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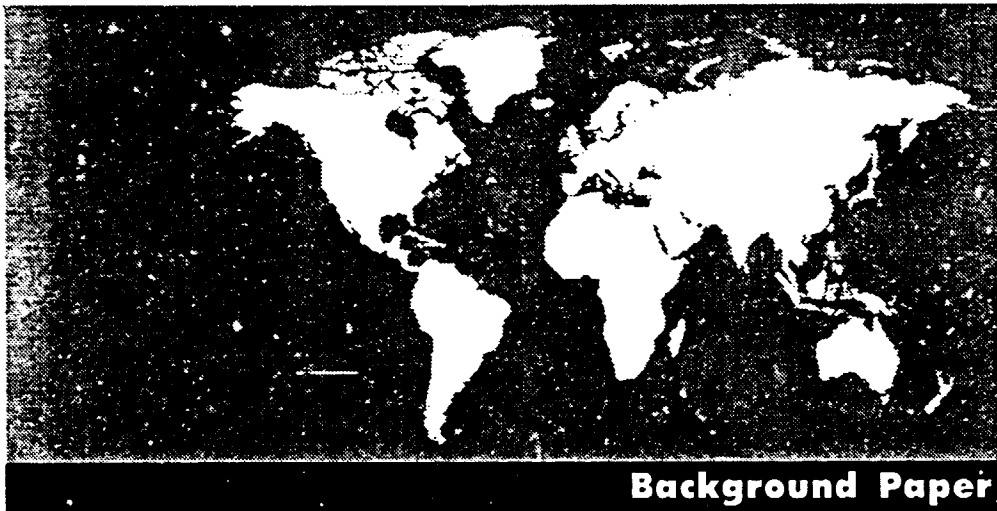
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Panel V
Industrial policy reforms:
The changing role of Government and
private sector development



Industry-related services: Key to competitiveness

Prepared by
the UNIDO Secretariat



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

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CONTENTS

| | Page |
|---|-----------|
| I. EXECUTIVE SUMMARY | 4 |
| II. THE ROLE OF INDUSTRY-RELATED SUPPORT SERVICES IN THE DEVELOPMENT PROCESS | 9 |
| A. Definition and classification of industry related services | 9 |
| B. The changing role of services in industrial and economic development | 16 |
| C. The new industrial revolution and the role of services | 18 |
| 1. The functional expansion and circulation of the industrial process | 20 |
| 2. The internationalisation of national economies, the convergence of technologies and the shift of the centre of competition | 21 |
| 3. The externalisation of industrial service operations | 21 |
| 4. The organisational and institutional segregation of industrial and service operations | 22 |
| 5. The shift from the industrial brand to the trade mark | 23 |
| 6. The sectorial breakdown of economic activities | 24 |
| 7. Increasing automation | 26 |
| D. The growth of services - an empirical assessment | 25 |
| 1. Market share, employment and capital content of services | 25 |
| 2. Estimation of Industry Related Services on the global economy | 28 |
| 3. The growth of international trade and competition in services | 30 |
| E. The transformation of manufacturing - a summary | 35 |
| III. THE NEED FOR INDUSTRY-RELATED SERVICES IN THE DEVELOPING COUNTRIES | 36 |
| A. The underestimated importance of industry-related services | 36 |
| B. The consequences of weak industrial support services | 37 |
| C. Balancing the public and the private sectors | 38 |
| D. Towards stronger industry-related services in developing countries | 38 |

| | | |
|------------|---|-----------|
| IV. | INDUSTRY RELATED SERVICES IN KEY ASPECTS OF INDUSTRIAL PROJECT EXECUTION | 39 |
| A. | Introduction | 40 |
| B. | IRS in project inception, generation and implementation | 40 |
| C. | Post-investment performance | 41 |
| D. | Technology development, transfer, adaptation and innovation | 41 |
| E. | R&D, product development and design | 44 |
| F. | Human resources for development and the brain drain | 45 |
| G. | Qualitative and residual factors associated with the development of industry-related services | 46 |
| H. | Concluding remarks | 47 |
| V. | RECOMMENDATIONS | 50 |
| 1. | Recommendations for the development of national IRS capabilities: | 50 |
| (i) | The creation of a favourable environment for IRS development | 51 |
| (ii) | Professional Associations | 51 |
| (iii) | Enterprises | 52 |
| (iv) | Parastatals | 52 |
| (v) | Sectoral Organisation | 53 |
| (vi) | Training in Modern Methods of Technology Management | 53 |
| (vii) | Training in Modern Business Organisation and Promotion | 53 |
| (viii) | Undertaking of Systematic Reviews and Evaluation of Programmes Implemented | 54 |
| 2. | UNIDO contribution to the development of IRS | 54 |

TABLES

| | | |
|-----------|--|----|
| II.1 | A broad classification scheme for Services | 10 |
| II.2 | Services classification within the NACE Code System | 11 |
| II.3 | Industrial Support Services | 12 |
| Exhibit 1 | | 15 |
| II.4 | Industrial employment and value added in selected industrial countries, 1950-1990 | 17 |
| II.5 | Employment changes in selected industrial countries (1981-1991) | 19 |
| II.E | The old and the new industrial systems (chart) | 20 |
| II.8 | DFI of major foreign investors by sector | 33 |
| II.6 | Production, investment and employment, EEC, 1980/90 | 27 |
| II.A | Changes in employment between 1981 and 1990 in selected industrial countries of western Europe (chart) | 61 |
| II.B | Changes in employment between 1981 and 1990 in Canada and the United States of America (chart) | 62 |
| II.C | Changes in employment between 1981 and 1990 in the main industrial countries (chart) | 63 |
| II.D | Changes in sectorial employment between 1981 and 1990 in selected industrial countries (chart) | 64 |

EXECUTIVE SUMMARY

The strategic importance of Industry Related Services (IRS) has become more widely recognized as the world's leading industrial firms increasingly externalise these services. IRS have undergone an unprecedented expansion in the main industrialized countries over the last two decades and are now a vital support in helping companies to attain and maintain competitiveness. These services encompass a broad range of industrial and commercial knowledge, provide growing numbers of jobs and play a key role in human resource development. It is impossible to envisage a realistic strategy for technology transfer and human resources development in the developing countries today without taking the development of Industry Related Services fully into account.

This paper examines the relationship between IRS and the process of industrial development and UNIDO's future role in that process.

The first part looks at the essential role of IRS at the investment stage where an average of 15 percent of industrial investment costs go to IRS, and at the production and post production stages, where such services account for more than 60 percent of production costs. It is estimated that in 1990 OECD countries spent US\$2,700 billion, equivalent to 16.9 per cent of their combined GDP, on IRS. Empirical research shows that in countries of the European Union, for each dollar invested in an industrial project, around five dollars will be generated in IRS during the production phase. This ratio is used as a guideline to IRS requirements when investing in and operating efficient industrial plants. Once the importance of IRS is recognised, it becomes vital to formulate plans of action and nation programmes to enhance such services in developing countries.

The widespread development of outsourcing in industrialized economies has been driven by the worldwide trend towards industry restructuring and globalisation. For example, firms can now procure goods and equipment in different countries and sub-contract the manufacture of components required and the provision of the services involved in the production of photocopying machines or vehicles. This reduces capital requirements and increases the flexibility of the enterprises. The firm retains the capacity to design its productions, specify standards, select through careful testing and supervision its sub-contractors and exercise quality control over its purchases. Advances in transport and communications have lessened considerations of distance for the operations of the firm and have facilitated outsourcing.

Outsourcing is also now giving impetus to industrialisation in developing countries. It is possible today for a firm to develop its capabilities on an ad hoc basis. It is no longer necessary

for a developing country to acquire industrial capabilities through the difficult and restrictive route of planning, from the outset, the complete manufacturing of the end product. An enterprise can start by producing components (with the support of external services) and subsequently expand the range of its production according to its abilities and the demand on its services. However, for a firm to be able to embark on manufacturing activities, it must have access to high quality IRS.

IRS contribute to increased efficiency, cost reduction and economic expansion through higher capacity utilisation. They also contribute to the national economy through job creation.

These trends in turn have had several important consequences, including:

- specialised technological services previously available only to large enterprises are now accessible for small and medium-sized enterprises, thus accelerating the rate of diffusion of industrial know-how
- large-scale redistribution of employment from the industrial sector to the services sector
- A massive change in the channels for technology transfer: developing countries can now organise their programmes for the acquisition of technology in a more flexible and efficient manner.

These changes present a wide range of opportunities for developing countries. The "unpacking" and restructuring of many industrial activities into a large number of Industry Related Activities, each of which can be acquired separately, has simplified considerably the process of industrial planning and development. In other words, developing countries now have greater opportunities to participate in the international economy.

However, there is also a greater danger of developing countries that do not develop IRS seeing their industries progressively marginalised. Another factor for concern is that foreign investment is increasingly directed towards developing countries where IRS are available.

The second part of the paper shows that, if developing countries were to invest and operate at the level of efficiency of developed countries, they would require IRS at a level of around US\$600 billion. In reality, however, the upper estimate of their IRS imports is around US\$ 137 billion, with only a modest input from locally generated IRS. This shortfall in services requirements accounts for low productivity, low capacity utilisation and many other problems encountered by developing countries in their attempts to develop an industrial base. It is argued in both parts I and II that the development of local

IRS has become central to economic growth. The importance of unlocking in-house IRS in parastatals is also discussed.

The main causes of the limited development of IRS in the developing countries are:

- Greater attention has been paid to the modernisation of financial, trade, transport and communications services than to the development of IRS. The latter have tended to be seen as a consequence of industrialisation and perceived as related to advanced stages of industrialisation to be pursued in a rather remote future;

- Developing countries have focused their attention on new investments to speed up industrialisation, neglecting the need to ensure the efficiency of existing investments requiring efficient industrial services;

- IRS are often integrated in composite deals associated with turnkey agreements, foreign loans and investments or aid. It is often the case that technical assistance or financing projects are explicitly designed to rely on foreign suppliers of services, virtually excluding domestic supply of services.

The significance of the functional expansion of industrial operations and the composite character of industrial goods (the mix of products and services) is grossly underestimated. It is assumed that IRS will be established either by the industries themselves as in-house activities or as independent professional services created spontaneously by market forces. Reality has shown that such creation requires specific policies and deliberate efforts.

In the prevailing global economy, those countries who persist in ignoring the importance of a parallel development of IRS will face a loss of income and employment generation opportunities. The classical development path will increase capital requirements, destroy jobs at home and create them abroad. Moreover, the development of producer services is also becoming central in the restructuring and privatisation of industry.

The Role of IRS in the Transition from Command to Market Economies

The development of the services sector in general and of industry related services in particular has been identified as the missing ingredient in the transition of command economies to market economies. Eastern European countries and most developing countries have managed their economies through central planning in which the main target of economic policy - expansion of the volume of output - was measured in terms of the "material product", excluding most service activities. Most service inputs were executed "in house". They were not externalised and therefore not recorded as "services" and remained "invisible". Located in the plant, not submitted to competition and isolated from the technological advances developing outside the factory,

they more often became a burden than a positive factor contributing to increased efficiency. Consequently, the externalisation and/or outsourcing of services "locked in" in industrial plants and parastatals is a prerequisite and vital phase of a successful privatisation exercise.

Privatisation programmes in many developing countries are delayed because potential buyers are mainly interested in acquiring only the core activities, whereas Governments are concerned with the social and employment implications. The solution to these apparently irreconcilable positions lies in an organised and supported externalisation of services. This will generate a large number of small and medium-sized private enterprises providing much needed support and consulting services to production activities. Externalised service companies are also in a position to extend their activities to other SMEs, thereby generating more jobs than when they were locked in industrial plants.

Part III of the paper is devoted to a brief expose of the implications and likely consequences of the persistence of the present gap in IRS. It shows that a lack of national project execution capabilities and IRS will expose many developing countries to further social and economic stagnation. Relentless, rapid and dramatic technological changes are forcing economic transformations in which many developing countries will be unable to participate in a positive and beneficial manner.

The shortage of IRS is also reflected in the fact that most developing countries have a large backlog of unspent aid funds and many development finance institutions have difficulty in fully disbursing their loans. There are various reasons for this situation but one of the main causes is the weakness in project management and execution capabilities of the borrowers. This is one reason for the UN system's current emphasis on increasing national execution and the development of national project execution capabilities. Clearly, UNIDO's role in project execution will be increasingly associated with assistance to local firms in developing countries to help them acquire the necessary IRS to enable them to execute projects and programmes.

Part IV of the paper notes the large investment by developing countries over the past three decades in education systems and manpower, vital prerequisites to the establishment of IRS. Yet while human resource development has mainly focused on increased education and training, IRS is the next link in the chain which uses these skilled and educated human resources. This is all the more important when taking into account the growing numbers of students joining either the ranks of the unemployed in developing countries or the "brain drain" to countries which can offer them jobs. The process of outsourcing has opened up numerous opportunities that developing countries can adapt to their respective conditions. There is sufficient experience worldwide to indicate that, given effective action at both the national and international levels, a great deal may be achieved within a reasonable period of time.

Part V of the paper puts forward a set of recommendations on ways and means of enhancing national IRS capabilities and on the way in which international cooperation can best contribute to the process. Against this background, UNIDO carried out a series of studies on the development of IRS and organised a regional workshop in Morocco at the end of 1993 and a first consultation on consulting and engineering services in Vienna in July 1995. Participants included representatives of Government, private sector industrialists and professional associations, such as the International Federation of Consulting Engineers, as well as international organisations, including the World Bank and the African Development Bank and, together, they drew up a set of recommendations on support for IRS development.

