## OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.


## DISCLAIMER



## FAIR USE POLICY

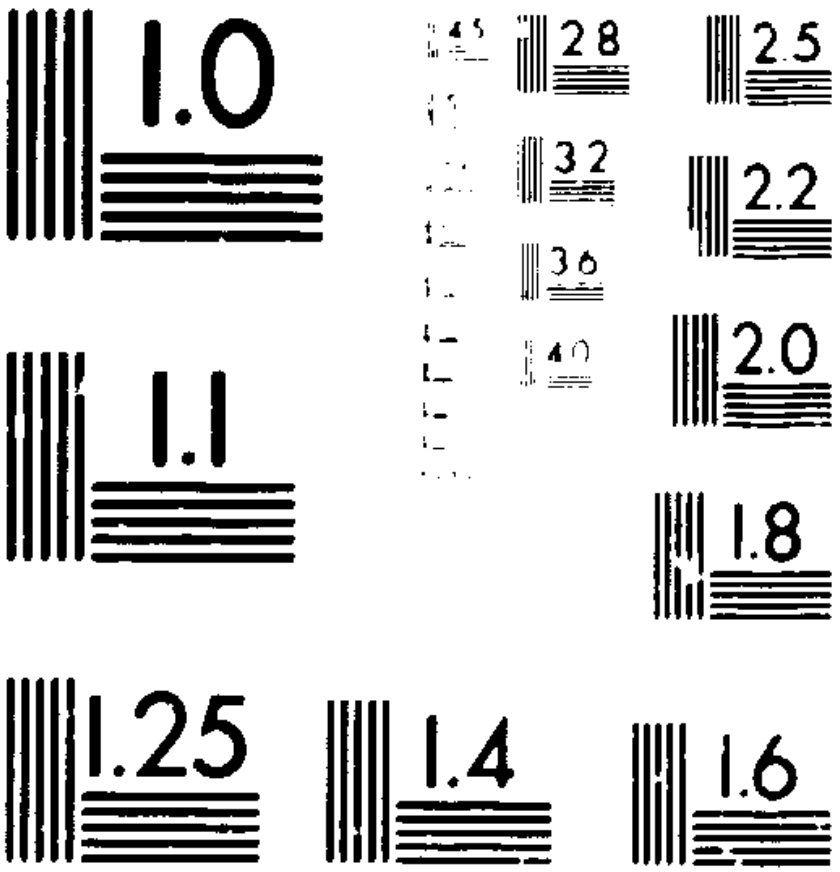


## CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org



RESTRICTED

13982

DP/ID/SER.A/532
16 August 1984
ENGLISH

# DEVELOPMENT OF ELECTRONICS CAPABILITY IN MALTA

DP/MAT/83/001

MALTA

Technical Report: Update and Recommendations *

Prepared for the Government of Malta
by the United Nations Industrial Development Organization,
acting as Executing Agency for the United Nations Development Programme

Based on the work of electronics expert,

Ronald E. Fischbacher

2746

United Nations Industrial Development Organization
Vienna

* This document has been reproduced without formal editing.

V.84-89235

ABSTRACT

This report describes the progress made toward the establishment of an Advanced Electronics Maintenance Unit for the Government of Malta.

It also contains a report and recommendations on action to encourage the growth of electronics industry in Malta.

Related topics in higher education are also dealt with, and recommendations included.

# TABLE OF CONTENTS

## 1. INTRODUCTION

The Government of Malta recognises that the rapidly advancing technology of electronics poses both problems and opportunities within its economy.

In the public sector, the influx of equipment using advanced technology is impacting many public and parastatal services from telecommunications to hospitals. In order to maximise the utilisation of scarce electronics servicing skills, an Advanced Electronics Maintenance Unit is being set up as a centre to which difficult servicing and repair problems can be referred, and where selected electronics technicians can receive additional training to enable them to keep pace with the changing technology.

In the industrial sector, the changing pattern of employment not only in Malta but throughout the industrial world renders it necessary to re-examine the potential for Malta to participate in the growth of electronics and light electrical industry as an employment factor.

To further these aims a UNDP project has been initiated with a brief as defined in Appendix 1. This essentially comprises three tasks which may be summarised as follows:-

- o Set up an Advanced Electronics Maintenance Unit and manage it for an initial period.
- o Analyse the potential for light electrical/ electronics industry in Malta, and advise on further steps to attract such industry.
- o Examine the relevant electronics educational and training systems, especially at the University.

