is derived from the first-order conditions of the Cobb-Douglas production function as set out in Devarajan (1986) and Dymiotou-Jensen (1987) under conditions of profit maximisation and perfect competition.

(4) demand for capital

let $K = \text{alphak} \cdot \text{Pn} \cdot \text{va} \cdot X / r$

where r is a (1x15) vector gross returns to sector-specific capital stocks

alphak is a (1x15) vector of gross shares of capital in value added

K is a (1x15) vector of sectoral demand for capital

Equation (4) is derived from the first-order conditions of the Cobb-Douglas production function in an exactly analogous fashion to equation (3).

(5) production function

let $X = Cx(\exp(1:\log(L^{\text{alpha}}))) \cdot K^{\text{alphak}/\text{va}}$

where Cx is a 1x15 vector of constant terms in the Cobb-Douglas production function

(6) household taxable income

let $Y_h = \text{thetalh} : ((w \cdot L_k) + Y_{f1} \cdot \text{er} - Y_{f1}' \cdot \text{CPI})$

let $Y_h = Y_h + \text{thetakh} \cdot (r \cdot K' + Y_{fk} \cdot \text{er} - Y_{kf}' \cdot \text{CPI})$

let $Y_h = Y_h + \text{thetahh} : Y_h + \text{thetaeh} \cdot Y_e + Y_{gh} \cdot \text{CPI} + Y_{fh} \cdot \text{er}$

where Y_h is a (3x1) vector of household taxable income

theta_{ij} is an (ixj) matrix of coefficients mapping the transfer of income from institution i to institution

$j; i, j = h, e, g, f, l, k$
h is household type h
e is enterprises
g is government
f is the rest of the world
l is labour category l
k is capital
Y_{ij} is the transfer of income from institution i to institution $j; i, j = h, e, g, f, l, k$
er (scalar) is the exchange rate CYL/foreign exchange
Ye (scalar) is enterprise income
CPI (scalar) is the consumer price index using current (Paasche) weights (define in equation (21) below)

(7) household disposable income

$$\text{let } YD_h = Y_h' * (1 - (1 : \theta_{hh}) - \theta_{he} - \theta_h)$$

where YD_h is a (1×3) vector of household disposable income

θ_h is a (1×3) vector of household taxation rates

(8) household consumption

$$\text{let } C_h = (1 - s_h) * YD_h$$

where C_h is a (1×3) vector of household consumption demands

s_h is a (1×3) vector of household savings out of disposable income

(9) household consumption demands

let $P_{cmn} = P_{wcmn} * (1 + T_{cmn} + T_{ecmn} + 1 : m_{mn}) * e_r$

let $CD = (Beta + (1/P) ! : gamma : (Ch' - Bh') !)$

let $C = CD : 1$

let $C_{mn} = Beta_{mn} + (1/P_{cmn}) ! : gamma_{mn} : (Ch' - Bh') !$

where P_{cmn} is a (1x3) vector of domestic purchaser prices of non-competing imports directly into household consumption

P_{wcmn} is a (1x3) vector of world prices of non-competing imports directly into household consumption

T_{cmn} is a (1x3) vector of tariffs on non-competing imports directly into household consumption

T_{ecmn} is a (1x3) vector of excise duties on non-competing imports directly into household consumption

m_{mn} is a (15x1) vector of trade and transport margins for non-competing imports

CD is a (15x3) matrix of composite commodities entering into household consumption

$Beta$ is a (15x3) matrix of minimum levels of consumption from the linear expenditure system

P is a (15x1) vector of purchaser prices of the composite commodity

$gamma$ is a (15x3) matrix of marginal consumption coefficients out of supernumerary income defined by the linear expenditure system

Bh is a (1x3) vector of supernumerary income defined by the linear expenditure system

C is a (15x1) vector of total composite commodity demands by households

C_{mn} is a (1x3) vector of non-competing imports directly into consumption in purchaser prices

$Beta_{mn}$,
 $gamma_{mn}$ are (1x3) vectors of parameters defined in the same way as $Beta$ and $gamma$

(10) households investment

$$\text{let } Z_h = Z_{h_BASE} * (1 + gc/100)^{(nyear)}$$

where Z_{h_BASE} is a (1x15) vector of base year household investment

gc is the annual % rate of growth of growth of consumer expenditure

$nyear$ (scalar) is the number of years since the base year

Note that there are no household investments in non-competing imports.

(11) household savings and investment

$$\text{let } LENDH = sh:YDh' + Sgh * CPI - P:Zh$$

where $LENDH$ (scalar) is the total lending of households to enterprises and government

S_{ij} (scalar) is total real transfer of savings from institution i to institution j

(12) enterprise income

$$\text{let } Y_e = (\text{thetake} * (r:K' + Yfk * er - Ykf * CPI) + \text{thetahe} : Y_h + Yge * CPI) / (1 - \text{thetaee})$$

(13) enterprise savings

$$\text{let } S_e = Y_e * (1 - 1:\text{thetaeh} - Tent - \text{thetaef} - \text{thetaee})$$

where S_e (scalar) is the savings of enterprises
 T_{ent} (scalar) is the rate of tax paid on enterprise income