These recommendations include the creation of a supportive environment for IRS, the strengthening of IRS professions and the establishment and expansion of professional associations, enterprises, parastatals and sectoral organisations' training in technology management and in modern business methods, as well as the carrying out of systematic evaluations of programmes which are implemented.

Having reviewed the joint activities of UNIDO and other relevant international organisations in this field, the paper concludes that the development of Industry related Services cannot be overlooked when designing scenarios and approaches to industrial development up to and beyond the year 2000.

I. THE ROLE OF INDUSTRY-RELATED SUPPORT SERVICES IN THE DEVELOPMENT PROCESS

A. Definition and classification of industry related services

Definition of IRS

Human needs are covered by two basic categories of projects: materials (foodstuffs, clothes, houses, cars, etc.) and non materials ones (medical care, education recreation, security, etc.). This broad distinction provides the basis for the distinction between products and services.

Demand for services arises not only at the final consumer's level but also at the intermediary levels, spreading over the entire investment production and distribution process. It has been estimated, for example, that 75 per cent of the value added created in manufacturing derives from production-related services. In United States for instance, as much as 65 to 75 percent of employment in manufacturing may be associated with service activities.¹

Although the basic distinction between goods and services appears clear, a generally acceptable definition of and classification scheme for services is missing. This often causes confusion: it is difficult to draw demarcation lines and to classify fringe cases, or to define categories of services.

Not only is a generally acceptable definition and classification of services absent; detailed information on services is also absent from current statistics. These, by and large, group services into very broad categories, often including heterogeneous activities such as educational services, medical and health services, legal services, religious organizations, welfare institutions, business services, etc., in one generic class: "other services". Figures referring to such broad categories are meaningless for measuring and evaluating critical linkages between industry and services, or more generally between services and the other economic activities.

Classifications of IRS

In order to establish a clear frame of reference for the present report, we have accepted the general classification scheme for services introduced by Gershuny and Miles and presented in table II. 1. In this scheme, IRS professional services, other producer services, transport and communication are classified as professional services. The NACE code (General Industrial Classification of Economic Activities within the European Communities), harmonized with the UNISIC code at the two-digit level, places most of these services under the general category of "Professional Business Services", as indicated in table II. 2.

Before plant start-up, these services are related to the conceptualization and formulation of a project, its implementation through inputs of technology, consulting engineering and design, capital equipment, trained human resources, and financing. At the operating stage, it requires management and entrepreneurial skills improvement, products adaptation, manpower training, systems and procedures design and implementation etc.

¹Pauli, Gunter, Double-Digit Growth, ESIF 3 (Berlaar, Belgium, Pauli Publishing, 1991) p. 23. and Quinn, James Brian, 1992." Intelligent Enterprise, New York, The Free Press.'

TABLE II.1: A BROAD CLASSIFICATION SCHEME FOR SERVICES**1. MARKETED SERVICES****(a) Producer Services**

- (i) Finance, Banking, Credit, Insurance, Real Estate**
- (ii) Professional Services: Engineering, Architectural, Legal and similar one**
- (iii) Other Services: Cleaning, Maintenance, Security**

(b) Distributive Services

- (i) Transport and Storage**
- (ii) Communication**
- (iii) Wholesale and Retail Trade**

(c) Personnel Services

- (i) Domestic Services**
- (ii) Hotel, Restaurant, Catering, etc.**
- (iii) Repairs**
- (iv) Entertainment and Recreation**

2. NONMARKETED SERVICES**(a) Social Services**

- (i) Health, Medicine, Hospitals**
- (ii) Education**
- (iii) Welfare**
- (iv) Public Administration, Legal Military Services**

Source: Gershuny, J.I. and Miles, I.D., "The New Service Society", London, Frances Pinter Publishers, 1983

Table II.2 SERVICES CLASSIFICATION IN THE NACE CODE SYSTEM (*)

| <u>CLASS/GROUP/ SUB_GROUP</u> | <u>ACTIVITY</u> |
|-------------------------------------|---|
| | PRIMARY SECTOR |
| 01-05 | Agriculture, Forestry, Fishing |
| | SECONDARY SECTOR |
| 11-15 | Extractive activity |
| 21-49 | Manufacturing industries |
| 16-17 | Electricity, gas, water |
| 50 | Building and civil engineering |
| | TERTIARY SECTOR |
| 61 | Wholesale, Distribution |
| 62 | Scrap & Waste materials |
| 63 | Commercial and Trade Agents |
| 64/65 | Retail Distribution |
| 66 | Hotel and Catering |
| 67 | Repairs of consumer goods |
| 71/76 | Transports |
| 77 | Travel agents, freight brokers, Storage and Warehousing |
| 79 | Communication |
| 790 | Express services |
| 81/82 | Banking, Financial and Insurance services |
| 83 | Professional business services |
| 831 | Stock Exchange |
| 833 | Dealers in real estate |
| 834 | House and estate agents |
| 835 | Legal and Notarial services |
| 836 | Accountants, tax experts, Auditors |
| 837 | Technical services |
| a. | Consulting Engineers |
| b | Construction Economists |
| c | Architects |
| 838 | Advertising |
| 839 | Other business services |
| 839 | Market Research and Management Consultancy |
| a | Market Research |
| b | General Management |
| c | Recruitment |
| d | Professional Training |
| 839.2 | Computer and Office machines services |
| 839.3 | Security services |
| 839.3.2 | Temporary work services |
| 84 | Renting/Leasing of movables |
| 91 | Public Administration |
| 92 | Sanitary services |
| 94 | Research and Development |
| 97 | Recreational and cultural service |
| 98 | Personal services |
| 99 | Domestic services |

(*) General Industrial Classification of Economic Activities within the EEC

TABLE II. 3: INDUSTRIAL SUPPORT SERVICES

| | Up stream | On stream | On stream Paral. | Down stream |
|---|--------------|--------------|------------------------|----------------|
| <i>General and Preliminary Studies (T)</i> | | | | |
| Technical and economic pre-feasibility and feasibility studies | . | . | . | . |
| Technical and economic identification and evaluation studies | . | . | . | . |
| <i>Economic and Financial Consulting and Studies</i> | | | | |
| Pre-feasibility and feasibility studies (T) | . | . | . | . |
| Financial Consulting and Studies (T) | . | . | . | . |
| Fiscal and taxation consulting & studies | . | . | . | . |
| <i>Architectural and Civil Engineering (T)</i> | | | | |
| Pre-feasibility & feasibility studies | . | . | . | . |
| Consulting & basic engineering | . | . | . | . |
| Detailed engineering & drafting | . | . | . | . |
| Procurement, Testing, Inspection | . | . | . | . |
| Maintenance and Repairs | . | . | . | . |
| <i>Special Scientific & Technical Studies (T)</i> | | | | |
| Pre-feasibility & feasibility studies | . | . | . | . |
| Consulting & basic engineering | . | . | . | . |
| Detailed engineering & drafting | . | . | . | . |
| Procurement, Testing, Inspection | . | . | . | . |
| Maintenance and Repairs | . | . | . | . |
| <i>Project Implementation and Management (T)</i> | | | | |
| Project Management and Supervision | . | . | . | . |
| Procurement, inspection and tests of materials, machinery and equipment | . | . | . | . |
| Inspection, controls and tests of processes, operations and products | . | . | . | . |
| <i>Pre-production support operations</i> | | | | |
| Product & process development and design (T) | . | . | . | . |
| Identification of production inputs (T) | . | . | . | . |
| Selection & Procurement of production inputs (P) | . | . | . | . |
| Movement and storage of production inputs (P) | . | . | . | . |
| <i>Production support operations</i> | | | | |
| Production Planning, Management and Control (T) | . | . | . | . |
| Tests, Inspections and quality controls (T) | . | . | . | . |
| Processes and Product development and design (T) | . | . | . | . |
| Technical and Technological innovation and improvements (T) | . | . | . | . |
| Maintenance and repairs (T) | . | . | . | . |
| <i>Post-production support operations</i> | | | | |
| Sales and distribution (P)(D) | . | . | . | . |
| Customer Services (Technical assistance and advise, guaranties, maintenance, repairs) (T)(P)(D) | . | . | . | . |
| Advertisement and Public Relations (P)(D) | . | . | . | . |
| <i>Managerial Services</i> | | | | |
| Corporate strategy and planning (T) | . | . | . | . |
| Corporate management (T) | . | . | . | . |
| Project planning and coordination (T) | . | . | . | . |
| Resources mobilization and allocation (T) | . | . | . | . |
| Human resources development and training (T) | . | . | . | . |
| Personnel selection and recruitment (T) | . | . | . | . |
| <i>Administration and Logistics</i> | | | | |
| Legal Assistance and Consulting (T) | . | . | . | . |
| EDP, Computer applications, O+M (T) | . | . | . | . |
| Express courier services (P) | . | . | . | . |
| Logistics and Administrative support (P) | . | . | . | . |
| Accounting, finance and taxation (P) | . | . | . | . |
| Custodian and Common Services (P) | . | . | . | . |
| Security (P) | . | . | . | . |
| Cleaning and housekeeping (P) | . | . | . | . |
| <i>Banking, Financial and Insurance services (P)</i> | . | . | . | . |
| <i>Brokerage Services (P)</i> | | | | |
| Real Estate (purchasing & renting) | . | . | . | . |
| Renting, leasing and hiring of movables | . | . | . | . |

(T) - Technical and Professional Services (P) - Producer Services

An industrial plant operates in an environment which includes government policy, strategy and planning framework. It requires inputs from a host of institutions. These include R+D institutes, consulting and design engineering firms, standard institutions, industrial safety units, productivity centres, industrial finance institutions, vocational and academic institutions, training centres, etc. No significant industrial development can be sustained over a period of time without the supportive institutional infrastructure.

During the operating phase of the industrial unit, other problems arise relating to efficiency of operation, capacity utilization, market changes and product line diversification, debottle-necking and extension of existing units. All these aspects call for well-developed consulting profession.

The range of services employed by industry can be classified into the following four broad categories:

- (a) **Upstream**, including all services needed before the start of the production process;
- (b) **On stream**, including all services needed during the production process;
- (c) **On stream parallel**, including all services needed by the managerial, logistic and administrative operations supporting production;
- (d) **Downstream**, including all services needed after the end of the production process; (mainly product design, R+D, marketing, advertising).

Table II. 3 classifies all services used by industry according to the above-mentioned categories. It also indicates the character of these services: technical, professional and producer. As *technical services* are classified those performed primarily by engineers and architects, assisted by lower technical staff such as draftsmen, surveyors, etc. As *professional services* are classified the ones performed primarily by professionals in such fields as economics, law, taxation, marketing, management, data processing, etc. As *producer services* are classified all the producer services listed in table II. 1 except professional services.

Spectrum of Services for Industry

A more useful classification distributes producers services over the various phases of the industrial cycle (investment, production and post production)

| | |
|---------|---|
| Phase 1 | Project generation (pre investment services, planning and feasibility analysis) |
| Phase 2 | Investment services (project management, engineering design, procurement, construction and commissioning) |
| Phase 3 | Management systems (design and implementation) |
| Phase 4 | Production management |
| Phase 5 | Post production services |
| Phase 6 | Post sales services |

Industrial consulting services are required during the whole investment life. During the pre-investment phases, they are related to project generation and the demonstration of the project feasibility and consist in the following consulting services:

Pre-investment services

- Selection of product
- Study of Raw Material Availability
- Selection of Plant Location
- Planning of Production Systems

- Selection of Process
- Study of Preliminary Investment Cost

- Study of Market and Product Price
- Master Planning
- Master Research
- Survey and Selection of Plant Location
- Study of Raw Materials and Plant Utilities
- Optimization of Production Systems
- Study of Investment Cost
- Financial Study and Economic Evaluation
- Environmental Assessment
- Planning of Plant Management
- Planning of Staff Training
- Time Schedule
- Bid Preparation
- Pre-qualification of Contractors
- Tender Execution
- Bid Analysis and Evaluation

The most important part of consulting and engineering design firms is devoted to the installation of industrial plants: basic design, detailed engineering, specification and procurement of equipment, construction supervision commissioning and start up, and above all project management to co-ordinate all these activities in term of time, cost and quality.