To carry out these tasks three UNIDO experts have been made available.

One of these does not join the project until September; his task will be the day-to-day management of the Unit in the initial stages. The other two - Dr H-D Liess and Mr R E Fischbacher - have shared the other tasks according to their time available on the project. This report therefore covers aspects of all three tasks.

Although this is the final report of one expert, the project continues, in that the Advanced Electronics Maintenance Unit will not come into operation until September 1984, and its managemement in early months will form a part of this project.

## 2. ADVANCED ELECTRONICS MAINTENANCE UNIT

### 2.1 Premises

Premises at the Technical Institute, Paola, adjacent to the Fellenberg Training Centre, have been allocated to the Unit. They consist of a large workshop area, approximately 10m X 8m, capable of accommodating about 12 technicians, together with a smaller room 3½m X 3m for use as an office and for storage of special items.

The rooms have been repainted and prepared for installation of furniture and equipment, and a telephone is being installed in the office.

In view of the need to preserve new electronic instrumentation in good condition, and to ensure that calibrations can be carried out with requisite accuracy, air conditioning has been provided for and will be installed for the commencement of operations in September.

Target temperature limits are $20^{\circ}C \pm 3K$, but the primary aim is to eliminate condensation (and consequent corrosion of equipment) during humid winter conditions.

### 2.2 Furniture

Six work benches have been constructed from a basic design produced by Mr Stoehr who is to manage the Unit initially. Some final touches have yet to be made - principally the fitting of electrical socket outlets to individual requirement. Antistatic rubber mats will be required for at least some of the benches to enable work on CMOS devices to be carried out without causing damage, but these may have to be purchased as kits from the equipment budget.

Existing wall benches have been refurbished for use round the walls of the workshop, and an existing island bench has been refurbished as a table. If this proves suitable further units can be repaired as required.

For equipment storage, wooden cabinets are provided. The preferred glass-fronted cabinets are not available.

A desk has been constructed for the office, but chairs have not yet been procured. For ergonomic and occupational health reasons adjustable swivel chairs are desirable, but these may prove too expensive for the budget.

Other items not so far resolved are a two-drawer filing cabinet for the office, and equipment trolleys for oscilloscopes.

2.3 Equipment

Contingency Fund Warrant 10/84 dated 22 May 1984 has been issued for Lm21,000 to cover equipment for the Unit.

The call for tenders was published on 29 May and tenders for specified equipment should be submitted by mid-July. It is highly desirable that Mr Stoehr be given the opportunity to participate in final selection of the equipment to be purchased, but it is acknowledged that this may be difficult to arrange.

2.4 Staffing

The Unit will be managed initially by Mr Edgar Stoehr, a UNIDO expert. A Maltese counterpart is in course of being selected. This counterpart will not automatically succeed Mr Stoehr, but will in practice have every opportunity to understudy him.

Trainees from the Fellenburg Training Centre have already been selected to work in the Unit and receive advanced training there.

They, together with the Maltese counterpart, will from the effective work force of the unit.

2.5 Reporting structure

Although an early function of the Unit will be to train a body of technicians, the unit is not essentially educational. It is intended to be entirely operational, and indeed might eventually undertake at least a part of its work on a commercial basis.

Accordingly, it will report functionally to the M & E Maintenance Section, Establishments Division, Auberge de Castille, through its Head, Mr Paul Camenzuli.

Since no budget exists at present for the day-to-day running costs of the unit, resources will have to be sought via Mr Camenzuli as need arises.

2.6 Work load

There are no clear routes through which work will flow into the Unit. Most of the public sector and parastatal bodies which use electronic equipment have maintenance facilities of their own. The necessity for these continues unchanged for day-to-day maintenance. For example, St Luke's hospital has CT scanner equipment which will require specific training to be given to a technician who will provide on-the-spot service for the machine. Specific maintenance such as this will continue to be provided by the responsible authorities.

When problems arise beyond the immediate competence of local skills, they will first be referred to the Unit. Recent examples of such problems are - a videorecorder malfunction, and a tube failure in a baggage x-ray unit at Civil Aviation.

2.7 Current Status

The provision of facilities, equipment and staffing is well advanced. It is likely that equipment orders will not be placed much before the end of July, but hopefully some items will be delivered by late September. Key staff will be available from the beginning of September.