(14) enterprise investment

let $Z_e = Z_{e_BASE} \cdot (1 + g_k/100)^{nyear}$

let $Z_{en} = Z_{en_BASE} \cdot (1 + g_k/100)^{nyear}$

where Z_e ,
 Z_{e_BASE} are (15x1) vectors of enterprise investment in
composite commodities in the current and base years
 Z_{en} ,
 Z_{en_BASE}
(scalar) are enterprise investment in non-competing imports in
the current and base years
 g_k is the annual % rate of growth of the aggregate
capital stock

(15) enterprise savings and investment

let $S_{fe} = (P_{z_{en}} \cdot Z_{en} + P \cdot Z_e + Seg \cdot CPI - she \cdot LENDH - S_e - S_{ge} \cdot CPI) / er$

let $P_{z_{en}} = P_{wz_{en}} \cdot ((1 + T_{z_{en}} + T_{ez_{en}} + 1 : m_{en})) \cdot er$

where $P_{z_{en}}$ (scalar) is the domestic purchaser price of non-
competing imports in enterprise investment
 she is the share of household lending which goes to
enterprises
 $P_{wz_{en}}$ (scalar) is the world price of non-competing imports
into enterprise investment
 $T_{z_{en}}$ (scalar) is the tariff on non-competing imports into
enterprise investment

Tezenn (scalar) is the excise tax on non-competing imports into enterprise investment

(16) domestic producer prices

$$\text{let } P_{mn} = P_{wmn} * (1 + T_{mn} + T_{emn} + 1 : mn) * e_r$$

$$\text{let } P_x = (P_n + P : a + P_{mn} * mn) / (1 - T_i)$$

where P_{mn} (scalar) is the domestic purchaser prices of non-competing imports into domestic production

P_{wmn} (scalar) is the world price of non-competing imports into domestic production

T_{mn} (scalar) is the import-weighted tariffs on non-competing imports

T_{emn} (scalar) is the excise tax on non-competing imports

P_x is a (1x15) vector of domestic producer prices

mn is a (1x15) vector of non-competing import requirements in domestic production

T_i is a (1x15) vector of production taxes

(17) domestic output prices

$$\text{let } P_d = P_x / (1 - T_{de} - (1 : md))$$

where P_d is a (1x15) vector of prices of domestically sold commodities

T_{de} is a (1x15) vector of excise taxes on domestic sales

md is a (15x15) matrix of margins on domestic sales

(18) competitive imports prices

let $P_m = P_w * (1 + T_m + T_{em} + (1 : m) * m) * e_r$

where P_m is a (1x15) vector of prices of competitive imports

P_w is a (1x15) vector of world prices of competitive imports

T_m is a (1x15) vector of import-weighted tariffs on competitive imports

T_{em} is a (1x15) vector of excise taxes on competing imports

m is a (15x15) matrix of margins on competing imports

(19) price of composite commodity

let $P = (\delta * \sigma * P_m^{1-\sigma} + (1-\delta) * \sigma * P_d^{1-\sigma})^{1/(1-\sigma)}$

let $P = (1/C_q) * P$

where δ is a (1x15) vector of the distribution parameter of the underlying constant elasticity of substitution function defining the composite commodity

σ is a (1x15) vector of elasticities of substitution between competing imports and domestic sales or Armington elasticities

C_q is a (1x15) vector of constants defining the Armington functions

Equation (19) is the price aggregation implied by the constant elasticity of substitution function defining the composite commodity

(20) Price of net output

let $P_n = P_x * (1 - T_i) - P : a - P_m * m$

where all variables are as previously defined

(21) consumer price index

$$\text{let } \text{CPI} = (\text{P:C} + \text{Pcmn:Cmn}') / (\text{Po:C} + \text{Pcmno:Cmn}')$$

where Po, Pcmno are the base (1984) values of the variables P and Pcmn as previously defined

(22) competitive import shares

$$\text{let } \mathbf{m} = (\text{Pd}/\text{Pm})^{-\sigma} (\delta / (1 - \delta))^{-\sigma}$$

where \mathbf{m} is a (1x15) vector of ratios of competing imports (less re-exports) to competing domestic sales; \mathbf{m} is non-zero for agriculture, mining, manufacturing and transport

Equation (21) is derived from the first-order conditions obtained when it is assumed that users of the composite commodity, made up of the imperfectly substitutable competing import and domestically produced commodities, minimise the cost of reaching a given level of utility when the composite commodity is used in consumption or a given level of output when used as a productive input.

(23) domestic output share

$$\text{let } \mathbf{d} = (1/\text{Cq}) * (\delta * \mathbf{m}^{(0-\rho)} + (1-\delta))^{(1/\rho)}$$

where \mathbf{d} is a (1x15) vector of shares of domestically supplied commodities in the composite commodity

ρ is a (1x15) vector, each element of which is defined by $(1-\sigma)/\sigma$

(24) export demand

let $E = C_e * (P_e^{er} / (P_x / (1 - T_e - m_e)))^{eta_e}$

where E is a (1x15) vector of exports measured in 1984 cif prices

C_e is a (1x15) vector of constant terms in the constant elasticity export demand function

P_e is a (1x15) vector of prices of exporters competitors

T_e is a (1x15) vector of export taxes (rebates)

m_e is a (15x1) vector of margins on exports

eta_e is a (1x15) vector of elasticities of the export demand functions

(25) tourist income and expenditure

let $Y_{Dt} = Y_t * (1 - T_t^{er}) - (1 : (w * L_t))$

let $F = \text{gammat} * Y_{Dt}$

let $F_{mn} = \text{gammat}_{mn} * Y_{Dt}$

where Y_{Dt} (scalar) is the net tourist income available for expenditure on commodities