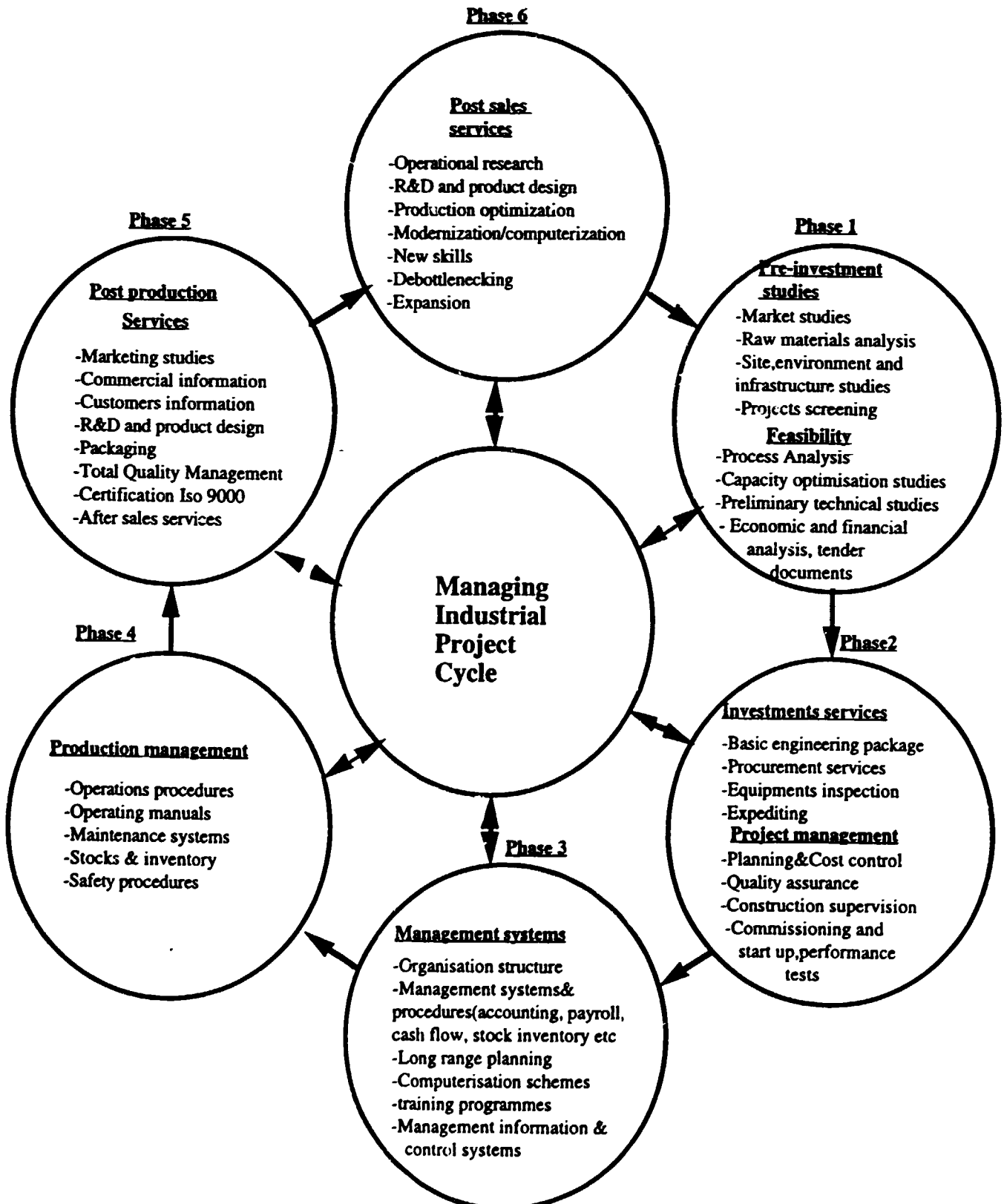
After the plant start-up they contribute to manage, operate and maintain the plant. Consulting services are also required for plant optimization, production improvement, extension of existing facilities generating additional investments, thus feeding a continuous process of self-sustained development and growth. The illustration of this succession of phases over the investment life is presented as a continuous cycle divided into six major phases (see exhibit 1).

This classification based on a distribution of activities between investment and post investment costs is the most appropriate, in the absence of meaningful statistics, to estimate the potential needs of developing countries in industry related services, and to formulate workable programmes for the development of these activities. (see section on estimation of IRS in the global economy where it is shown that in western countries services for production and post production are 4 times more important than services for investment)

This presentation illustrates the idea that the plant start-up is not and end in itself and that at this stage, the owner should have acquired the capabilities to manage, operate and maintain the plant and above all to assure its continuous improvement and development. The owner's organization, assisted by consulting firms, must be prepared to master the whole industrial development cycle and contract external consulting services, whenever required.

This division may appear, to some extent, arbitrary, but it has the merit of acknowledging the complexity of the process, and segmenting it into manageable parts. On the one hand, it illustrates the logical progression of tasks leading to an efficient plant operation, and to the implementation of future improvements. On the other hand, it identifies the complex spectrum of required services during the investment life.

Producers services for investment, production and post production



B. The changing role of services in industrial and economic development

Since the industrial revolution, economic development has been considered synonymous with industrialization. It has been seen as a unique, one-way process of shifting human and material resources from the primary to the secondary sector, mainly to manufacturing. The faster the growth of manufacturing industries and the higher their contribution to employment and to GDP formation in a given country, the greater its success in the economic development race.

In this view of industry as the "development locomotive" of the economy, agriculture and services are considered of secondary importance, merely providing inputs and support operations needed by the development protagonists.

The above concept, supported by empirical evidence and examples of successful industrialization, became so unquestionable that certain important changes which occurred in the structure and functioning of the industrial sector as well as in the overall economic development process passed unnoticed or, at least, did not receive the attention they deserved.

In all developed countries, as table II. 4 shows, industrial employment in manufacturing industries reached a saturation point around 35-37 per cent of total employment while their contribution to GDP rarely passed 38-40 per cent. After a period of stagnation, both industrial employment and value added began a continuous relative decline, their lost ground being taken over by the rapid expansion of services. This phenomenon may be seen on as a pre-condition for continuing success. It has been argued that, thanks to the fulfilment of all basic material needs by industry, a new kind of "post-industrial" society and economy have emerged, characterized by high levels of prosperity and consumption, mainly of non-material products (services). Whatever the merits of this argument, it is true that profound changes gradually occurred in the structure and functioning of industries. These have long remained unnoticed, or at best their true meaning and implications were not properly understood.

The post-industrial society began to be questioned when economies commenced to experience stagnation, with recurring recessions and growing, persistent unemployment; poverty surveys now disclose shocking levels of absolute poverty in the richest countries of the world. Old remedies such as industrial investments for employment generation did not produce the results expected. On the contrary: increased industrial investments led to increased unemployment in manufacturing as most of these investments were submitted to rationalization schemes and automation, reducing instead of generating employment. As table II. 6 shows, the countries of the European Communities invested US\$ 1,269 billion at 1985 prices in industry during the 1980-1989 decade: industrial employment however decreased from 46 to 38 million people!

These problems and experiences, particularly the persistent long-term unemployment, led to a re-examination of the role of services as an employment generation factor.

Studies on the employment-generating capacities of the tertiary sector were originally based on the assumption that this sector, being more or less domestically oriented, did not face tough competition (like manufacturing) and - being less mechanised and automated - could offer better opportunities for employment creation.

The assumptions with regard to employment generation were correct, as table II. 5 and charts II. A - II. D show. But studies also revealed profound changes taking place in the organization and structure of the industries as well as in the whole economic system. These are the real cause of the employment generation capacity of the tertiary sector. To place the development of industry-related services in proper perspective, these changes will now be briefly discussed.

TABLE II.4 : INDUSTRIAL EMPLOYMENT AND VALUE ADDED IN
SELECTED INDUSTRIAL COUNTRIES, 1950-1990
(Percentages on total economy)

| | A - All industries | | | | B - Manufacturing Industries | | | |
|------------------------------|--------------------|------|--------|------|------------------------------|------|----------------|------|
| | Belgium | | France | | Germany | | United Kingdom | |
| | A | M | A | M | A | M | A | M |
| Industrial Employment | | | | | | | | |
| 1950 | 46.9 | 34.1 | 38.3 | 26.6 | 42.9 | 33.6 | 50.6 | 38.7 |
| 1955 | 47.4 | 34.5 | 39.2 | 27.2 | 46.9 | 36.7 | 51.9 | 40.1 |
| 1960 | 46.5 | 34.7 | 37.8 | 26.6 | 48.8 | 38.2 | 48.6 | 37.2 |
| 1965 | 46.9 | 35.3 | 39.1 | 27.5 | 49.5 | 38.3 | 46.6 | 35.0 |
| 1970 | 41.9 | 31.6 | 39.2 | 27.5 | 49.3 | 39.4 | 44.8 | 34.7 |
| 1975 | 39.0 | 29.3 | 38.4 | 27.7 | 45.3 | 35.6 | 40.5 | 31.0 |
| 1980 | 34.1 | 24.8 | 35.9 | 25.7 | 44.1 | 34.3 | 37.7 | 28.4 |
| 1985 | 30.3 | 23.0 | 32.9 | 23.8 | 41.4 | 31.9 | 32.9 | 24.1 |
| 1988 | 23.8 | 18.1 | 26.1 | 18.9 | 36.0 | 27.7 | 26.7 | 19.6 |
| 1990 * | 21.1 | 16.1 | 23.2 | 16.8 | 28.0 | 24.3 | 24.1 | 17.7 |
| * Estimates | | | | | | | | |
| Industrial GDP | | | | | | | | |
| 1950 | 45.6 | 31.3 | 47.3 | 38.3 | 49.4 | 38.3 | 48.4 | 36.8 |
| 1955 | 44.5 | 30.9 | 40.0 | 36.4 | 53.2 | 41.4 | 42.8 | 36.9 |
| 1960 | 40.9 | 30.5 | 48.1 | 37.4 | 53.3 | 40.2 | 42.7 | 32.1 |
| 1965 | 41.3 | 30.4 | 43.4 | 33.1 | 53.1 | 40.1 | 40.8 | 29.9 |
| 1970 | 42.3 | 32.1 | 38.8 | 28.7 | 53.1 | 40.9 | 37.9 | 28.0 |
| 1975 | 38.2 | 27.2 | 37.6 | 27.3 | 48.4 | 36.9 | 36.0 | 25.0 |
| 1980 | 36.0 | 24.8 | 35.9 | 26.3 | 42.7 | 32.6 | 37.0 | 23.5 |
| 1985 | 31.5 | 23.5 | 30.5 | 22.0 | 40.7 | 31.9 | 34.6 | 20.7 |
| 1990 | 31.0 | 23.3 | 29.1 | 21.3 | 39.4 | 31.1 | 32.5 | 18.2 |

Sources :

1. OECD, Labour Force Statistics 1950-1960 (OECD, Paris, 1963)
2. OECD, Labour Force Statistics 1960-1971 (OECD, Paris, 1973)
3. OECD, Labour Force Statistics 1969-1989 (OECD, Paris, 1992)
4. OECD, National Accounts 1950-1961, (OECD, Paris, 1964)
5. OECD, National Accounts 1960-1985, Volume II, Detailed Tables, (OECD, Paris, 1988)
6. OECD, National Accounts 1977-1989, Volume II, Detailed Tables, (OECD, Paris, 1991)
7. Commission of the European Communities, Panorama of EC Industry 1990 (EC, Brussels 1991)

C. The new industrial revolution and the role of services

The rapid technological progress recorded in the field of microelectronics and informatics and the wide and exponential growth of its applications have stimulated a vivid discussion around the theme of a third industrial revolution, a new era marked by the advance of microelectronics, automation and informatics.

In all these discussions the technological dimension of change has been emphasized while the social and organizational dimensions preceding or associated with these technological changes are more or less ignored or grossly underestimated. The first and second industrial revolutions took place in different countries (the United Kingdom and the United States), and spread to other countries in different ways. The factors which have conditioned these developments should be sought in differences in social conditions, organizational patterns and infrastructure which have an impact on the actual use of technological innovations. Without, for example, large markets, the influx of young unqualified immigrants as a primary labour force, the corporation as the basic organizational form and the stock exchange as the main capital supplier, the technologies of the assembly line would not have had the spectacular results and caused the vast changes recorded in the USA and other industrial countries. The most profound changes which are accompanying the third industrial revolution are:

- (1) The functional expansion and circularization (see section 1 in text below) of the industrial process;
- (2) The internationalization of national economies, the convergence of technologies and the shift of the center of gravity of competition;
- (3) The growing externalization of industrial activities and operations;
- (4) The organizational and institutional segregation of industrial and service operations;
- (5) The shift from the industrial brand to the trade mark;
- (6) The sectoral desegregation of economic activities;
- (7) Increasing automation.

TABLE 11.5 : EMPLOYMENT CHANGES IN SELECTED INDUSTRIAL COUNTRIES (1981- 1991)

| | EUROPE (1) | | NORTH AMERICA (2) | | A S I A (3) | |
|--|---------------------|---------|-------------------------|---------|-----------------------|--------|
| | 1981 | 1990 | 1981 | 1990 | 1981 | 1990 |
| A. ABSOLUTE NUMBERS (000) | | | | | | |
| TOTAL EMPLOYMENT | 96,827 | 101,500 | 111,398 | 130,486 | 17,549 | 22,163 |
| Primary Sector | 6,675 | 4,929 | 4,120 | 3,886 | 4,845 | 3,320 |
| Secondary Sector | 36,755 | 33,212 | 33,532 | 34,289 | 5,475 | 7,818 |
| Tertiary Sector | 53,397 | 63,359 | 73,746 | 92,311 | 7,229 | 11,025 |
| Producer Services (4) | 5,951 | 8,711 | 9,691 | 14,802 | 586 | 1,272 |
| Distributive Services(5) | 22,167 | 24,381 | 28,987 | 34,650 | 4,424 | 6,321 |
| Social Services(6) | 25,279 | 30,267 | 35,068 | 42,859 | 2,219 | 3,432 |
| B. PERCENTAGE DISTRIBUTION | | | | | | |
| Primary Sector | 6.9 | 4.9 | 3.7 | 3.0 | 27.6 | 15.0 |
| Secondary Sector | 38.0 | 32.7 | 30.1 | 26.3 | 31.2 | 35.3 |
| Tertiary Sector | 55.1 | 62.4 | 66.2 | 70.7 | 41.2 | 49.7 |
| Producer Services | 6.1 | 8.6 | 8.7 | 11.3 | 3.3 | 5.7 |
| Distributive Services | 22.9 | 24.0 | 25.0 | 26.6 | 25.2 | 28.5 |
| Social Services | 26.1 | 29.8 | 31.5 | 32.8 | 12.6 | 15.5 |
| C. PERCENTAGE CONTRIBUTION TO EMPLOYMENT GENERATION | | | | | | |
| | 1981-1990 EUROPE | | 1981-1990 N. AMERICA | | 1981-1990 ASIA-NIC | |
| Primary Sector | (37.4) | | (1.2) | | (33.1) | |
| Secondary Sector | (75.8) | | 4.0 | | 50.8 | |
| Tertiary Sector | 213.2 | | 97.3 | | 82.3 | |
| Producer Services | 59.1 | | 26.8 | | 14.9 | |
| Distributive Services | 47.4 | | 29.7 | | 41.1 | |
| Social Services | 106.7 | | 40.8 | | 26.3 | |

(1) WEST EUROPE (Belgium, France, Germany, Italy, United kingdom)

(2) NORTH AMERICA (Canada, USA)

(3) NIC of Asia (S.Korea, Hong Kong, Singapore)

(4) Financial (Finance, Banking, Insurance, Real Estate), Professional (Engineering, Architectural, Economic, Legal, Managerial, etc.), Auxiliary (Cleaning, Maintenance, Security, etc.)