The Unit can therefore come into being at the beginning of September, and become functional later the same month.

## 3. INDUSTRIAL EXPANSION

This task involves analysing the opportunities and obstacles to expand electronics industry in Malta.

This analysis is presented in the paper of Appendix 2.

### 3.1 Recommendations

From the paper a number of recommendation may be drawn.

- Using the example of SGS-ATES and Eurocomponents (and if necessary General Instruments), the major semi-conductor companies of USA and Japan should be approached to set up assembly and test facilities in Malta. (9.1)

- A close examination should be made of the possibility of starting up a software industry in Malta, based on existing skills, but boosted by external experience, and possibly by affiliation to an existing company. (9.2)

- The major medical electronics companies of the world should be approached and encouraged to set up facilities in Malta. (9.3)

- In all these approaches, preference should be given to US and Japanese companies who have most to gain from setting up satellites with access to EEC and Mediterranean markets. (3.4)

- Relevant reference works should be searched for opportunistic targets other than the above. Although success probability may not be high, this targetted approach is much to be prefered to undirected mail-shots. (9.4)

- A determined attempt should be made to identify potential expansion of the industrial infrastructure by seeking out the marginal needs of existing companies, and matching these to unused resources, or stimulating new enterprise. (7.4)

- Particular efforts should be devoted to ensuring that existing companies have a congenial environment. It will always be easier to retain established companies than to set up new ones.

- Re-examine the effectiveness of customs procedures specifically for this rapid turn-round industry. (4.2)

- Consider carefully the long term viability of 'manufacture only' industries. (6.1)

- Re-examine the rate of formation of engineers in the light of world trends, and the certain effects of shortages.(4.4, 7.2)

- Increase the marketing emphasis in the Business Administration course. Send selected Maltese overseas to learn marketing skills. (7.3)

- Provide immediate marketing assistance to smaller electronics firms in Malta. (7.3)

- Make an updated comparison of incentives offered to inward investors, and ensure that Malta is competitive overall. (8)

- Assign to one capable man the tasks of tracking this important industry, of continuously identifying growth areas, of stimulating opportunistic approaches, and of nurturing existing electronics firms.

- Possibilities for more detailed examination include:

  Small d.c. and synchronous motors for automotive and instrument applications.
  Programmable Controllers - e.g. Gould Modicon.
  Major telecommunications manufacturers - USA and Japan.
  Automotive electrical and electronics components.
  Temperature controllers - domestic and industrial.

All the above are consistent high volume or growth areas.

## 4. HIGHER EDUCATION IN ELECTRONICS

In the course of examining the conditions for electronics industrial growth, links were formed with the Department of Electrical Engineering at the University of Malta.

During discussions on the structure and content of the courses, a number of broad conclusions were reached, which will be elaborated in a later phase of the project.

- The explosive growth in importance of Information Technology should be recognised by a formal split between Power subjects and Information Technology, with the creation of a chair for the latter.

- o Efforts to establish an M.Sc. course, with associated research work, should be accelerated.

- o Consideration should be given to providing incentives for private industry to take a larger proportion of student-workers to provide for the forward needs of that industrial sector.

- o A healthy research programme at the University would have the potential to devise new products which would form the basis of new small companies.

## 5. FURTHER ACTION

The Advanced Electronics Maintenance Unit is an ongoing project. Prior to the commencement of operations in September tenders have to be evaluated, and equipment ordered. Selection of the Maltese counterpart has also to take place. These actions are with the Malta Government in consultation with Mr Stoehr.

Educational matters will be taken up by Dr Liess during his next mission in September.

Pursuit of the recommendations in section 3 is left in the hands of the Malta Development Corporation. Approaches to industry will have to be followed through from the product level to specific companies, and from there to named individuals involved in strategic planning within the companies.

Should it assist the project I can be available for additional short missions in Malta to follow up the industrial expansion initiative.