Y_t is total tourist income in terms of foreign exchange

T_t is the rate of taxation on tourist income

gammat is a (15x1) vector of tourists consumption expenditure spent on composite commodities

F_{mn} (scalar) is the tourist expenditure on non-competing imports

gammat_{mn} (scalar) is the share of tourists consumption expenditure spent on composite commodities

(26) government income

$$\text{let } Y_g = T_h:Y_h + T_{ent}:Y_e + T_t:Y_t + Y_{fg}:er + T_c:(P:C) + T_k:(r:K' + Y_{fk}:er - Y_{kf}:CPI)$$

$$\text{let } Y_g = Y_g + (T_i:P_x/P_xo):X' + (T_d:P_d):D' + (T_m:P_w):M'$$

$$\text{let } Y_g = Y_g + T_e:E' + ((m_n + s_{m_n}:g):P_{w_{m_n}}(T_{m_n} + T_{em_n})) : X'$$

$$\text{let } Y_g = Y_g + (P_{w_{c_{m_n}}}(T_{c_{m_n}} + T_{ec_{m_n}}):er):C_{m_n}' + (P_{w_{t_{m_n}}}(T_{t_{m_n}} + T_{et_{m_n}}):er):F_{m_n}$$

$$\text{let } Y_g = Y_g + (P_{w_{g_{m_n}}}(T_{g_{m_n}} + T_{eg_{m_n}}):er):Z_{g_{m_n}} + (P_{w_{z_{m_n}}}(T_{z_{m_n}} + T_{ez_{m_n}}):er):Z_{em_n}$$

- where Y_g (scalar) is government income
- T_c (scalar) is the value added tax rate
- T_k (scalar) is the capital tax rate
- $P_{w_{i_{m_n}}}$ (scalar) is the world price of non-competing imports into expenditure by institution i
- $T_{i_{m_n}}$ (scalar) is the tariff rate on non-competing imports into expenditure by institution i
- $T_{e_{i_{m_n}}}$ (scalar) is the rate of excise tax on non-competing imports into expenditure by institution i
- i is =c,t,g and e for consumers, tourists, government and enterprises

(27) government expenditure and savings

$$\text{let } G = G_{exo}$$

$$\text{let } S_g = Y_g - (1:Y_{gh}):CPI - Y_{ge}:CPI - P:G - Y_{gf}:CPI$$

- where G_{exo} is a (15x1) vector of current government expenditure on the the composite commodities

S_g (scalar) is government savings

(28) government investment

let $Z_g = Z_{g_BASE} \cdot (1 + g_k/100)^{-(nyear)}$

let $Z_{gmn} = Z_{gmn_BASE} \cdot (1 + g_k/100)^{-(nyear)}$

where Z_g ,
 Z_{g_BASE} is a (15x1) vector of government investment in
composite commodities in the current and base years

Z_{gmn} ,
 Z_{gmn_BASE}
(scalar) is government investment in non-competing
imports in the current and base years

(29) government savings and investment

let $S_{fg} = (P_{gmn} \cdot Z_{gmn} + P : Z_g + (S_{gh} + S_{ge}) \cdot CPI - S_g - shg \cdot LENDH - Seg \cdot CPI) / er$

let $P_{gmn} = P_{wgmn} \cdot ((1 + T_{gmn} + T_{egmn} + 1 : mn) \cdot er)$

where all the variables are as previously defined, except
 P_{gmn} , P_{wgmn} , T_{gmn} and T_{egmn} , which follow the analogous
definitions for the same variables for other
institutions

(30) balance of payments

let $S_f = (Y_{lf} : 1) \cdot CPI / er + Y_{kf} + Y_{gf} + \theta_{taef} \cdot Y_e / er + P_w : M'$

let Sf = Sf + (((Pwcn*X)*(mn+(g*stan))):1) + ((Pwcn*Can):1) + Pwgan*Zgan

let Sf = Sf + Pwzenn*Zenn + Pwtan*Fan - (1:Yf1) - Yfk - (1:Yfh)

let Sf = Sf - Yt - Yfg - (((Px/(1-Te-me'))*E):1) / er

where Sf is foreign savings and all other parameters and variables are as previously defined

(31) domestic market supplies and imports

let D = d'*Q

let M = m'*D

where D is a (15x1) vector of domestic market supplies valued at purchaser prices

M is a (15x1) vector of competitive imports into domestic supply valued at purchaser prices

(32) supply and disposition

let mdt = I + md

where mdt is a (15x15) rake matrix transforming activity outputs into domestically supplied commodities

let DDEMANDPd = a

let DDEMANDPd = 0

row DDEMANDPd = mdt*D

column DDEMAND = DDEMANDPd*Pxo

where DDEMAND is a (15x15) matrix of domestic market sales measured
in base year producer prices

let Mcif = M*Pw

let MMDEMAND = a

let MMDEMAND = 0

row MMDEMAND = mm*Mcif

where Mcif is a (15x1) vector of imports into domestic supply at
cif prices

MMDEMAND is a (15x15) matrix of total margins required for
competitive imports

let MNMARGC = mm*((Pwcm*Cam):1)

let MNMARGZg = mm*Pwgm*Zgm

let MNMARGZe = mm*Pwzmn*Zmn

let MNMARGF = mm*Pwtm*Fm

let MNMARGX = mm*((Pwmn*mn):X')

let MNMARG = MNMARGC+MNMARGZg+MNMARGZe+MNMARGF+MNMARGX

let XDEMAND = ((DDEMAND+MMDEMAND):1)'+MNMARG'+E

let Xcheck = (X-XDEMAND):(X-XDEMAND)'

let $\Delta X = X - X_{DEMAND}$

where $MNMARG_j$ is a (1x15) vector of total margins required for non-competing imports; $j=C, Zg, Ze, F$ and X