(5) Transport, Storage, Communications, Wholesale and Retail Trade

(6) Education, Health, Medicine, Hospitals, Welfare. Public Administration and Defence.

1. The functional expansion and circularization of the industrial process

The factory gate and the classical commercial terms "franco warehouse" and "ex-factory" are coinciding less and less with the actual beginning and end of the industrial process. In many cases, a user does not "just" buy a manufactured product. In reality, a basket containing the physical product and all collateral services (guarantees, financing, repairs, maintenance, replacement, options etc.) is bought. Who would buy a car or a computer nowadays if these services were not part of the transaction package?

The responsibility of the manufacturer, in other words, is continuously expanding: downstream to the consumer or user of the product and upstream beyond the procurement of the production inputs right to the conception, design and development of inputs and new products. This is not only true for many capital and durable goods, which represent an increasing part of household expenditure, but more and more for cheap mass consumption products such as mineral water as well. The consumers of these products buy a mix of product and services (regular supply, standard quality, easy handling, return or recycling of containers, etc.). Given this development even the term "final consumer" appears to be imprecise for many products, and especially in the case of consumer durable, the term "current user" is, perhaps, more suitable. The combined effect of the above factors has been a gradual re-shaping of the operational and organizational configurations of the manufacturing process from a linear process with fixed ends to an endless, circular one (see chart II. E).

CHART II.E(A): THE OLD INDUSTRIAL SYSTEM

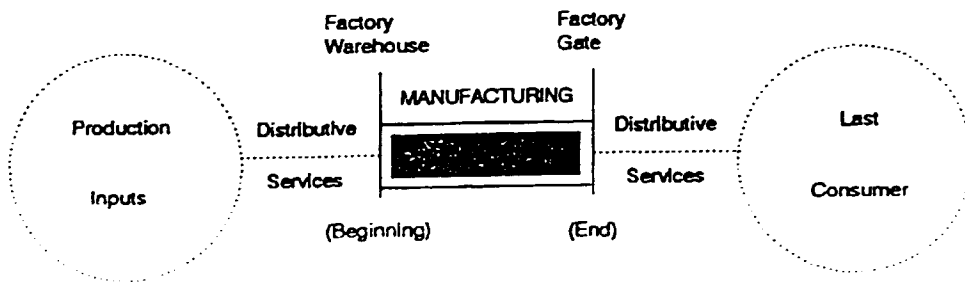
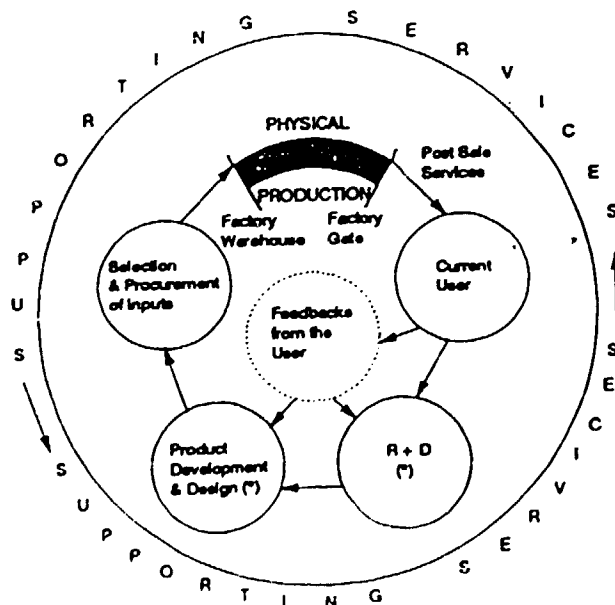


CHART II.E(B): THE NEW INDUSTRIAL SYSTEM



(*) Including development, acquisition, and adaptation of new technologies

2. The internationalization of national economies, the convergence of technologies and the shift of the centre of competition

The influence of external factors is increasing so rapidly that the identities and borders of national economies are disappearing. One factor, for example, is consumer credit, which is very important for the marketing of industrial products. A long line of credit suppliers with international connections has been added, including the "plastic money" makers, to the original credit source, the domestic banking system.

The internationalization of national economies has reduced the number of technology and process options and configurations. All industrial firms can and must have a technology which is internationally competitive. This technological convergence narrows the industrial competition margins; however, the "mix" offered by manufacturers, containing the physical product (technology) and all collateral services, provides new possibilities to compete. Simultaneously, this mix shifts the centre of competition from the industrial to the services sector.

3. The externalization of industrial service activities and operations

The upstream and downstream expansion of the manufacturing process should be associated with a growth of industrial operations, value added and employment. However, as tables II.4 and II.5 and charts II.A-II.D show, industrial statistics indicate an entirely opposite trend: the share of the industrial sector in employment and GDP generation is continuously decreasing. This is due to the fact that parallel to the upstream and downstream expansion of manufacturing, profound changes are taking place in industrial organization and management, the most important among them being the "externalization" of activities.

The main characteristic of industrial organization and management in the past was the vertical integration under one roof (the plant) of all operations required for the transformation of raw materials and other inputs to finished products. This gave rise to vast industrial empires and agglomerations which benefited from the advantages of economies of scale and a myriad -industry linkages. Successful in the developed countries, this model also became *the* prototype for industrialization efforts in the developing countries.

However, the advantages of the model eventually conflicted with disadvantages arising from the requirements of specialization, multiplied by complications arising from the downstream and upstream expansion of industrial operations.

With up to 75 per cent of the value added created in manufacturing deriving from services to production, the services are now the most critical factor in industrial success. Services needed by modern industries have become very sophisticated and expensive, and cover an extremely wide range of activities, as appendix A shows. In many cases, moreover, the need for a service is not continuous, or when the demand is continuous, a full unit may not be required, (e.g. you may need office cleaning every day, but not the whole day, or you need an access to a maintenance computer any time but you don't need the full machine all the time). No industry can now afford to maintain all services "in-house" or keep them updated in an era of rapid technological changes. Moreover, the recurring economic recessions of the last two decades have led to a careful re-examination of production costs as well as of the profitability of operations. This re-examination has resulted in two important changes in the structure and functioning of industries:

- Externalization of many services, i.e. a shift from in-house production to reliance on outside service producers. Industries now concentrate on core activities where they have the comparative advantages of experience and specialization;

- Organizational and institutional segregation of the industrial and service operations.

The most important advantages associated with "externalization" are:

- Reduced costs, as industries profit from the competition of specialized service suppliers and no longer have to deal with under-utilised in-house facilities. In addition, there are reductions in overhead costs for the supervision of in-house service operations outside the main sphere of organizational competence and specialization;
- Better quality of services, because competition forces service suppliers to specialize and to continuously improve their competence. The result is a resource and technology basis which cannot be matched by any in-house unit;
- More flexibility, as operational costs can be better adjusted to fluctuations in demand and production than in the case of in-house operations;
- Greater organizational efficiency, when in-house operations are forced to compete with external suppliers (see also section 4 below). This approach has proved to be superior to conventional organizational and supervisory devices.

The main disadvantage is perhaps loss of control (or, increased cost of control) over input when it is provided by a subcontractor as compared to in-house production. Residual right of control is also important as are the possibilities of technological/commercial leaks to competitors. Given equal quality, it is a trade-off between buying an input from a subcontractor or making the input itself.

Once the merits and advantages of externalization became evident, this led to an expansionary spiral stimulated by three factors. First, there were the industries themselves externalizing as many operations as possible in order to profit from the advantages of externalization. Second, the service suppliers expanded their business by making attractive offers and acting as a *de facto* pressure group for externalization. Third, there was the demonstration effect, inducing both industries and suppliers to look more carefully into possibilities of capitalizing on the advantages of externalization.

4. The organizational and institutional segregation of industrial and service operations

The experience gained with and the advantages of externalization have also stimulated the segregation of purely industrial operations and support services. Assessments of benefits and losses of segregation have revealed that:

- In-house services are not always inefficient or expensive. Some companies are able to produce better services at lower costs than outside suppliers of services;
- The critical factor in evaluating the efficiency and cost of in-house service producers is the absence of open market competition. Market mechanisms soon reveal the success or failure of the industrial operations. But the evaluation of the efficiency and costs of in-house service operations is difficult due to the fact that these services enjoy a monopoly inside the organization, and their excessive costs are hidden under "general expenses".

The above observations and considerations have led to four main types of reorganization:

- Separating service units organizationally and institutionally from purely industrial

operations, but keeping them twinned at the financial "cluster" or concern level;

- Introducing open-market conditions for all in-house service producers, whether these are integrated or organizationally independent. In-house operations which are unable to compete with outside providers of services are externalized;
- Giving greater independence to in-house producers of services which are able to offer better quality services at lower prices than outside competitors. These units then offer their services not only to the mother company but to any client in the market. This allows them to capitalize on expanding markets and economies of scale, further improving their competitive position, profitability and turnover. Caterpillar provides an example in this case. The company has set up a very successful spare parts distribution company, Caterpillar Logistics, which is able to deliver any of its 100,000 spare parts world-wide and within 24 hours. It provides these services not only to the mother company but also to many other manufacturers;
- The Japanese just-in-time delivery system;
- Taking into consideration that the contribution of services to manufacturing value added is up to three times higher than the contribution of industry's core activities (see above) and that services are growing at rates three to four times faster than agriculture and industry combined, it is obvious that services have become the main arena of competition and the primary object of investors' attention. This includes existing firms that want to diversify operations. As a result, industrial enterprises are also investing or acquiring interests in promising or successful service producers, particularly those providing strategic inputs and technologies for their core industrial operations.

With services moving in several directions, their relations with industry acquire new forms transcending, as the next section explains, conventional demarcation and classification lines.

5. The shift from the industrial brand to the trade mark

The product brand continues to be a very important element in the marketing of industrial products. It offers the consumer the guarantee of a good product made by a well-known manufacturer. The brand image was originally associated with the quality and technical characteristics of the physical product (performance, durability, safety, etc.). As the "industrial offer" gradually became more complicated, physical products being packaged with collateral services (financing, guarantees, technical and operational support, availability of spare parts, maintenance and repair facilities, replacement options, etc.) the "product image" was expanded from the mere physical characteristics of the product to its "offering basket" containing the physical product and all collateral services.

This expansion has increased technical, organizational and financial requirements which manufacturing enterprises often could not meet. Concentrating on core activities, i.e. making only the physical products, they have left to their distributors the task and responsibility of creating the product image and the offer basket using their own trade mark. Clothing, dressing accessories, home appliances, electrical and electronic products, TV sets, even computers and a long line of other industrial products are offered today by department stores, chain stores, supermarkets and specialized distributors under their own trade mark or under a brand name masking an unknown producer. Even firms known as manufacturers/producers today sell staff made by other manufacturers but under their own label, for example Germany's Blaupunkt just puts its own blue spot on Japanese Matsushita products, and tells the consumer nothing about it. The critical factor in these cases is that the confidence of the consumer has shifted from the product or industrial

company to the distributor whom the consumer expects to make the right technical choice on his behalf and to offer the best collateral services and guarantees.

Another form of industry-services relation in this area is the one of the "industrial intermediary", i.e. an organization which appears to produce industrial products under its own brand name but does not possess an industrial production facility. Instead, it subcontracts the manufacturing of its products. These are then simply marketed and distributed, with all the collateral services.

In all these cases the classical demarcation line between producing industries and distributing services has been transcended. Many classical industrial functions such as R&D, product development and design, technical and performance norms, packaging, presentation, etc. have been shifted from the producer to the distributor who, with feedback from his clients, assumes the product development and design functions, either alone or assisted by specialized consultants. Many garment industries, for example, have dismantled their product development departments as fashion, colours, sizes, materials and technical specifications of products are now determined by their distributors.

6. The sectoral desegregation of economic activities

The upwards and downwards expansion of industrial operations coupled with increasing externalization and the diversification of services transcends the conventional demarcation lines between agriculture, industry and services. The old classification of economic activities no longer corresponds to the realities of economic life. The distinction between industry and services has already disappeared in the economic vernacular: all large scale business activities tend to be called industries (as indicated by terms such as insurance industry, real estate industry, construction industry, show business industry, etc.). The actual distinction between material products (goods) and non-material ones (services) is less clear and important than it appears to be: both satisfy human needs, and these can rarely be satisfied by purely material or non-material products: they usually require a package of goods and services. Moreover, material and immaterial products are often interchangeable when it comes to satisfying a need. A "bit of fun" or a small entertainment can, for example, take the form of eating an ice-cream (good), going to a movie theatre (service) or to a gym (service). The "tripartite" distinction of economic activities is being gradually replaced by a "binary" one: producers-consumers.