R E Fischbacher

**APPENDIX 1**

## DEFINITIVE TELEX 16.11.83

CHETCUTI A.A. O.P.M. 607143

UNIDO VIENNA 13612
UNDEVPRO GENEVA 289620

16.11.83 MISS M. CHETCUTI A.A.

PRIORITY

M 1295. FOR HEDEIBA, UNIDO INFO YAMMIN, UNDP GENEVA. MAT/83/001 MATINENANCE AND SERVICING OF ELECTRONIC EQUIPMENT IN THE PUBLIC SECTOR. FOLLOWING ARE JOB DESCRIPTIONS REGARDING AAA DR H. LIESS, BBB EXECUTIVE ENGINEER, CCC MR FISCHBACHER:

AAA NAME: DR HANS DIETER LIESS

JOB TITLE: OPERATIONAL ADVISER

DUTIES:

(A) ASSIST IN THE CONSOLIDATION AND ORGANIZATION OF, AND ADVISE THE GOVERNMENT, ON THE SERVICING UNIT BEING SET UP SPECIFICALLY TO COORDINATE ALL ACTIVITIES RELATING TO THE SERVICING AND MAINTENANCE OF MACHINERY AND EQUIPMENT IN GOVERNMENT DEPARTMENTS AND PARASTATAL ORGANIZATIONS.

(B) ASSUME OVERALL RESPONSIBILITY FOR, AND PARTICIPATE ACTIVELY IN THE RUNNING OF THAT PART OF THE UNIT DEALING WITH ELECTRONIC EQUIPMENT.

(C) (i) ADVISE THE UNIVERSITY AND OTHER EDUCATIONAL AUTHORITIES ON THE PLANNING AND CURRICULA OF COURSES CONCERNING THE STUDY OF ELECTRONIC ENGINEERING;
(ii) LECTURE AT THE UNIVERSITY;
(iii) PREPARE APPROPRIATE TRAINING SCHEMES IN ELECTRONICS.

(D) ATTRACT FOREIGN ENTRAPRENEURS TO JOIN MALTESE GOVERNMENT IN SETTING UP JOINT VENTURES FOR THE PRODUCTION OF ELECTRONIC PARTS AND PRODUCTS.

BBB JOB TITLE: EXECUTIVE ENGINEER ( A SUITABLY QUALIFIED ELECTRONICS ENGINEER)

DUTIES: THE ELECTRONICS ENGINEER WILL BE REQUIRED TO AID OR LIESS AND:

(A) ASSUME DIRECT RESPONSIBILITY FOR, AND PARTICIPATE ACTIVELY IN THE DAY-TO-DAY RUNNING OF THAT PART OF THE UNIT DEALING WITH ELECTRONIC EQUIPMENT:

(B) (i) HELP ORGANIZE AND RUN PRACTICAL ON-THE-JOB TRAINING COURSES AT TECHNICIAN LEVEL FOR THE STAFF OF THE MAINTENANCE UNIT DEALING WITH ELECTRONIC EQUIPMENT;

(ii) ORGANIZE, WITH THE AID OF A FEW STUDENTS, AN ELECTRONICS AND MAINTENANCE GROUP AND FURTHERMORE SET UP AND HEAD A DEPARTMENT IN THE EXISTING ELECTRONICS SCHOOL IN ORDER TO CATER FOR SERVICING OF ELECTRONIC EQUIPMENT IN GOVERNMENT DEPARTMENTS;

(iii) SUPERVISE RADIO AND TELEVISION EQUIPMENT.

CCC NAME: MR RONALD ERNEST FISCHBACHER

JOB TITLE: ADVISER ON THE SETTING UP OF ELECTRICAL INDUSTRIES/ COMPONENTS

DUTIES: REQUIRED FOR AN INITIAL ASSIGNMENT OF 3 MONTHS DURING WHICH PERIOD HE WILL:

(A) ANALYSE AND ASSESS MALTA'S POTENTIAL IN THE PRODUCTION OF ELECTRICAL COMPONENTS.

(B) ADVISE ON THE FEASIBILITY OF SETTING UP OF ELECTRICAL INDUSTRIES.

A. FIORINI LOWELL
PRIMIN OFFICE MALTA

APPENDIX 2

# THE POTENTIAL FOR ELECTRONICS INDUSTRY IN MALTA

## 1. INTRODUCTION

The Government of Malta has initiated a project with UNIDO to examine the potential for expanding the industrial base of Malta in the electronics and light electrical sector.

The brief is as follows:-

- o Analyse and assess the country's potential in the production of electrical components.
- o Advise Government organisations, including Government-controlled companies, on the feasibility of setting up light electrical industries.