$MNMARG$ is a (1x15) vector of total margins required for total non-competing imports

X_{DEMAND} is a (1x15) vector of demands for domestic output

X_{check} (scalar) is the sum of squared differences between supply and demand

ΔX is a (1x15) vector of absolute differences between domestic supply and demand

(33) labour market and commodity market clearance

let $UN = L_s - L_k$

let $UN_r = (UN/L_s) * 100$

let $L_n = L_s * (1 - UN_n)$

where L_s is a (4x1) vector of the labour supply measured in wage units

L_n is a (4x1) vector of labour supply with the base year levels of unemployment

UN_r is a (4x1) vector of unemployment rates

UN_n is a (4x1) vector of base year unemployment rates

let $X = X_{DEMAND}$

return

The model is solved iteratively for the equilibrium levels of output, consumption, investment, government expenditure, exports, inputs, income commodity prices and wages for given values of the exogenous variables.

APPENDIX 2

THE MEASURES OF EFFECTIVE PROTECTION

The following summarises the measures of effective protection used in section 4 of this report. The notation is as set out in APPENDIX 1, except v_{wm} and v_{wx} , P_{wm} and P_{wx} , a_{wm} and a_{wx} , m_{wm} and m_{wx} , which refer to unit value added at world prices, world prices, composite commodity input-output coefficients, non-competing import coefficients, respectively, estimated using import and output weighted tariffs, respectively for 1984.

(1) EPRM (Effective Protection to import substituting activities, Balassa method, import weights)

$$\text{let EPRM} = (100 * (T_m - T_m : a_{wm} - m_{wm} * T_{mn}) / v_{wm})'$$

(2) DVAM (Evans, change in domestic unit value added in import substituting activities, import weights)

$$\text{let DVAM} = (100 * (0 - P_{wm} * T_m + (P_{wm} * T_m) : a + (P_{wm} * T_{mn} * m_n)) / v_a)'$$

(3) DVAEM (Evans, change in unit value added to exports, import weights)

$$\text{let DVAEM} = (100 * (T_e + (P_{wm} * T_m) : a + P_{wm} * T_{mn} * m_n) / v_a)'$$

(4) DVACM (Evans, change in unit value added in import substituting activities with a Customs Union, import weights)

$$\text{let DVACM} = (100 * (P_{mw} * (T_{xcu} - T_m) + (P_w * (T_m - T_{xcu})) : a) / v_a)'$$

(5) DVAECM (Evans, change in unit value added in export activities with a Customs Union, import weights)

$$\text{let DVAECM} = (100 * (\text{Te} + (\text{Pwm} * (\text{Tm} - \text{Txcu})) : \text{a}) / \text{va})'$$

(6) EPRX (Effective Protection to import substituting activities, Balassa method, output weights)

$$\text{let EPRX} = (100 * (\text{Tx} - \text{Tx} : \text{aw} - \text{mnw} * \text{Tmn}) / \text{vawx})'$$

(7) DVAX (Evans, change in domestic unit value added in import substituting activities, output weights)

$$\text{let DVAX} = (100 * (0 - \text{Pwx} * \text{Tx} + (\text{Pwx} * \text{Tx}) : \text{a} + (\text{Pwmn} * \text{Tmn} * \text{mn})) / \text{va})'$$

(8) DVAEX (Evans, change in unit value added in export activities, output weights)

$$\text{let DVAEX} = (100 * (\text{Te} + (\text{Pw} * \text{Tm}) : \text{a} + \text{Pwln} * \text{Tmn} * \text{mn}) / \text{va})'$$

(9) DVACX (Evans, change in unit value added in import substituting activities with a Customs Union, output weights)

$$\text{let DVACX} = 100 * (\text{Pwx} * (\text{Txcu} - \text{Tm}) + (\text{Pwx} * (\text{Tm} - \text{Txcu})) : \text{a}) / \text{vao}$$

(10) DVAECX (Evans, change in unit value added in export activities with a Customs Union, output weights)

$$\text{let DVAECX} = (100 * (\text{Te} + (\text{Pwx} * (\text{Tm} - \text{Txcu})) : \text{a}) / \text{vax})'$$

1 See Krueger (1982) and Lucas (1983).

APPENDIX 3

DATA SOURCES AND METHODS

A3.1 The SAMU Data Base

The starting point for the data base of the ASAP model was the 11-sector 1984 FINALSAM constructed in the Planning Bureau in 1986 for the year 1984. The 1984 FINALSAM was aggregated to 10 sectors for the purposes of running the GAMS model. Unfortunately, the 1984 FINALSAM treats manufacturing as a single sector in both the activity and commodity classification, making it unsuitable for use in this Mission where five of the six sector case studies covered more than 2/3 of the manufacturing sector. The sixth case-study sector, the New Knowledge-based Activities, was not included because the activities identified for this case study do not conform to any readily identifiable statistical categories. Thus the first major data requirement for the ASAP model was the estimation of a SAM in which the sectors of the case studies were identifiable. The sectoral disaggregation within manufacturing was chosen so that 5 of the 6 sector case study sectors were identified. Following the convention used in the FINALSAM 1984, the same classification was used to identify producing sectors as for commodity groupings. The disaggregation chosen, shown in Table A3.1, was slightly different from the 1984 SAMU (U for updated SAM) in that the very small sector Mining was included with Other Manufactures to form Other Manufactures and Mining.