It is widely believed that externalization and, generally, the shifts of activities and employment from industries to services have been provoked by the new industrial revolution marked by the advancement of microelectronics. There are two objections to this:

- The externalization of many industrial operations, e.g. external procurement or subcontracting of parts and accessories in the automobile industries, began a long time before the impact of microelectronics was felt. Crucial activities such as industrial design, R&D, quality control, management consultancy etc., were established and flourished outside manufacturing companies long before the microelectronics revolution;
- Even if microelectronics, CAM, automation and robotization have accelerated the externalization process in certain ways, it can be argued that in other ways they have perhaps slowed it down as they offer powerful tools for the effective management and control of in-house services. This must be emphasized, as developing countries - misinterpreting externalization trends and more generally the leading role of industrial support services in the development process as being associated with advanced stages of industrialization and automation, could fail to make timely adjustments in their current

industrial structures and operations which are essential to improve or even retain their competitiveness.

What the third industrial revolution has done is to make the machine operator obsolete, replacing him by the "modem", the "chip", the "CAM diskette". This change towards the "worker-less", automated industrial plant will also make a series of managerial functions such as personnel management, factory supervision, etc. obsolescent. These people are, however, replaced by a new kind of operators, professionals and experts needed to run the production process: analysts, programmers, system engineers, designers, etc. Industries will therefore continue to create jobs - but indirectly, in the services sector. These jobs are classified statistically as non-industrial labour, part of the services sector.

D. The growth of services - an empirical assessment

I. Market share, employment and capital content of services

Conventional statistics, classifying in-house industrial services as industrial operations and those provided by outside suppliers as service activities, give a false impression of the developments discussed in this chapter. According to the figures in table II. 6, the countries of the European Community invested, during the 1980/90 decade, US\$ 1,269 billion (at 1985 prices and exchange rates) in their industries; yet, as we have seen, their industrial labour force was reduced from 46 to 38 million. A broader view is needed here: these investments, together with another US\$ 1,547 billion invested directly in services, increased employment in services from 66,8 to 77,0 million, i.e. created 10,2 million new jobs, 2,2 million more than the losses in industrial employment.

The shifts of tasks and functions from the industrial to the services sector are also visible in the increasing share of services in the final selling price of industrial products. A rough estimate, based on the data given in table II.6, indicates the changes that took place in the countries of the European Communities during the past decade, reflecting trends recorded in all industrial countries:

| | 1980 | 1990 | % |
|-----------------------|-------|-------|-------|
| Shares of: (*) | | | |
| Manufacturing | 35,8 | 31,7 | -28.1 |
| Other Industries | 15,1 | 12,6 | -19.8 |
| Distributive Services | 23,8 | 23,9 | +0.4 |
| Producer Services | 25,3 | 31,8 | +25.7 |
| | 100,0 | 100,0 | |

(*) Agriculture, Housing and Government expenditure excluded.

The reduced share of manufacturing industries in the final selling price of industrial products is associated with an even stronger reduction in labour content. Calculations on the basis of the data in table II. 6 show the following reductions in labour content (for a hypothetical volume of sales amounting to US\$ 1 million sales) at 1985 prices, estimated on the basis of the value added per employee

| | 1980 N | 1980 % | 1990 N | 1990 % | Change 1980/90 % |
|-----------------------|-----------|-----------|-----------|-----------|---------------------|
| Employed in: | | | | | |
| Manufacturing | 18,8 | 37.7 | 12,3 | 28.1 | - 52.8 |
| Other Industries | 6,5 | 13.0 | 4,3 | 19.8 | - 48.8 |
| Distributive Services | 11,4 | 22.8 | 9,6 | 22.2 | - 2.7 |
| Producer Services | 13,2 | 26.5 | 13,0 | 29.9 | - 1.5 |
| | 49,9 | 100.0 | 39,2 | 100.0 | - 27.3 |

N = Number of employees

The shifts of tasks and functions from industries to services are associated with a differential growth of capital costs, as the following comparisons show:

| | Value Added per employed | Value Added per employed | Fixed Capital per employed | Fixed Capital per employed |
|-----------------------|-----------------------------|-----------------------------|-------------------------------|-------------------------------|
| | 1980 | 1990 | 1980 | 1990 |
| Industries | 20 078 | 26 836 | 25 254 | 33 621 |
| Distributive Services | 20 944 | 24 803 | 28 287 | 34 493 |
| Producer Services | 19 184 | 24 411 | 23 231 | 26 652 |

| | Changes in 1980/1990 | Changes in 1980/1990 |
|-----------------------|----------------------|----------------------|
| Industries | + 33.7 | + 33.1 |
| Distributive Services | + 18.4 | + 21.9 |
| Producer Services | + 27.2 | + 14.7 |

These figures indicate that the industries have recorded the highest productivity and fixed capital increase per employee (33.7 and 33.1 per cent, respectively), which is associated with a strong decline in employment generation capacity. The increase in productivity in producer services is somewhat lower, but to achieve this growth, the producer services needed only a modest increase in fixed capital per employee. These trends are confirmed by the figures in appendix table A. 3. This table (as well as table II. 6) also shows that the loss in manufacturing employment is almost fully compensated by the growth of employment in professional and business services alone.

TABLE II. 6: EUROPEAN ECONOMIC COMMUNITY – PRODUCTION, INVESTMENTS AND EMPLOYMENT, 1980–1990

| SECTORS | VALUE ADDED (1985 prices & exchange rates) | | | | INVESTMENTS 1980– 1990 (1985 prices & exchange rates) | | EMPLOYMENT | | | |
|------------------------------------|---|--------------|----------------|--------------|---|--------------|---------------|--------------|---------------|--------------|
| | 1980 | | 1990 | | (1000) | % | 1980 | | 1990 | |
| | Mill. US\$ | % | Mill. US\$ | % | | | (1000) | % | (1000) | % |
| PRIMARY SECTOR | 93072 | 4.0 | 90999 | 3.1 | 186640 | 3.8 | 11887 | 9.5 | 9762 | 7.8 |
| SECONDARY SECTOR | 920537 | 39.1 | 1013203 | 34.4 | 1269348 | 25.6 | 45849 | 36.8 | 37755 | 30.3 |
| Fuel and Power | 108318 | 4.6 | 115707 | 3.9 | 383894 | 7.7 | 1942 | 1.6 | 1677 | 1.3 |
| Manufacturing | 647946 | 27.5 | 724513 | 24.6 | 795071 | 16.0 | 34112 | 27.4 | 27896 | 22.4 |
| Building and Construction | 164273 | 7.0 | 172983 | 5.9 | 90383 | 1.8 | 9795 | 7.9 | 8182 | 6.6 |
| TERTIARY SECTOR | 1214284 | 51.6 | 1658509 | 56.3 | 2151922 | 43.4 | 66751 | 53.6 | 77025 | 61.8 |
| Distributive Services | 432061 | 18.3 | 544843 | 18.5 | 757707 | 15.3 | 20630 | 16.6 | 21967 | 17.6 |
| Transport and Storage | 99976 | 4.2 | 123915 | 4.2 | 272404 | 5.5 | 1211 | 1.0 | 1283 | 1.0 |
| Communications | 45652 | 1.9 | 59613 | 2.0 | 161974 | 3.3 | 932 | 0.7 | 1049 | 0.8 |
| Trade | 286433 | 12.2 | 361315 | 12.3 | 323329 | 6.5 | 18487 | 14.9 | 19635 | 15.8 |
| Producer Services | 456819 | 19.4 | 723212 | 24.6 | 789593 | 15.9 | 23812 | 19.1 | 29626 | 23.8 |
| Financial and Insurance | 103745 | 4.4 | 150096 | 5.1 | 344660 | 7.0 | 3144 | 2.5 | 3610 | 2.9 |
| Professional and Business Services | 301518 | 12.8 | 495664 | 16.8 | 371694 | 7.5 | 16459 | 13.2 | 21052 | 16.9 |
| Hotels and Catering | 51556 | 2.2 | 77452 | 2.6 | 73239 | 1.5 | 4209 | 3.4 | 4964 | 4.0 |
| Non-Market Services | 325404 | 13.8 | 390454 | 13.3 | 604622 | 12.2 | 22309 | 17.9 | 25432 | 20.4 |
| Owner occupied dwellings | 127157 | 5.4 | 182828 | 6.2 | 1348010 | 27.2 | | | | |
| ECONOMY | 2355050 | 100.0 | 2945539 | 100.0 | 4955920 | 100.0 | 124487 | 100.0 | 124542 | 100.0 |

Note: The above data have been elaborated and adjusted from following sources:

1. Commission of the European Communities, Panorama of EC Industry 1990 (EC Brussels, 1991)
2. OECD, National Accounts 1977–1989, Volume II, Detailed Tables, (OECD, Paris, 1991)
3. OECD, Labour Force Statistics 1969–1989, (OECD, Paris, 1992)

2. Estimation of Industry Related Services in the global economy:

To formulate adequate policy recommendations, and define the related measures and plans of action to assist developing countries in building up their capabilities in IRS, it is necessary to estimate their requirements in terms of support services for efficient investment, operation, management and maintenance of industrial sectors.

These estimates of IRS requirements in developing countries could then be considered as the potential demand, or as a target towards which national policies as well as international technical assistance could be deployed.

In the absence of sufficiently detailed statistics that permit an estimate of the contribution of IRS to GDP, it was necessary to develop a simple method for defining an order of magnitude of developing countries' requirements in industry related services.

IRS are required i) for investment, and ii) for production and post production phases, and since the gross fixed capital formation (GFCF) covers the investment phase, it would be possible to estimate the total IRS requirements by working out a ratio between IRS required for GFCF, and IRS required for production and post production phase.

- Estimation of IRS for pre-investment and investment phase:

This phase starts with development planning and feasibility analysis, includes engineering, project management and procurement of equipment and finishes with commissioning and start up of the industrial plant. The cost of this phase is recorded in GFCF.

The share of GFCF attributable to IRS varies from 10 to 17 per cent for industrial projects, and from 8 to 16 per cent for other projects (see table 1.2). If we take into account various pre-production expenditure, such as commissioning and start-up, management and operation systems, training, an average percentage of 15 per cent of GFCF seems to cover adequately the share attributable to IRS for investment.

Share of Total Project Cost Attributable to IRS

| Type of Work Requiring Engineering Design and Consultancy Services | Percentage of Total Cost |
|--|--------------------------|
| Architecture | |
| Architectural Design and Contract Administration | 3.0-6.0 |
| Buildings and Infrastructure | |
| Feasibility Studies | 0.5-2.0 |
| Detailed Design | 3.0-6.0 |
| Construction Supervision | 5.0-8.0 |
| Sub-Total | 8.0-16.0 |
| Process and Industrial Engineering | |
| Feasibility Studies | 1.0-2.0 |
| Design or Process Engineering | 1.0-3.0 |
| Detailed Engineering | 7.0-10.0 |
| Procurement and Construction Supervision | 1.0-2.0 |
| Sub-Total | 10.0-17.0 |

Source: The Export Marketing of Technical Consulting Services from Developing Countries, Geneva, UNCTAD/GATT, 1986, p.31 quoted in UNIDO-A, p.44, op. cit.

- Estimation of IRS for the production and post production phase:

The importance of services in the 1990 EEC economy may be best highlighted by comparing the value added of services (US\$1,686 billion) with the value added of the secondary sector (US\$1,013). The total value added of the EEC economy was US\$3,000 billion.

The value added by professional and business services in the same year at 1985 prices was US\$495 billion; the sales value of professional services was US\$522 billion. The share of professional services in total sales (valued at US\$5,557 billion) was 9.4 per cent; the share of professional services in total value added was 16.5 per cent (see table 1.3b).

GFCF for 12 EEC countries in 1990 amounted to US\$1,237 billion. The share of GFCF attributable to IRS is estimated at $US\$1,237 \text{ billion} \times 15 \text{ per cent} = US\185.5 billion .

Total producer services² for the same year (see table I.3a) amounted to US\$923.9 billion.

The ratio between services spent for investments, and services spent to support production and post production in EEC for 1990 was close to 5 (precisely 4.98).

The world's total production in 1990 was US\$22,298,850 million. Table I.4 shows the national groupings that generated this output. 24 high income countries consisting of OECD countries plus Israel, Singapore, Hong Kong and Kuwait contribute 73 per cent of the total world output. In the second column is entered the estimated values of GFCF and the cost of professional services consumed to generate the GFCF. The last column is based on the amount of IRS that would be required to operate these investments effectively. For the purpose of this Report the ratio of the cost of IRS required to operate investments to the cost of IRS to plan and implement investments is assumed to be 4 as found above for the EEC.

High income countries generate most of their requirements (US\$2,695 billions) of IRS locally.

Middle and low income countries (except NICs) generate a small part of their IRS requirements; they import most of IRS for new industrial investments. Imports of IRS for production and post production are limited to the lesser extent. Existing support services are still locked in the large industrial companies (mainly public). Outsourcing or externalization is at an embryonic stage.

Although outsourcing and further IRS development appears to be the easiest source of employment generation in most of these countries, as well as making privatization more bearable socially, its mechanisms and benefits are not well understood. A great deal of work is required in most middle/low income economies to familiarize decision makers with these mechanisms which are central to modernization of industrial sectors and indispensable for reaching or maintaining competitiveness.

Nowadays, the level of consumption and the quality of professional services determine the efficiency and capacity utilization of the industrial sector. It is assumed for the purposes of this Report that a modern industrial economy will consume four times as much professional services to operate the industrial sector as it required in the investment phase.

² Production services include professional and business services, banking and insurance, but exclude distributive services (transport and storage, communications, wholesale and retail trade).