For the present purposes these will be referred to as electronics industries.

This paper is concerned essentially with analysis of the current situation and opportunities, and with an examination of the conditions for building a sound industrial base for the future.

## 2. THE CURRENT SITUATION

Malta has a history of being host to light electrical/electronics industry, almost entirely of foreign ownership. Currently there are a number of industrial companies operating.
Among them are:

| | |
|---|---|
| SGS-ATES | Semi-conductor assemblies |
| Eurocomponents | Power semi-conductors<br>i.f. transformers |
| Delta(Malta) Ltd | Power supply regulators |
| Louis Vella<br>Electronics | Pcb assembly |
| Merit (Malta) | Switches |
| Magruvision | TV receivers |
| Hob Electronics | Switches, timers |
| Electromatic | Solid state relays<br>Industrial Controls |

Of these, SGS-Ates is by far the most significant employer, with a current workforce of 600 and expectations of growth to 1200.

Magruvision, Delta, Electromatic, and Louis Vella are small, but the others have workforces in the region of 100. Overall there appears to be employment in Malta for just over 1000 people in electronics manufacturing industry, over half of which is in SGS-ATES.

This is only around 1% of the Malta workforce engaged in a large and continually expanding sector of world economy.

## 3. STRENGTHS OF MALTA

The assets of Malta as a manufacturing base have been highlighted frequently in other publications, but they must be looked at here in relation to the electronics industry.

### 3.1 Labour cost

The cost of labour in Malta is certainly low in comparison with highly industrialised Western nations. However, when compared with the Far East, where electronics manufacture is already firmly established, Malta labour rates are not low.

Moreover, even in the Far East the labour intensive sectors of the industry have been tracking the lowest labour-cost areas as they emerge, moving from Japan to Taiwan to Korea, etc.

There is a further factor to be taken into consideration at the present time. Strenuous efforts are being made throughout the world to reduce the labour content of electronics manufacture. In the extreme it has been reported that the Japanese manufacturer, Sharp, is producing 2,000,000 calculators a week on a production line with three people.

This trend reflects the increasingly capital-intensive nature of the industry and the consequent reduction in the impact of low labour costs. This factor must be carefully borne in mind when encouraging industry to Malta, to ensure that there is long-term viability.

In the medium term it is likely that part of the semiconductor manufacturing process will remain labour intensive for some time, namely the mounting of the die prior to encapsulation. This is a process in which the Maltese have already demonstrated capability (vide SGS-ATES and Eurocomponents). However, the reasons why General Instruments pulled out of Malta would have to be more closely examined for their lessons.

3.2 Labour stability

This is an asset in the electronics industry as in any other. However, labour problems have not loomed large in this industry in recent years, and in recent times some of the large (Japanese) companies have negotiated special agreements with unions in Europe to secure continuity of labour. Thus, the stability factor is likely to be of only secondary significance in the business start-up situation.

### 3.3 High productivity

This is a very positive factor, but difficult to quantify and prove. Nevertheless companies have indicated that they find productivity higher than in associated factories in Western Europe, and even the Far East.

### 3.4 Market access

Malta is reckoned to have good access to North African, Middle East and East European markets as well as the EEC countries.

The size of the EEC markets for electronics totally outweighs the others, although the North African market, and the Middle East markets may eventually be expected to increase at a relatively greater rate. There is nothing to suggest that Western European countries need to set up offshore facilities to penetrate either the limited North African or Middle East Markets at the present time.

The situation may be different, however, for US and Japanese companies, who may find some advantage in a base which is offshore both to these markets and to the EEC. It must be borne in mind, however, that very many of the most significant US electronics companies already have manufacturing bases in EEC countries. Nevertheless here lies one possible line of action.

## 4. POSSIBLE IMPEDIMENTS

### 4.1 Utilities and services

Electricity supplies have a reasonably good record for continuity, but demand is uncomfortably close to installed capacity, and this may be viewed with concern by companies with a primary dependance on electrical supply. Voltage fluctuations are also a source of potential problem, especially low voltage. Lightning-induced spikes are a particular hazard in this industry.

Water supply is likely to be of less importance to the electronics industry which does not have many large consumption water-dependent processes.

4.2 Customs

Since virtually none of the raw materials or components for the electronics industry are found in Malta, these have to be imported, and since Malta will not be a significant customer, the finished product must be re-exported. This industry is therefore highly dependent upon quick and efficient customs procedures.