In constructing the 1984 SAMU, the same valuation conventions were used as in the FINALSAM 1984. This corresponds to the producer price valuation of domestic output and its use in sales to the local market and for exports. The producer price definition is very close to that used in the 1981 Input-Output table. However, the intermediate and final demands on the domestic market are all based on a composite commodity made up of domestically produced goods and competing

imports. Thus, competitive imports and production for the local market combine as imperfect substitutes into the 15 different types of composite commodities which are measured and sold at market or purchaser prices. The closeness of substitutability in use for the composite commodities is governed by what is known as the Armington elasticity; perfect substitutes have an Armington elasticity of infinity whilst perfect complements have an Armington elasticity of zero. The sector case studies provided crucial information to assist in making the judgement required to specify the value of the Armington elasticity in the constant-elasticity of substitution function which defines the composite commodity.

The 1984 FINALSAM was used to provide control totals for the manufacturing sector as a whole. In the key area of obtaining a disaggregation of the manufacturing sub-sector input-output table, column control totals of intermediate inputs used in domestic production were obtained from the Industrial Statistics. In the case of the row totals of intermediate input usage, these were obtained as a residual after all items in final demand were disaggregated for the manufacturing sectors. This sectoral disaggregation for final demand activities was obtained using the 1981 input-output proportions. Disaggregation of the employment, import and export totals were provided by the Planning Bureau. The final input-output flows and input coefficients for 1984 were estimated using the standard RAS technique (see Bacharach (1970) for a discussion of the RAS technique). The whole of the disaggregated 1984 SAMU was built as a part of the modelling data base. This data base was then transferred to the ASAP program where the final assembly of the 1984 SAMU was carried out. The complete 1984 SAMU is shown in Table A3.2.

The great advantage of using such mechanical routines as the RAS method for obtaining a set of consistent estimates of the input-output disaggregation for 1984 is that they permit one to use the best available information in a consistent fashion. Given that the basic data was all assembled in the spreadsheet, any new or updated information can be accessed by the ASAP program, incorporated into a re-estimated 1984 SAMU and be ready for re-estimation of the ASAP

model in a matter of minutes. This said, the quality of the disaggregated SAMU depends critically on the quality of the underlying disaggregated information.

The key component in obtaining the disaggregated 1984 SAMU was the preliminary estimates of the manufacturing input-output flow table for 1981 provided by the Statistics Department. Unfortunately, these preliminary estimates are far from ideal. Both the 1984 FINALSAM and SAMU work with a producer price valuation of the domestic outputs from the supply and the demand side and a purchaser price valuation of all intermediate and final demands for the composite commodity. These valuation conventions are different from those being used in the 1981 Input-Output Table. At present, the 1981 Input-Output Table is being estimated in terms of producer prices and with no disaggregation of the margins to readily facilitate conversion to purchaser prices. Further, the input-output flow matrix is in terms of local inputs with total competing and non-competing imports being shown as separate rows of inputs.

From the perspective of the modeller, it is difficult to justify the use of local inputs as the relevant technical input requirement used in production where the same or very similar inputs are also available through imports. The relevant technical input-output coefficients are those for local and competing imports on the one hand (the composite commodity), and for non-competing imports on the other. In principle, the choice between local and competing imports for intermediate inputs will not be governed by technical considerations but by economic considerations such as relative prices and product characteristics. For this reason, the economic modeller must analyse how this economic decision is made in the course of any analysis which is concerned with the import content of domestic economic activities. This analysis can only proceed if the relevant technical coefficients are available in the first place.

The availability of only producer price local intermediate input flows with only aggregate margins and aggregate estimates of the

competing and non-competing imports posed a serious difficulty for the ASAP model. It meant that the mechanical RAS method had to be used to obtain the input-output flows consistent with a purchaser price valuation of 1984 intermediate usage of the composite commodity required for modelling purposes. This procedure is rather bizarre since the initial source material for intermediate input usage obtained from the Industrial Census is for total inputs valued at market or purchaser prices. To obtain the producer price valuation of these inputs, margins, non-competing and competing inputs are estimated and subtracted to give the intermediate flows of local goods in producer prices. In effect, this procedure had to be partly reversed by mechanical rather than by direct estimation in order to obtain the desired intermediate input flows for the 1984 SAMU. It means that the normal discrepancies between the input-output coefficients arising from changes in relative prices and technical change are compounded by discrepancies due to measurement error.(2)

It is difficult to assess how good the disaggregated SAMU input-output flows for 1984 are. In effect, the RAS procedure re-allocates competing imports and margins across the rows of the 1984 input-output flow estimates as a constant proportion of the local inputs. These proportional adjustments across the rows are consistent with the assumption used in the CGE model that the margins and the share of competing imports in the composite commodity is the same in all uses. However, a second set of adjustments are made by the RAS method to ensure consistency of the intermediate usage with the totals of the columns. This introduces a second set of modifications to allow for the (correct) observation that the margins and the competing import usage is not proportional across the rows. Clearly, it would be much better to have the raw estimates of the 1984 input-output flows so that the modeller could choose how to model the formation of the composite commodity given the best available data set. For this reason, the estimates of effective protection reported in section III should be interpreted with an added degree of caution bearing in mind the assumptions that had to be made in order to obtain the input-output components of the 1984 SAMU. The great advantage with the data base set-up is that, as soon as more accurate input-output information is available, the 1984 SAMU can be quickly

re-estimated.