Table I.4 Estimated Value of IRS in Global Economy;
(1990, in US\$, billions)

| Grouping | GDP | GFCF | IRS for investment stage (15.0% GFCF) | "Optimal IRS" (5) |
|---|--------|-----------------------|---------------------------------------|-------------------|
| World | 22,299 | 4,383 | 658 | 3,290 |
| Low-income economies (inc. India and China) | 916 | 183 (20% of GDP) | 27 | 135 |
| Middle-income Countries | 2,438 | 610 (25% of GDP) | 92 | 460 |
| Total DC's | 3,354 | | 119 | 595 |
| High-income Countries | 16,316 | 3,590 (22% of GDP) | 539 | 2,695 |

3. The growth of international trade and competition in services

Trade in technical and professional services has been of long standing. In fact, international trade in engineering and contracting services began to take a substantial scale during the first half of the nineteenth century when the construction of harbours and railways increased world-wide. The export of consulting and contracting services related to the establishment of large agricultural development projects in European colonies involving large scale civil engineering (irrigation canals, dams, terracing, land reclamation) in addition to the expansion of transport systems (Suez and Panama canals, railways, harbours, roads) assumed a massive scale.

Trade in consulting and contracting services grew unabated over the past two centuries. As technology increased in complexity so did these services. Yet, and despite the strategic importance of these services they did not receive adequate attention in either the compilation of statistics or at the level of policy making. The focus was always on the products generated by these services rather than on the service itself.

The recent prominence that the service sector has assumed in industrial countries and the Uruguay Round have finally changed the perception of the service sector in the national economy. Messerlin and Sauvart noted that the "progress achieved in Uruguay Round negotiations on services testifies that trade negotiators and national decision makers are coming to share a perception already common among economists: that trade in services is similar in fundamental ways to trade in goods." (The World Bank and The UNCTC, The Uruguay Round: Services in the World Economy, 1990 Washington and New York).

This is a significant development. The service sector and specially IRS activities have finally been recognised as vital to the national economy of all states; furthermore this international prominence of the service sector has made services a subject worthy of the attention of policy makers and international organisations. The liberalisation of international trade in services also calls on developing countries to act promptly to improve the efficiency of their activities in IRS if these are to be able to compete with highly developed international firms.

GATT estimated that world trade in merchandise and services for 1988 were: US\$2.9 trillion and US\$600 billion (17 per cent of world trade) respectively. By 1990 world trade expanded to US\$4.3 trillion of which US\$820 billion or 18.9 per cent was trade in services. [Martin World, "The Gatt makes its last stand," Fin. Times 20 January, 1992]. UNCTAD

published: Trade in Services: Sectoral Issues (1989) with a view to enhancing international understanding of the various sectoral

This proportion of trade in services is in inverse proportion to the ratio of employment and value added in the economies of OECD countries. However, not all services are tradeable because services are purchased when they are produced and they are not storable. It was estimated in 1985 that only 11 per cent of the gross output of services in the UK are traded compared with 33 per cent for manufactures. [Michael Prowse, "Why free trade will be an elusive goal," Fin. Times 27 September 1985].

However, extensive developments in information technology has already changed some of these assumptions: thanks to the modem it is now possible to generate services and to trade them simultaneously in distant markets. Furthermore, multimedia technology has made it possible to store "entertainment" for delivery in different markets.

- Services account for a rising share of world trade. While at the end of the 80's only 8 per cent of all services produced today were traded, as compared to 45 per cent of all manufactured goods and 65 per cent of all agricultural commodities, the tradability of services is increasing rapidly.

By 1993 the share of trade of services had reached 22.2 percent. Apart from the traditional commercial services (freight, insurance and other services related with merchandise movements), professional, business and industrial support services are also increasingly traded. Trade in the latter categories is grossly underestimated statistically as international payments are not recorded or hidden within various invisible transactions in foreign exchange. But the higher growth rates of trade in services (9 per cent in 1989 and 12 per cent in 1990) clearly indicate the increasing tradability and internationalization;

World trade in services, 1980/93

| | 1980 | 1985 | 1990 | 1992 | 1993 |
|---|-------|-------|-------|-------|-------|
| Trade in commercial services (billions US\$) | | | | | |
| -OECD | 358.0 | 379.6 | 790.8 | 936.1 | 933.7 |
| -Rest of the world | 283.3 | 298.5 | 648.2 | 764.9 | 752.0 |
| -Rest of the world | 74.6 | 81.1 | 142.6 | 171.1 | 181.8 |
| Share of services in total trade (%) | | | | | |
| -OECD | 17.0 | 18.2 | 20.4 | 21.9 | 22.2 |
| -OECD | 18.8 | 19.3 | 21.2 | 22.7 | 23.1 |
| - Rest of the world | 12.7 | 15.3 | 17.5 | 19 | 19.1 |

Note: Only countries reporting to the IMF considered

- Mexico is included in the rest of the world
- Figures for 1990 includes estimates for developing countries for which actual data are not yet available
- Merchandise trade plus commercial services

Source: IMF balance of payments data

- Trade in services is not only increasing more rapidly, but also becoming more profitable than merchandise trade, as manifested by the following figures on the European Community for the 1987/89 period (US\$ billion, excluding inter-EC trade):

| Merchandise Trade | | Earnings (net-%) |
|-------------------|-------|------------------|
| Imports | 612 2 | |
| Exports | 630 9 | |
| Balance | 18 6 | 60 |
| Trade in Services | | |
| Imports | 129 2 | |
| Exports | 141 6 | |
| Balance | 12 4 | 40 |

Although trade in services represented only 18 per cent of total trade, it earned 40 per cent of the net foreign exchange balance.

- Transnational corporations, which in the past belonged exclusively to the industrial and financial services sectors, are expanding rapidly into all service activities, spanning from highly sophisticated (R&D, industrial design and quality control) to menial activities (cleaning, security, key copying and tyre replacement) as table II.7 illustrates. It should be emphasized once again that this is a trend which developing countries have to take seriously, because the rapid growth of industrial support services is not only associated with advanced stages of industrialization;
- The aggressive attempts by developed countries to expand foreign trade in services are illustrated by their strong pressure for the liberalization of trade in services in the GATT rounds;
- There is a rapidly increasing share of services in direct foreign investments (DFI). Since 1987, 75 per cent of Japanese FDI has been in services. The same trends are manifested by other major foreign investors, as illustrated in table II. 8.

TABLE II.8 : DFI OF MAJOR FOREIGN INVESTORS BY SECTOR

| FROM ↓ | TO → | EEC | | United Kingdom | |
|---------------------------|---------|----------------|--------------|----------------|--------------|
| | | (Million US\$) | % | (Million US\$) | % |
| JAPAN | | | | | |
| DFI 1951-88 | | | | | |
| Manufacturing | | 4,642 | 16.6 | 1,107 | 10.5 |
| Services | | 22,126 | 79.1 | 9,258 | 87.7 |
| Real Estate and Others | | 1,204 | 4.3 | 188 | 1.8 |
| Total | | 27,972 | 100.0 | 10,553 | 100.0 |
| | | EEC | | USA | |
| JAPAN | | | | | |
| Stocks - 1988 | | | | | |
| Manufacturing | | 3,310 | 15.7 | 14,753 | 28.0 |
| Services | | 16,579 | 78.8 | 26,947 | 51.1 |
| Commerce | | 3,374 | 16.0 | 9,277 | 17.6 |
| Banking & Insurance | | 10,508 | 49.9 | 9,149 | 17.3 |
| Others | | 2,697 | 12.8 | 8,521 | 16.1 |
| Real Estate | | 1,158 | 5.5 | 11,063 | 21.0 |
| Total | | 21,047 | 100.0 | 52,763 | 100.0 |
| REST OF THE WORLD | | | | | |
| | | FRANCE | | GERMANY | |
| | | (Million ECU) | % | (Million ECU) | % |
| DFI 1981-87 (Net) | | | | | |
| Manufacturing | | 6,547 | 35.9 | 5,995 | 29.5 |
| Services | | 8,599 | 47.2 | 11,566 | 56.9 |
| Real Estate and Others | | 3,082 | 16.9 | 2,775 | 13.6 |
| Total | | 18,228 | 100.0 | 20,336 | 100.0 |
| U. S. A. | | | | | |
| Stocks - 1987 | | | | | |
| Manufacturing | | 8,374 | 73.0 | | |
| Services | | 3,011 | 26.2 | | |
| Commerce | | 1,726 | 15.0 | | |
| Banking & Insurance | | 518 | 4.5 | | |
| Others | | 767 | 6.7 | | |
| Real Estate | | 93 | .8 | | |
| Total | | 11,478 | 100.0 | | |
| U.S.A. | | | | | |
| DFI 1981-88 (Net) | | | | | |
| Manufacturing | | 3,679 | 47.2 | | |
| Services | | 3,586 | 46.0 | | |
| Other | | 536 | 6.9 | | |
| TOTAL | | 7,801 | 100.0 | | |

Source :

Commission of the European Communities, Panorama of EC Industry 1990
(EC, Brussels 1991) pp. 83 - 108

Adaptation of the Organisational Structure of the Monolithic Firm

Not all large organisations adopted the path of externalisation. However, these firms had to adapt to the competition by introducing open-market conditions for all their in-house service producers and making them responsive to outside competition. These in-house IRS suppliers who were competitive were then allowed to market their services outside the mother firm.

IRS, Transfer of Technology to Developing Countries and the Globalisation of the World Economy

The rapid improvements in both communication and transport systems have led to considerable expansion in the spread of international firms. International firms now resort to considerable sub-contracting to smaller firms spread globally: some firms out-source up to 80 per cent of the components that they utilise in the production of their final products. The sub-contracting extends to both services and manufacturing and is geographically delocalised. Thus, the accounting services of a company may be performed in one country and thanks to the modern head quarters are in constant contact with the accountants who may be based in another country thousands of kilometres away. Large multinational firms retain the control of finance, management, R&D, (but here also entire segments of the Research Programme can be sub contracted). Large multinationals such as IBM have research offices, or sub contractors all over the world. The headquarters co-ordinates the research programme, quality and marketing over production but essentially procure components manufactured to their specifications and designs by distant contractors who compete fiercely for their market.

In all of these processes of globalisation and sub-contracting IRS play a critical and strategic role: no country can progress far without developing Industry Related Services in parallel with the development of manufacturing. The globalisation of the world economy now enables each country to identify its comparative advantages and to build at its own speed the industrial activities through the mechanisms of sub-contracting. A diligent management is able to accumulate technology at the speed that it can sustain. Although this route to development is neither easy nor simple the performance of a substantial number of countries has proven its feasibility and practicality.

What is important to stress here is that no country can seek to develop its technological capabilities without concomitant and serious attention being given to the development of its IRS.

Outsourcing in Engineering: Illustrative Examples;

Outsourcing in engineering has been on a very extensive scale as the following examples indicate. The American firm Perkins Engines, specialises in manufacturing diesel engines, and employed 10,000 workers in 1981 when it was a vertically integrated firm. The firm produced 400,000 engines a year, valued at US\$1 billion; the engines were in either complete units or in kit form. By 1991 it had made considerable capital investments in its production facilities, reduced its staff from 10,000 to 3,200 out of whom 2,000 were paid on an hourly basis. The company reduced the number of firms supplying components from 470 to 270, increased the number of components which are outsourced, increased inventory turnover from 4 to 12: that is, the inventory is turned over once a month instead of once every 3 months.

A smaller company, had a similar experience: Peter Brotherhood, had a turnover of £22 m in 1990 and this declined to £18 in 1991. Peter Brotherhood manufactures: steam turbines for marine and industrial applications (one third of output), one third gas compressors applications for petrochemical and process industries, one third special purpose machinery built to customers specifications and/or joint design. It reduced its work force from 1,700 to 400; it out sources 90

per cent of the components it utilises and it tripled output per worker on its staff. [Source: Stewart Dalby, "The lean, mean fighting machine" Fin.Times March 14, 1991]

E. The transformation of manufacturing - a summary

The industrial sector is undergoing profound structural and functional changes under the combined effect of the trends mentioned previously. The most salient features of this transformation are :

- The industrial plant is gradually becoming a "deserted" place where machines are set up, controlled, regulated and directed by industrial service operators located outside the plant. The distinction between capital-intensive and labour-intensive industries as well as between advanced and intermediate technologies, once very important for the developing countries, will gradually lose its meaning

as the globalization of competition will lead to increasing convergence in technologies and industrial processes. There will of course be exceptions to this rule: it is a general trend with variations regarding forms, place and timing;

- The industrial sector is becoming less and less a distinct, self-contained economic activity. It gradually becomes part of a broader cluster of interdependent activities. On the one hand, it has to satisfy consumers by offering sophisticated packages of industrial goods and services; on the other, it has become dependent on outside professional services to keep its competitive edge. Although the industrial sector is and will remain a key development factor, it can no longer perform this role without the assistance of the services sector. But services cannot be developed independently either, as their operations are closely interlinked with those of the industrial sector;
- The manufacturing sector is gradually beginning to resemble infrastructural industries like electricity and gas: although vital to the economy, its final contribution depends on the parallel development of a wide range of interlinked activities. The data presented in table II. 9 provide an example of the relationship between these sectors. Fuel and power industries, transport and communications require a relatively high proportion of investments per operator, just as manufacturing (in 1990: US\$ 176,949, US\$ 60,210, US\$ 80,391 and US\$ 30,379, respectively), compared to the investments required in such sectors as agriculture, construction or trade;
- The most important of all changes is the relocation of the "industrial brain" - i.e., the functions related to the development, technological updating and management of industrial operations- from the industrial plant to the service suppliers, and mainly to those supplying professional services. Knowledge has been estimated to account for 70 per cent of the development costs of an industrial product; in the services, they account for some 90 per cent of a product. The producer services have now acquired a critical role as a catalyst and multiplier in industrial and economic development. They are becoming the main source, producer and distributor of technological and development knowledge and, in the final analysis, the main determinant and "locomotive" of socio-economic progress.