Malta Customs may not be entirely geared to these needs, especially in summer when the working hours are not seen to be compatible with those of industry.

4.3 Premises

There is a generation of factories which were built with metal roofs. These pose particular problems of heat in summer and cold in winter and may not be seen by potential investors to be suitable for electronics manufacture.

Where semi-conductor processes are concerned dust-free temperature-controlled premises will be required, and while this must be the responsibility of the investor, premises must be inherently suitable for conversion.

4.4 Engineers and Technicians

No electronics manufacture of significance is carried out without creating a need for engineers and technicians. They are required for production engineering, for maintenance, for test, and for quality control. In many cases middle management is drawn from the ranks of engineers.

Currently there is a shortage of qualified electronics engineers and technicians in Malta, and a number of companies

have cited this as a constraint on expansion. It is doubtful whether the present number of engineers going through university is adequate to plug the gap.

4.5 While these possible impediments taken singly may appear relatively trivial, their combined effect may be significant to a potential investor, who, seriously examining the possibilities for start-up, will inevitably seek the experiences of established companies.

## 5. ELECTRONICS EXPERIENCE IN MALTA

5.1 Before attempting to define specific targets for Malta's industry recruitment drive, it is vital to examine past experience with electronics industry in Malta, and to set this alongside world trends in electronics manufacture.

Recent experience shows that Malta has been a base for significant international electronics companies. General Instruments, Plessey and Toko, representing USA, UK and Japan have all established themselves in Malta. Yet all of them have now left the island.

5.2 The reasons are particularly clear in the case of Plessey. The Malta factory was engaged in the manufacture of ferrite core memories for computers. This product involved threading fine wire through thousands of tiny magnetic rings - work not unlike some aspects of textile manufacture in which Malta has a long history. At the peak of the ferrite memory era, the Malta factory was set up to supplement UK factory production.

5.3 Toko is a leading world supplier of i.f. transformers, a component widely used in radio and television manufacture throughout the world. These small coils used to be wound on manual or semi-automatic machines. Special purpose

automatic machines are now capable of winding the coils, with consequent reduction of labour content.

At the same time, the technology is changing. Surface-acoustic-wave filters, made by deposition of conductive material on suitable substrates, are making inroads into the transformer markets. Thus, while the i.f. transformer market is still measured in multi-millions per annum, it is nevertheless declining.

In the face of reducing labour requirement, and a shrinking market, Toko clearly felt the need to contract their manufacturing base, and as a consequence, closed their Malta facility which was relatively labour intensive.

5.4 These histories demonstrate the vulnerability of 'extension' factories to changes in both product technology and manufacturing technology.

Such vulnerability is compounded in recessionary periods by strong pressures to sustain employment in the home country of the manufacturer. Only when the 'extension' factory grows to become the primary producer can this pressure be sucessfully resisted.

## 6. NEED FOR MORE CONTROL

6.1 A key characteristic of the electronics industry is its rapid rate of change. Products may pass through their complete life cycle in four or five years. Any enterprises involved only in the process of manufacture, and not in the technology, design, and marketing is sooner or later at the mercy of those who are.

The concept of a 'manufacture only' economy may be adequate for a nation emerging from an agricultural history and with

limited prospect of educating a corps of engineers and managers except over the long term. Malta is not in this situation. Malta aspires to a standard of living akin to that of the Western industrialised world and has a record of high educational achievement. It already produces high calibre engineers, and can point to successful industrial entrepreneurs.

It is not, therefore, fanciful to project the need for Malta to encourage enterprises of which a greater degree of control is vested in the island.

## 7. NECESSARY INFRASTRUCTURE

7.1 While there is no fundamental reason why efforts cannot be made immediately to establish indigenous electronics industry in Malta, there are a number of infrastructural factors which will have to be tackled if such a policy is to be effective.

### 7.2 Supply of engineers

Throughout the Western World there is at the present time a shortage of engineers - especially of electronics engineers. Japan is producing 70 000 engineers annually, USA 65 000, France 30 000, and Germany 15 000. To keep pace relatively with Japan, Malta would have to produce 3½ times as many engineers as its present annual total, and to keep pace with Germany 1½ times as many.