A3.2 Tariff Data

In the construction of the 1984 FINALSAM, tariffs enter as a part of government revenue associated with competing and non-competing imports. In so far as export taxes and subsidies, and rebates to exporters of customs duties paid on inputs are also recorded, they appear as a single entry in the government revenue row. No other aspects of the structure of protection, such as import licenses or controls, appear in the SAM. However, when basing an economic model on the SAM, it is important to give consideration to the way in which protection data in general can be incorporated into the accounting framework.

Consider first the tariff information recorded. Since the tariff revenue is the amount of the relevant import valued cif multiplied by the cif tariff equivalent of specific import duties or the ad valorem tariffs themselves, it is straight forward to obtain an estimate of the height of the average tariff by dividing tariff revenue by cif import values. This is the import-weighted measure of the average level of the tariff in each importing category. This measure of the height of the tariff component is consistent with the valuation basis of the SAM, where all domestic distribution of imports is valued at purchaser prices ie the cif value of imports plus tariffs, excise taxes and trade and transport margins.

The import weighted tariff is a poor measure of the height of a protective structure. For those items where protection is high, it is likely that the imports will be low but that there will be a large amount of domestic production. Conversely, for those items where tariffs are low, there will be a higher level of imports. Thus, the higher the level of protection, the lower will be the weight assigned to any particular tariff sub-category within an aggregate import competing sector. This is exactly the opposite to what the measure of

the average height of the tariff is designed to measure. Ideally, the higher the tariff, the higher will be protected domestic production; the measure of the average height of the tariff structure should attempt to capture this effect. The standard way in which this is done in the protection literature is to use either a domestic output weighted measure of protection, or a domestic market supplies weighted measure of protection. Neither measure is ideal (there is no such thing as an ideal price index) but it is widely accepted that either the output or market supply weighted measure gives a much better estimate of the average height of domestic prices above world prices. Both measures of the height of the protective structure are used in the trade policy literature, and can be incorporated into standard measures of effective protection. However, this cannot be so readily done within the SAM framework since as soon as the import-weighted tariff is dropped in favour of, say, an output weighted tariff, the whole basis of valuation in the SAM and the estimation of government revenue breaks down.

As far as I am aware, there is no discussion of how to incorporate a more adequate measure of the height of a protective structure into the SAM framework.(3) However, this can quite easily be accomplished by incorporating a set of dummy accounts into the SAM. Thus, when an output-weighted tariff is used to measure the amount of the tariff revenue, the excess of this amount must be subtracted from government revenue through a negative entry associated with the dummy government account. This negative entry into the dummy government account can also be thought of as the revenue generated by the dummy government account necessary to pay importers or final users the excess over the actual tariffs paid for competing imports implied by the output weighted tariff. In the 1984 SAMU, this excess is shown as being repaid to importers of competing imports, so that the final valuation of competing imports is at the cif plus import weighted tariff valuation.

Alternatively, competing imports could be re-valued at purchaser prices reflecting the estimated output weighted tariffs, with the subsidy reflecting the difference between the output weighted and

actual tariffs paid being paid as a direct subsidy to all final users of the competing import. In the 1984 SAMU, imports remain valued at their cif plus import weighted tariff rates since it is much easier to read the SAM as it reflects the actual valuation of imports in the accounts. However, when using the output weighted tariff in the ASAP model, it is a straightforward matter to show competing imports valued at cif prices plus output weighted tariffs, with the dummy subsidy being allocated to the domestic users of competing imports.

The second major problem for the estimation of the height of the protective structure arises from the wide range of import licences, import controls and voluntary restrictions which play an increasingly important role in the structure of protection throughout the world, and in Cyprus as well. In principle, the tariff equivalent of direct controls or restrictions can be estimated by direct observation of the difference between the domestic and cif prices of restricted commodities. In terms of the SAM valuation procedures, a second dummy account can be added to allow for the premium over world prices accounted for by the protective structure. In this case, the rents so attracted will be paid for by domestic users and appropriated by either the importers or domestic producers of the relevant items. However, since there is no information available at present on the protective effect of non-tariff barriers, these effects cannot be incorporated at the moment.

In order to capture the diversity of the structure of protection, it would be desirable to have separate estimates of the output weighted tariffs on competing imports by sector of use, and for non-competing imports by sector of use for a 6 sector disaggregation of manufacturing for the most recent year possible. Compilation of these data require the matching of tariff classification with the production statistics, an exercise which requires the classification of inputs into import competing and non-competing sub-components. The competing domestic output average tariffs could then be calculated by sector of use for the present situation, best taken as 1984 as a base year for consistency with the SAM data base, and for the situation which will be approximated by a Customs Union with the

EEC, the major alternative tariff structure under consideration.