III. THE NEED FOR INDUSTRY-RELATED SERVICES IN THE DEVELOPING COUNTRIES

A. The underestimated importance of industry-related services

In agrarian economies and in those at the first stages of industrialization, the services sector is dominated by traditional trade and domestic assistance operations. These are taken to represent the services sector as a whole, which is therefore considered to be a backward part of the economy, a refuge for parasitic activities and for unqualified labour. From this perspective, services are a "burden" for the economies of developing countries, and modernization is crucial if the countries are to catch up economically.

While the modernization of financial, trade, transport and communications services have received proper attention in developing planning, the development of services which are essential for industrial development has generally received scant attention. The increasing emphasis given to institutional infrastructure during the last two decades has been limited mainly to public institutions dealing with R&D, planning and development administration. There are several reasons for this neglect of IRS.

The main reason is that the development of industry-related services has been seen as a consequence of and not as a precondition for industrialization. Furthermore, the structural changes which have led to the growth of IRS are associated with advanced stages of industrialization, and are therefore considered a problem of the rather remote future.

Another reason is that developing countries are focusing their attention on new investments to speed up industrialization, neglecting past investments. In new investment the required industry-related services amount to 8-12 per cent of the total investment costs. This is relatively little, compared to the bulk of the investment; and if one adds the fact that part of the services may have to be imported (see next paragraph), it does not seem to leave much of a margin for involvement by local IRS firms.

In addition, these services are closely associated with transfers of technology which generally require special knowledge and expertise. Also, IRS are often integrated in composite deals associated with turn-key agreements, foreign loans and investments or aid. In all these cases, foreign suppliers of IRS will be involved, often to the virtual exclusion of domestic suppliers. Indeed, many assistance or financing projects are explicitly designed to rely on foreign suppliers of services. As Chapter V of this report will show, the Maghreb countries rely on such foreign suppliers for 70-100 per cent of their IRS requirements. It is characteristic that 30 per cent of the consulting engineering and 23 per cent of management consulting services produced in the European Community are exported to developing countries; the most important customers for engineering consulting have been the developing countries, which in 1985 accounted for 86.2 per cent of the world export in technical consulting (Lamel, Mesch, Solka, 1990 - pxx).

Finally, the significance of the functional expansion of industrial operations and the composite character of industrial goods (the mix of products and services) is grossly underestimated. As a result, market shares and employment opportunities are lost. There is an awareness in developing countries that industrial support services are an integral part of industrial operations; but their role is considered to be subordinate and they are expected to be established either by the industries themselves as in-house activities, parallel to the expansion of their core industrial operations, or as independent professional services created spontaneously by market forces.

B. The consequences of weak industrial support services

The estimated figures on developed country services given in chapter II.D may serve as a rough indication of the costs (in terms of market shares, value added and employment) which are the result of neglecting the development of industrial support services. If they insist on concentrating their efforts on "classical" industrialization and ignore the importance of a parallel development of their services, they will face a loss of income and employment generation opportunities, for in the present-day of global environment, the classical development path will increase capital requirements, destroy jobs at home and create them abroad. The lost employment opportunities take the following forms:

- Directly at home through the relative reduction of industrial employment when labour productivity (value added per employee) is increased in accordance with international trends, through capital investment;
- Indirectly at home and abroad through the widening gap between the share of the ex-factory selling price of a given industrial product and the share of its "service content" in the final "all-inclusive price" paid by the last consumer for the physical product and the collateral services;
- Directly at home through imports of service inputs consumed by local manufacturing industries, inputs which could be produced locally.

C. Balancing the public and the private sectors

An excessively large public sector with numerous problematic and unprofitable industries is a not unusual phenomenon in developing countries, regardless of their political or economic system. It is the result of a variety of factors such as scarcity of private funds and local entrepreneurship, failure of private investors to successfully operate industries, unemployment pressures, doctrinaire economics and international political affiliations. In recent years, attempts have been made to privatize public manufacturing industries to bring about a better balance between public and private sectors. These attempts have not often met with success.

Segregating the core industrial activities from their supporting services and privatizing the latter could be more successful. This would have the following advantages:

- It would require little capital expenditure;
- It would overcome the unemployment fear which have proved to be a serious obstacle to privatization, as employment is not reduced but merely shifted from the public to the private sector;
- The main objective would not be the dismantling of the national public sector, but the development of national industrial support services, enhancing national development capabilities and potential. As the national character is retained and national capabilities are enhanced, it should be ideologically acceptable and gain political support;
- It facilitates privatization as manufacturing companies are relieved of the burden of inefficient services and excessive personnel commitments;
- It presents minimal risks of disturbances and friction as the newly established services already have a market, while the industries can count on service suppliers familiar with their specific needs;

- It establishes a "soft" precedent and a reliable testing ground for the privatization process.

D. Towards stronger industry-related services in developing countries

The discussion so far has made it clear that developing countries cannot afford to neglect IRS if their industrial sectors as well as their service sectors are to grow and to become more competitive, both at home and in the global market. Growth of IRS also presents considerable employment opportunities, should result in significant foreign exchange savings and is a potential source of foreign exchange earnings.

Industrial support services can not grow in isolation from structural change and growth of the industrial sector or, for that matter, of the economy as a whole. The absence of such a correspondence could result in structural imbalances and inflationary pressures. This does not mean that in all countries the relations and trends will be identical. Differences will be the result of the international division of labour. Some countries will be able to develop strong IRS capacities and become exporters while others may have to continue relying partly on service imports for their industries.

It should be stressed that the development of industrial support services in developing countries is unlikely to be an "automatic" result of market forces. In industrialized countries, industrial support services have emerged through a "spontaneous" process. But in these countries special conditions prevailed: there were no competing forces when the need for IRS became strong enough to favour their emergence. Today's developing countries can not count on such a competitive vacuum. The IRS enterprises of the developed countries will not leave them a breathing space for developing their own industrial support services; besides, their financial and organizational superiority will easily overcome the competition of the weak local services, particularly intensive knowledge services. If developing countries are to reduce their dependence on imported services, they will have to make deliberate efforts to build up their IRS.

IV. INDUSTRY-RELATED SERVICES IN KEY ASPECTS OF INDUSTRIAL PROJECT EXECUTION

Industrial policies in developing countries have by and large ignored the development of local consulting and engineering design services, which represent the knowledge-intensive part of industry related services.

The emphasis was put on creating or increasing the industrial base (i.e. installing production lines), which, it was assumed, will increase employment opportunities and curb the import's burden.

During the 70's, fuelled by the availability of funds (exports of national resources, or easy access to foreign financing resulting from the recycling of petro dollars) industrial investments flourished in developing countries; they were acquired mainly as turnkey/financed packages leaving little space for the involvement or the development of local inputs (equipment and services) in the investment process. It was generally considered that their cost was marginal (10 to 17 per cent of total installed cost, see table IV. 1) that their development would take time, and that they will ultimately be generated as a consequence of investments.

During the 80's, it appeared that despite huge investments schemes (US\$ 380 billion in the Maghreb region), unemployment was growing, industrial plants were running at a fraction of the design capacity, imports and subsequently the debt burden were reaching worrying levels.

Nowadays, the reasons underlying these situations are better known:

- It was not realized that industry support services (i.e. consulting/engineering design services) for the investment phase are also needed for managing, operating, maintaining and developing industrial plants.
- In developed countries, the increasing externalization of services is resulting in shifting a growing part of the manufacturing value added (and jobs) to the service sector. Establishing and operating a production line means more and more, creating jobs in the services sector. Establishing an industrial base without developing the related industry services (i.e. buying the hardware, without software) will result in increasing imports of services, particularly intensive knowledge services, and subsequently to creating jobs abroad.
- The weakness of local consulting/engineering design capabilities results also in difficulties in integrating locally produced capital goods and spare parts into existing plants and new investments. It leads to the excessive recourse to external financing of turnkey packages, which by definition reserve the supply of goods and services to the financing country, even when they are locally available. This situation is probably the main cause of the growing medium and long term debt.

Under these conditions the level of gross fixed capital formation (GFCF) and job creation are directly related to the capacity to import, and to attract financing in a financial environment which is considered to worsen during the 1990's, due to the financing requirements of the USA's deficit and the restructuring of Eastern Europe.

Industry-related services are not only required in all phases of the industrial development process. They also provide data, inputs and advice which can help to develop related activities such as construction economics, finance and insurance. And they can become a seedbed for the development of advanced and specialized consulting activities such as R&D, quality control, product development and design, etc. which are of vital importance to reach or maintain competitiveness industries

product development and design, etc. which are of vital importance to reach or maintain competitiveness industries

The following sections will briefly outline the role of IRS in a number of key aspects of the industrial development process. A well-developed IRS system can play a crucial role in a wide range of issues closely related to the successful industrialization of developing countries; one could argue that its role is even more important than in the industrialized countries, as so many issues present themselves simultaneously now. The key aspects discussed below are:

- Project inception, generation and implementation;
- Post-investment performance;
- Technology development, transfer, adaptation and innovation;
- Research and development, product development and design;
- Human resources for development (brain drain is one of the major issues here);
- Qualitative and residual factors acting as catalysts and multipliers.

B. IRS in project inception, generation and implementation

Many developing countries have a low capacity to absorb disposable aid funds due to their inability to select the proper projects and to implement them within specified time limits. It has also been observed that the utilization of local funds is often better than that of foreign funds. In both cases, the inadequate development of local IRS is a major reason. Preparations must usually be of a high standard to fulfil the disbursement requirements of foreign funding agencies, and delays and deficiencies in preparing feasibility studies and detailed designs as well as uncoordinated implementation have therefore been major obstacles. Improving these capacities will expedite project generation and implementation.

There are other aspects of projects which suffer from insufficient local IRS capacity. A common phenomenon in many developing countries is that industries established with great hopes and sacrifices become a burden to the country soon after their establishment due to mistakes in the selection of appropriate projects and technologies, and the inadequacies of IRS already referred to in the last paragraph. The same project inputs can produce varying qualities of project output, depending on the country, and this provides an indication of the importance of endogenous consulting capacities. The most crucial factor in new industrial projects is not the industrial plant *per se*, but whether the project fits the technological level of the country, the culture and behaviour of its industrial labour force; whether backward and forward links of a new plant cause multiplier effects throughout the country's industrial and general socio-economic structure; and whether there are opportunities for access to or for developing more sophisticated technologies which fit the country's development objectives. Foreign experts can provide advice on the technical aspects of industrial plants, but they draw mainly on the experience and socio-cultural environment of industrialized countries. Adjusting and modifying technical proposals to fit the country's needs and conditions requires local experience and expertise. This is confirmed by the fact that many foreign consultants and consulting firms seek local expertise on these matters even in cases where it is not mandatory.

Crucial decisions regarding new industrial plants are usually taken by national authorities whose staff plays, consciously or unconsciously, the dual role of decision-maker and local consultant, while generally lacking the expertise required for the second role. The underestimation of the importance of local expertise by policy-makers and the "self-contained" attitude of the administration's rank and file has proved to be one of the most formidable barriers for the development and proper utilization of endogenous consulting capacities.

This issue may be illustrated with an example from another UNIDO report.³ It established, *inter alia*, that in a developing country a new sugar mill with a crushing capacity of 2000 tons had been chosen at an investment cost of US\$ 18 million (1972), while an equivalent expansion of an existing mill would have required only US\$ 1,2 million. The offer, made by a foreign turn-key supplier, was connected with credit facilities giving the impression that the plant could start "free of charge". The inadequate development of local engineering and consulting capacities did not allow either a thorough and comprehensive evaluation of the offer in terms of foreign exchange requirements (twice the value of investment due to interests, other charges and over-pricing) or the presentation of a local counter-proposal for expansion of the existing mill, which would have had obvious advantages (foreign exchange savings, local income and employment generation).

C. Post-investment performance

During the first stages of industrialization new investment provides the main development force. As development goes on, the proportions between new and past investments are reversed and the overall performance of the economy depends more and more on the performance of past investments. Yet, a widespread phenomenon in many developing countries is that attention is mainly paid to the establishment of new industries while the existing industries undergo an accelerating deterioration. This explains, partly, how a constant volume of investments can lead to diminishing GDP increases: part of the industrial expansion generated by new investments is offset by the declining performance of past investment.

The improvement of post-investment performance is an area in which local expertise can play an important role due to the fact that the "core knowledge" for these industries has been imported, assimilated and adopted. The locally available records of successes and failures is an excellent guide in this context.

It should be emphasized that technological updating is a continuous operation. In an era of continuous technological changes and innovations and rapid replacement of fixed assets, the most advanced industries of today become obsolete tomorrow. This increases the modernization costs exponentially. If developing countries continue to leave the modernization of their industries to foreign expertise, the modernization costs will further weaken their competitive position.

D. Technology development, transfer, adaptation, and innovation

When developing countries shift the emphasis from import substitution to export-oriented industries, they urgently need new, sophisticated technologies to compete effectively in international markets. UNIDO has estimated that payments of developing countries for technology transfers (fees, royalties and technical know-how) reached the level of US\$ 9 billions in 1990.

The main problems which developing countries are facing in technology acquisition and development are:

- Payments for technology transfers which do not coincide with actual transfers of technology as most of the technology suppliers transfer use but not "knowledge" of new technologies, perpetuating the technological dependence of their buyers, and consequently of the importing countries. In the Republic of Korea (ROK), for example, a study on technology transfers⁴ disclosed a general trend among technology suppliers

³ Regional Cooperation Network on Industrial Consulting between the Developing Countries in the EXCAR Region. (DP/RAS/93/013), pp. 19-92.