It will be argued that Malta does not seek to be a primary engineering nation, which will reduce its requirement for engineers as compared with these countries, but this in turn is counter-balanced by the fact that Malta starts well behind in the race.

Not only is this a factor likely to inhibit growth of technology-based industry in Malta, but it is already a

constraining factor in existing industry. Several companies report that the inability to recruit qualified engineers is restricting growth opportunities.

At present the lead time for the creation of new engineering graduates is five years. The student-worker scheme is well geared to the production of graduate engineers who will emerge with some practical experience. The penalty is found in the long lead time. This throws a heavy burden on educational planners who have to plan for the requirements of five to fifteen years ahead. Present indications are that Malta is not producing enough engineers to enable it to retain a significant place in the technology oriented world of the rest of the century.

7.3 Marketing

Historically Malta has been host to companies which have sited manufacturing facilities in Malta, but have carried out sales and marketing activities from their main base. Maltese have thus had opportunity to involve themselves in most aspects of manufacture, including production scheduling, restocking, labour supervision, packaging, shipping etc; in short, all aspects of day-to-day production.

Sales and marketing, however, has normally been handled by the parent company away from Malta, and no comparable opportunities have been available for Maltese to become trained and experienced in the relevant techniques. Thus, although some small indigenous companies have been spawned off from facilities such as Plessey, they have difficulty in expanding, or even surviving, because of their lack of experience in overseas sales and marketing.

That this activity is not beyond Maltese capability is evidenced by the success of at least one large service

company, Panta Lesco, which competes internationally with European, US, and Japanese engineering contractors in the Middle East and elsewhere.

For the mid-term, serious consideration should be given to training at least a few selected Maltese (probably, but not necessarily, engineering graduates) by placing them with companies overseas to learn the art of marketing. The best experience is likely to be obtained in the United States, although it must not be assumed that all US companies are good at international marketing. It is important to keep the international dimension in mind.

In the longer term the scope of the University of Malta degree in Business Administration should be examined to see whether it is possible to deepen and extend its treatment of this topic, with expatriate help if possible.

For the short term, means should be sought to provide sales and marketing assistance to existing Maltese companies first of all to keep them in business, but also with a view to encouraging their expansion to become employers of more labour.

7.4 Industrial base

In the larger industrial countries there is a well developed network of smaller supply and subcontract companies which act as feeders to the larger companies. Because Malta is small, and its industry less well developed, this network is rudimentary. Companies setting up in Malta therefore tend to be vertically intergrated. That is, they either make all their own requirements internally, or supply them from overseas.

Facilities such as plating, sheet-metalwork, pcb design, pcb manufacture, and a host of others available on a

competitive basis normally eliminate the need for such integration, which can inhibit new start-ups.

Furthermore, such a sub-industrial network provides significant employment and does not require major marketing skills.

This industrial base is, of course, normally created by internal demand. Consideration should be given to accelerating the process in Malta by matching resources and requirement. The Federation of Industry operates a register of facilities required and resources available, but this is a passive medium. An active attempt to check on the latest requirements of local industry and to match them with under-used resources could raise the 'made in Malta' content of manufacture, and highlight new business opportunities in the industrial substructure.

## 8. NON-TECHNICAL FACTORS

In the drive to attract new industrial investment, Malta is far from being alone. Much of Europe suffers from high unemployment - some of it much higher than Malta. Strenuous efforts are therefore being made by many governments to establish new industries, with particular attention being paid to the 'sunrise' industries. Substantial inducements are offered in the form of grants, low-interest loans, tax holidays, etc.

While financial inducements alone do not determine company decisions to invest overseas, they form a powerful part of the decision-forming package. In addition, they may be seen as an indication of the attitude and intention of the host country to foster the growth of the industry and to provide it with a continuing favourable environment.

Malta does not currently enjoy a particularly favourable view of its industrial climate as seen from abroad. Lack of significant competitive financial packages for inward investors may harden that view.

## 9. SPECIFIC TARGETS

From a general analysis of the possibilities and problems, it is necessary to extract some principal targets.

### 9.1 Semi-conductor companies

As noted in 3.1, the semi-conductor industry engages in processes which are still labour intensive. Moreover, Malta can point to two companies already engaged on the island in assembly, encapsulation and test of semi-conductor devices.

The semi-conductor business is growing, and will continue to grow over many years.