The tariff data for import-competing industries prepared for the EEC negotiations cover around 2/3 of domestic industrial production. The matching total domestic output figures are for 1984, so that it proved possible to calculate the average domestic output weighted tariff for the 6 manufacturing sectors identified in the SAM by blowing up the sample averages for each sector to the sector totals for 1984. The calculation of the output tariffs for the present situation, and for the most likely negotiated outcome of the Customs Union, would ideally use a world price for a homogeneous commodity. However, this is not the case.

The procedure adopted for measuring the height of the present tariff structure was to use import weights in the process of aggregating individual tariff items up to a level of aggregation for which it was possible to estimate competing domestic production. Thereafter, output weights were used in the process of reaching the final output-weighted measure of the tariff structure.

In the case of estimating the likely height of the tariff after accession to a Customs Union with the EEC, the heterogeneity of each manufacturing category posed additional problems. If each industry were in fact producing homogeneous commodities, it would make sense to assume that EEC suppliers were above world prices ie that the difference between the Common External Tariff and the tariff on imports from the EEC represented the difference between pre and post Customs Union prices in external trade for Cyprus. The relevant tariff rates for imports from outside of the EEC after joining the proposed Customs Union would then be the EEC General tariff. The effect of joining the Customs Union would then be estimated by comparing the existing Cyprus tariff structure with the EEC General External Tariff, applying the same domestic output weights to measure the height of Cyprus tariffs after the Customs Union.

However, the commodities identified are not homogeneous, and it will not always be the case that EEC suppliers will be exporting at prices above world prices, as measured by the EEC general tariff. This will be the case where imports already coming from the EEC are in fact the least-cost or world-price sources of supply, in which case, the relevant height of tariff for Cyprus is the EEC tariff. Hence, there is a case for an import weighted average tariff based on the historical import weights using the EEC tariff for imports from the EEC and the Common External Tariff for imports from outside of the EEC giving a weighted average of the tariff for each import sub-category which is likely to prevail after the proposed Customs Union. The average height of tariff after the Customs Union is then estimated by attaching the average import weighted tariffs on each sub-category to arrive at the domestic output weighted tariff for the Customs Union. In effect, this procedure assumes that all imports from the EEC before the Customs Union are in fact at world prices and that there will be no trade diversion as a result of the Customs Union.(4) For those cases where there is no estimate of the import weights, then informal knowledge of trading patterns was used to assign either the general tariff or the EEC tariff as the one relevant to the principal source of supply.

Where there are binding import restrictions as well as tariffs, it will be necessary to assume the removal of these restrictions will have the same effects on the average tariff change as discussed above.

More serious problems arise with the intermediate input tariffs because of the prevalence of exemptions and reliefs of duty. In this case, using the industry average height of protection is likely to over-estimate the height of input tariffs, and therefore underestimate the amount of protection being given by the tariff structure. However, in the absence of the disaggregated competing and non-competing imports by sector of use and by import sector of origin, it is not possible to obtain an estimate of the tariff on productive inputs. However, in order to capture some of the effects of biases in the pattern of import duties according to sector of use,

only the import levy was applied to non-competing imports used in domestic production, investment or by tourists and other foreign bases and embassies. The resultant estimates of the 1984 tariffs on manufacturing compared with earlier estimates by Demetriades (1984) are shown in the text Table 2.1, and the estimated manufacturing protection at the level of aggregation used in the 1984 SAMU is shown in Table 2.2. Other tariffs on traded inputs are measured using the import weights directly from the 1984 SAMU in the effective protection calculations discussed in the next section.

It can be readily seen from Table 2.2 that the output weighted tariff TX is much higher than the import weighted tariff TM for 1984. However, at a lower level of disaggregation as shown in Table 2.1, this result does not always hold. Also, the nominal tariffs have increased between 1967 and 1984 for final goods such as Clothing and Footwear, but declined in some of the commodity groups which produce intermediate products such as Electrical Machinery. It can also be seen from Table 2.2 that the roughly estimated tariffs on non-competing inputs into domestic production, TMN, are much lower than the tariffs on final goods. As noted above, this is not a result arrived at by detailed analysis of the tariff data, but is based on the judgement that all of the pressures within the business community and government have tended to increase protection on final goods and to lower it in producer goods. Clearly it would be desirable to have this confirmed with empirical analysis. The final two columns shown in Table 2.2 are for the estimated export subsidies which cover part but not all of the export rebates paid to exporters using protected imported materials, and also the estimated external tariff should Cyprus go into a Customs Union with the EEC.

A3.3 Technical Change

The stylised facts about the combined effects of both product and process innovation when measured as technical change suggest that, although there may be marked changes in the structure of the input-output coefficients in the process of growth and structural change,

the total input to gross output ratios do not change very much over time. In contrast, the labour to gross output ratio tends to fall dramatically whilst the changes in the capital to output ratios can go in either direction (see Carter (1970, ch 13)). In the absence of detailed empirical investigation of technical change in Cyprus, the estimate of the rate of technical change used in the present GAMS model in part reflects these stylised facts in that the intermediate to gross output ratios are held constant. However, rather than introduce labour saving technical change as the major source of productivity improvement, the GAMS model makes the simple initial assumption that the rate of technical change is 2% pa for both capital and labour inputs in all industries except agriculture, which is assumed to have a zero rate of technical change. This estimate of the rate of technical change based on the modified stylised facts is also taken as the back-ground starting point against which the sector strategy of radical technical change is assessed.(5)

The sector case studies provide an important source of information on the extent to which it is possible to accelerate the over-all rate of technical change in manufactures. In spite of the considerable variation in the structure of each sector studied and the types of process and product innovations which could be implemented, it is striking that a general view emerges that the order of magnitude of accelerated technical change possible is between 2% pa and 4% pa applied to all inputs and treating product innovation as an enhancement of the unit price of the product. This implies a total additional technical change of just over 10 - 20% pa up to 1991, and of between just over 20% and nearly 50% pa up to 1996. In addition, the view emerged that, with attention to marketing and product innovation, the rate of growth of export markets could expand at comparable rates. Clearly there is much scope for analysing the impact of such a large change in the manufacturing sector on the rest of the economy and exploring the implications of possible bias in technical change. However, at this stage of the development of the ASAP model and its data base, it was felt that it was only appropriate to use the case study information to provide an estimate of the rough orders of magnitude of the additional technical change which might emerge from an Industrial Strategy.