Approaches should be made to major semi-conductor manufacturers in USA and Japan, citing successful, established enterprises, inviting them to set up facilities in Malta.

### 9.2 Software

Since Malta has no natural resources, it is attractive to consider a business area which requires no imported raw material and has a very high added value. Generation of software is such an area. In addition, the capital investment required to start up software business in limited. Access to a suitable computer is certainly required, but premises largely consist of office space.

Software is a booming industry, and with the emergency of microcomputers and lower cost hardware, is becoming the key factor in business and industrial systems. As a consequence there is world-wide pressure on software supply, and a

corresponding shortage of programmers and system designers.

The educational standards and characteristics of the Maltese lend themselves to programming and system design, and there are Maltese who already have experience in this a area.

It is possible, therefore, to conceive of a Maltese software industry, initially serving the North African and Middle East markets, but not limited to them.

In the case of software it is not relevant to approach overseas companies in the same way as for hardware products. The working medium is people, and before approaching an overseas company a body of people already producing software would have to be identified.

Two possible approaches can be envisaged. First, an existing group could seek affiliation to an existing software company with a view to supplying markets more accessible from Malta. Thereby it would start to gain experience and reputation from an established supplier. In the event of withdrawal of the partner, the resource remains, strengthened by additional experience.

The second possibility is to induce an expatriate Maltese to return and start up such a business in Malta. It is understood that at one time Mr Peter Debono had such an objective in mind. If Maltese finance can be arranged, an all-Maltese enterprise could be launched, with the intention of rapid expansion.

9.3 Medical electronics

The medical electronics business is worth $ 125 billion world wide. It has grown rapidly and is still growing. This is therefore an area where Malta could seek a stake.

Only the larger companies who may have come into volume manufacture are worth approaching. Among them are Hewlett Packard, Siemens, Philips, GEC Picker International, and Toshiba.

Once again, the best chances of success are likely to lie with American or Japanese companies.

9.4 Other sectors

Although analysis suggest that in the current worldwide industrial climate it will not be easy to find other sectors of the electronics industry which will be prime targets, with the aid of MDC staff the relevant reference books are being combed in a search for other companies and product areas where a direct approach may be made.

## V I S I T S

| DATE | ORGANISATION | |
|---|---|---|
| 25.04.84 | Office of the Prime Minister | Administrative Secretary |
| 26.04.84 | Louis Vella Electronics<br>Luqa Industrial Estate | |
| 26.04.84 | Toko (Malta) Ltd<br>Marsa Industrial Estate | |
| 27.04.84 | Ministry of Education<br>Lascaris | Deputy Prime-Minister |
| 27.04.84 | Federation of Industries<br>Development House<br>St Anne Street<br>Floriana | |
| 28.05.84 | University of Malta<br>Tal Qroqq | Dept of Business Administration |

APPENDIX 3

| CONTACT | TELEPHONE | VISIT BY |
|---|---|---|
| Mr Joseph Sammut | | Fischbacher/ Liess |
| Mr Louis Vella | | " |
| Mr George D'Amato | | " |
| Dr Carmelo Mifsud Bonnici | | " |
| Mr Franco Masini President | 625328 | " |
| Mr J.E. Agius Export Executive | | " |
| Mr John Scicluna Secretary | | " |
| Prof Edward Scicluna | | Fischbacher |

## W O R K I N G  C O N T A C

| NAME | FUNCTION | UNIT |
|---|---|---|
| Alfred Fiorini Lowell | Assistant Secretary | Administration Division |
| Paul G Camenzuli | Head of Electrical & Mechanical Section | Establishments Division |
| Joseph F Bartolo | Chief Inspector of Wireless and Telegraphy | Wireless Telegraphy Branch |
| Fred Fearne | Education Officer II | Education Department |
| Lawrence Zammit | Head | Fellenberg Training Centre, Paola |
| Noel Zarb-Adami | Manager | Malta Development Corporation |
| Wally Vella Zarb | Technical Services Div | " |
| Martin Testa | Research Department | " |

APPENDIX 4

T S

| | TELEPHONE |
|---|---|
| Office of the Prime Minister | 608143 |
| Auberge de Castille<br>Valletta | 25231 |
| " | 20460 |
| " | 603925 |
| Ministry of Education<br>Lascaris | 605041 |
| " | 823657 |
| Ministry of Industry | 21431 |
| " | " |
| " | " |