A3.4 The Armington Elasticities

One of the most difficult parameters to estimate for the ASAP model is the elasticity of substitution between local production and competitive imports. These elasticities are known as the Armington elasticities in the literature are widely used in single country CGE models (see Dervis, de Melo and Robinson (1982, section 7.2). In the GAMS model, an informed judgement based on the stylised facts learned from empirical studies of import demand functions was used to set the Armington elasticity for manufactures to 6. The sector studies of Cyprus manufacturing industries provided an ideal opportunity to make a more informed judgement about the size of this parameter for the sectors covered.

The estimated direct effects of the Customs Union on manufacturing sector output, based on the sector case studies. These estimates take into account the changes in the structure of protection with the Customs Union, the characteristics of each sector in import substituting and export activities, and the likely sources of import competition after protection changes with the Customs Union.

Two types of effects were identified in the estimated direct effects of a Customs Union. First, the changes in the structure of protection would affect the degree of import penetration in each sector. Second, export activities would be indirectly affected depending on the extent to which the firms cross-subsidised exports from the import-competing side of their activities. In each case, the sector consultants made a judgement about the capacity of the firms in each sector to respond to increased competitive pressure. In the case of Textiles and Wearing Apparel, it was judged that the firms would be in a strong enough position to respond favourably to the increased competition, but in Leather and Leather Products, it was judged that a number of firms would not be able to respond favourably and would therefore go bankrupt.

Taking domestic sales as constant and using the 1984 outputs, imports and exports, the output changes and implied export changes shown in the main Report were translated into changes in the share of imports in total domestic supply. The changes in the competitive imports to local production for domestic sales were then combined with the changes in import prices arising from the change in protective structure reported in Table 2.1 and 2.2 to give an arc elasticity estimate of the Armington elasticity. This was done for both the import and output weighted tariffs, and the results are reported in Table A3.4. Since the ASAP model projections reported in section V use both import weighted tariffs and Armington elasticity estimates based on the import tariffs, the output weighted Armington elasticity estimates are shown in brackets in Table A3.4.

It is readily apparent from the Armington elasticity estimates shown in Table A3.4 are highly sensitive to the import versus output weighted tariff estimates. This is particularly true for Wood and Wood Products, where the output weighted tariff is over twice the size of the import weighted tariff. Given the large difference between the import weighted and output weighted estimate of the Armington elasticity in this sector, it is not surprising that, in the ASAP runs reported in section V which use import weighted tariffs and Armington elasticities, the general equilibrium effects of the fall in wages associated with the Customs Union almost completely offset the loss of tariff protection associated with the Customs Union.

A3.5 Capital Stock

At the time of the preparation of the data base for the ASAP model, the estimation of the base year capital stock for the GAMS model proceeded by making exogenous estimates of the rate of profit for 1984 and used the gross returns to capital from the FINALSAM 1984 to arrive at the implied capital stocks. Capital stocks so derived were then projected for 1985, 1986 and 1991 using a combination of projected sectoral gross investments and average sectoral rates of

depreciation. Gross investment for the whole economy by sector of origin of the investment was estimated using a 1984 capital matrix. The relevant data for the 1984 ASAP model categories are set out in Table A3.3.

It can be seen from Table A3.3 that the assumed rates of profit vary enormously between sectors. Further, the sectoral investment targets are translated into a programme of investment in different types of capital goods based on a matrix of investment proportions estimated for 1984. It is difficult to assess the quality of the investment proportions matrices, or the extent to which sectoral investment targets can be implemented through available government policy instruments. However, more worrying is the fact that these estimates of capital stocks for 1984 are based on the ad hoc estimates of the rate of profit by sector without much empirical evidence. For these reasons, the estimates of the capital stocks are only used as a proxy for projecting the rate of growth of investment.

Greater confidence in the quality of the base year capital stock estimates would be achieved by drawing on the perpetual inventory estimates of the capital stocks which are available in the Statistics Department. These estimates of the base year capital stocks have now been incorporated into the GAMS model, but they were not available in time for the work of the mission. In view of the weakness of the preliminary investment data shown in Table A3.3, it was decided that it would be better to by-pass the transformation of the implied demand for capital at the sectoral level into the demand for investment goods and to assume that the bundle of investment goods projected could be transformed into these implied demands. The implications of this assumption are discussed in the context of the projection results reported in section V of the main text.

A3.6 Parameter Estimates and Exogenous Variables Summarised

The estimates of the exogenous variables and parameters used in the projections together with the source of the estimates are shown in Tables A3.4 below. Insofar as the particular projections and parameter estimates are crucial to the model projections, these are discussed in section V of the main text.

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