⁴ Young Hun Kim, Korean Experience on Transfer of Technology. UNIDO, ID/WG 355/16-1981.

to provide only peripheral technology in an attempt not to keep control of core technological know-how. In about 22 per cent of technology transfer projects insufficient transfer of know-how has been reported;

- Repeated imports of the same technology under joint venture and bilateral agreements between local and foreign firms. This takes place under varying technology "brands" and "trade marks" costing to the country a multiple of its real value. In Pakistan, for example, a survey of IACP (Industrial Advisory Center of Pakistan) disclosed that only 20 per cent of technology transfers concerned a new product while 80 per cent were duplications or modifications of the same product. In the ROK, where technology transfers are under government control, similar trends have been identified. A survey⁵ disclosed that 20,8 per cent of the imported technologies had already been locally developed (the same or similar), 28,3 per cent had been imported previously or at the same time, and that only 50,9 per cent were really new technologies. Such waste in technology transfers is often more costly than the actual physical investment;
- Technologies are not bought by the developing countries but sold by the technology suppliers. Coupled with restrictive clauses referring to the use and export of acquired technologies, this makes technology transfers more a device for penetrating developing country markets than a tool for boosting their development and exports. In Thailand, for example, where a liberal policy on technology imports has been adopted to accelerate industrialization, 57 per cent of the payments for technology transfers concerned the promoted sectors, i.e. the ones selected as the country's development priorities, and 43 per cent the non-promoted sectors. Food, beverages, cosmetics and pharmaceuticals accounted to 31 per cent of all technology transfer payments in 1980-81;
- The need to adapt acquired technologies to the country's techno-economic structure and to its development targets and export objectives. The USA provides a good example. During its early industrialization period, all technologies were imported from Europe, or imitated. Yet, applied in the USA, they produced spectacular gains in productivity, a multiple of those recorded in the countries of their origin. A great part of this success is attributed to the adaptation and further development of these technologies in order to make best use of the abundant industrial labour force, the result of the great influx of young and unskilled immigrants. Dismantling technology packages and developing machines, devices and processes to make the best use of these labour resources were the main causes of these productivity gains.

"Dismantling" technology packages and adapting, modifying and further developing their components in order to re-assemble them according to the country's needs and conditions is the essence of successful technology transfer and development. The real value of technology transfers lies in their multiplying effect through the backward and forward links of the industries applying these technologies, as well as in their potential for wider diffusion. This is the real meaning of appropriate technology - the term does not have to imply intermediate or less advanced technology. This is an area in which technology suppliers have generally shown a negative attitude. Restrictive clauses impede the use of local materials and inputs as well as the development of ancillary activities, and block the strengthening of the technological base of the importing countries.

Developing countries tend to blame the "technology suppliers" of the developed countries for all these problems. However, they are also partly responsible due to the inadequate development of their capacities for the acquisition, development and adaptation of technologies. In this context,

⁵ A study on the transfer of technology - Korean case, Technology Transfer Center, KIST, 1977, pp. 67-68.

a study on ESCAP⁶ which is, however, valid for all developing countries, has identified the following main shortcomings:

- Low level of science and technology. Acute shortages of scientific and technological resources pose a serious barrier to the choice of the most appropriate technologies as well as their best use and diffusion;
- Transfer of managerial technology is more difficult than that of physical production technology since it involves more social, cultural and mental elements;
- Many of the developing countries have an inadequate infrastructure for technology transfer including knowledge of and access to sources of technological information, evaluation of the appropriateness of technology options as well as control of technology transfers;
- A bias in favour of foreign products and technologies, inhibiting indigenous innovative efforts;
- The negative effects on the development of domestic technological capabilities of the massive introduction of foreign technologies, as part of a policy for rapid industrialization. Apart from the case of Thailand (see above), the case of the ROK is illuminating. Excessive investments in the ROK's heavy industries resulted in imported technologies that emphasized immediate production over domestic technology development.⁷ This necessitated huge imports of raw materials, left little time for absorption and assimilation of imported technologies and impeded the development of ancillary activities and indigenous innovations. At a later stage, the ROK government, however, made successful efforts to strengthen the domestic technology base, in co-operation with private enterprise.

Like the ROK, other developing countries have established an institutional infrastructures to handle and control technology transfer, paying increasing attention to terms and conditions in technology transfer agreements, and establishing R&D institutions focused on acquisition, development and adaptation of new technologies. Although these measures have often considerably improved the transfer of technology to developing countries, they have usually failed to provide a decisive response to the problems mentioned above, because:

- Centralized systems miss the flexibility and dynamism required for rapid and diversified industrialization;
- Emphasis has been given to the legal, financial and administrative aspects of technology transfer rather than to knowledge transfer;
- The "interfaces" connecting technology and end-users are still inadequately developed;
- There has been no continuous effort in "breaking down" technology packages and in the development of domestic technology components.

The main failure of the developing countries in the present context is the underestimation of

⁶ ESCAP, Expert Group on ASEAN and Pacific Economic Cooperation, ASEAN-Pacific Cooperation in Technology Transfer, Bangkok, May 1982.

⁷ Young-Won Kim, "A study on technology issues in the complex of capital goods industry in Korea", report of the Federation of Korean Industries, April 1982.

the importance of "grass roots" movements parallel to the official centralized ones. The structural changes the developed countries described in Chapter II have not been the outcome of governmental planning or recommendations of specialized public or private institutions. They have been the result of two forces: The industrial enterprises, on one side, looking empirically for solutions of their mounting problems without having a ready-made answer, and the service suppliers on the other, making "attractive proposals" and exercising "convincing pressures" for the expansion of their business; an objective coinciding with the interests of their clients, the industries. Central planning authorities and study centers in the industrialized countries began to realize that something "was going on" after the interaction of the two main forces began to provoke the structural changes described before.

One of the secrets of Japan's successful industrialization has been the recognition of the need for "grass roots" mechanisms. The Japanese technology transfer experience⁸ proved that a "change agent", i.e. a mediator between technology transferor and transferee, is one of the more important pre-conditions in successful technology transfers, especially where the environments of transferor and transferee are very diverse. Domestic IRS can play this crucial mediating role.

The absence of the interplay between two main private sector actors is the largest handicap of many developing countries. If the development of local IRS is to fill this vacuum in a context of balanced overall development, market forces alone will not be sufficient, as has been explained in the previous chapter: governments will in this case have to play an actively catalyzing role. Once they have been sufficiently developed, local IRS services can:

- Improve the selection of appropriate technologies, as well as the terms and conditions on technology transfers;
- Accelerate the diffusion of acquired technologies and eliminate duplications in technology transfers;
- Improve the real transfer of technical knowledge, reducing technological dependence;
- Turn the acquisition, adaption, modification and development of technology from an array of *ad hoc* cases into a continuous, consistent process;
- Create a national depository of knowledge and experience in transfer, adaptation, modification and further development of new technologies.

E. R&D, product development and design

R&D institutions for basic, applied and adapted industrial research in developing countries often suffer from a series of common problems, differing in degree, at both ends of the R&D process. The selection of research subjects is only loosely connected with the real or emerging problems of potential end-users and the diffusion and application of R&D results also suffers from inadequate connections between R&D institutions and end-users. Here again, the absence of an intermediary (change agent) is felt. In the ROK, the KAIST (Korea Advanced Institute for Science and Technology) has established a subsidiary, the K-TAC (Korea Technology Advancement Corporation) to fill the latter vacuum. Its aim is to commercialize research results developed by research organizations under the Ministry of Science and Technology and to link research organizations with businesses and entrepreneurs for translating research and development into practical applications. In countries like Thailand and Philippines, R&D institutes have established

⁸ Eiji Ogawa, "Technological development in Japan's small business", Monthly of the Public Corporation of Small and Medium-sized Business Finance, June 1976.

special units shopping for research contracts in the market in order to link their research and development projects with the actual needs of their industries. Although these institutional arrangements have substantially improved the relevance of R&D efforts to the needs of the respective countries, they have not solved all problems related to the relevance of R&D efforts and to the practical applications of R&D products. For the following reasons, IRS should be strengthened to make the most of R&D:

- As indicated in Section IV. D, centralized systems generally miss flexibility and dynamism required in complex and rapidly changing economies - many developing countries are entering the second and third stage of their industrialization. A great number of individual "agents of change" will be increasingly required to complement the commercialization of R&D outputs as well as to indicate research subjects relevant to the very needs of many thousands of industrial units. This offers a wide scope for national IRS;
- Entrepreneurs and managers, especially in countries without industrial tradition, very often have a wrong perception of the problems they face and can hardly identify the technological changes needed. An independent expert would be needed here, but very often foreign consultants are used who are not familiar with the complexity of social, cultural, structural and politico-economic factors associated with technological changes. Local consultants would be far better placed to handle such issues;
- Costly R&D products often remain unused at home, while the best ones are "leaked" to other countries, even being re-imported with some modifications and adaptations in the guise of imported new technologies. With the aid of proper structures, in which local consultancy could play a key role, this could be avoided.

F. Human resources for development and the brain drain

The scarcity of qualified scientists and professionals is often a bottleneck for the industrialization of developing countries. The great sacrifices that many countries have made to develop their human resources have generally not removed this bottleneck, and two other problems are emerging: growing unemployment of university graduates at home and emigration (brain drain).

The following points can be made about these problems:

- The scarcity that still exists is often less a matter of numbers and formal qualifications but of applicable knowledge and practical experience, the result of limited opportunities at home. Even in cases when graduates have acquired practical experience abroad, this experience may be irrelevant at home due to different local conditions (degree and fields of specialization, size of establishments etc.). What is missing in many developing countries is the absence of opportunities to practice, offered in the developed countries by the great number of "practising laboratories", i.e. IRS firms which provide the critical "extension services" of their educational and research institutional settings;
- The weakness or absence of IRS limits career opportunities to only two alternatives: academic or public administration careers in which the often scarce professional resources are not properly utilized. This widens the gap between numbers and qualifications in terms of practical experience and in particular with regard to updating knowledge and on-the-job experience;

- The main reason for scientific and professional emigration (brain drain) is not the salary differential as the general lack of opportunities for professional advancement (improving one's knowledge, acquiring practical experience, a wide range of employment opportunities). Incentives for halting or reversing the brain drain have not been very effective as they have by and large been based on salary improvements and academic or public service employment, neglecting the wide area of independent professional careers in e.g. the IRS sector.

G. Qualitative and residual factors associated with the development of industry-related services

The broad areas in which industrial support services and more specifically IRS can contribute to the acceleration of industrialization and improved performance of existing industrial establishments, outlined in the previous sections, do not exhaust the benefits of developing these services. As in all aspects of the development process, strategic, qualitative and residual factors of IRS often play a critical role as catalysts and multipliers.

Developing countries, facing a scarcity of capital resources and large labour surpluses which grow faster than their economies, have tried development strategies minimizing capital requirements and maximizing employment opportunities. By and large these strategies have the following characteristics:

- Establishment of import substitution industries based on an existing domestic market and aiming at creating the first nuclei of their industrial sector;
- Using import substitution savings (plus foreign aid, loans and investments) to establish labour-intensive industries and, in addition, increasing the labour intensity of industries by employing so-called "intermediate technologies".

The needs of developing countries for foreign exchange, the pressure to liberalize their economies as a precondition for receiving foreign aid, loans, and investments, and the demonstration effect of the success of the newly industrialized countries have all led to a basic re-orientation of their industrialization strategies towards exports.

Export-oriented industries require, regardless of technologies and processing methods, products which can compete in international markets with the best products of the most advanced industries. Understanding this, developing countries now pay increasing attention to technology acquisition and the development of their own technological basis; they are also revising their attitudes towards labour-intensive industries and intermediate technologies.

This shift to export-oriented industries was originally thought to come about as a result of buying the right technologies for new industries. It was soon realized that technology is not static, and its acquisition not a one-off operation. Technology is continuously changing. Developing countries therefore began to emphasize the

development of their own technological basis and the institutional infrastructure needed for the acquisition and adaptation of foreign technologies as well as for developing their own.

We have already seen that developing countries, trying to profit from the experience of the developed countries, have copied the relevant institutions set up by central administrations (development banks, R&D centres, vocational training schools, export promotion agencies, etc.), but have failed to see that these alone can not produce satisfactory results without the concurring interaction and contributions of many small, decentralized and specialized professional services.

which are major a catalyst in the process. Some of the reasons for their involvement deserve to be discussed here more extensively:

- Scientific and technological discoveries by themselves do not lead to change and progress. Their effect depends on their application in daily life. The USA and Japan are good examples. While many important technological discoveries, like TV, were made in Europe, their world-wide role is the result of adaptation, further development and commercial exploitation by the USA. In a similar fashion, Japan (and other countries) have used the results of the extremely expensive US space programme to adapt and develop micro-sensors, photographic instruments, isolation materials, etc. This adaptation and commercial exploitation has been the result of combined action by their central institutions, carrying out adaptive research, and the great army of "front line" consultants (mainly consulting engineers and management consultants but also patent lawyers, advertising consultants and trade experts);
- Researchers everywhere have the tendency to direct their efforts to "big issues" (worthy of the Nobel prize), paying little attention to "small deals". They spend more time on new discoveries than on better applications of existing ones. Here, the presence of "front line" consultants can help to balance pure research and its practical applications;
- Centralized development institutions also tend to concentrate on big issues. They fail to see that the rapid economic progress of many countries has been the cumulative effect of a stream of systematic small improvements rather than of great strategies or discoveries. In the USA for example, labour productivity (physical output per worker) rose by more than 500 per cent during the 1889-1957 period. Studies on the factors which have contributed to these spectacular productivity gains have shown that only 13-26 per cent of this growth could be attributed to the increase of fixed capital per worker. The rest was due to residual factors such as technological inventions and innovations, R+D, education, health, etc.⁹ The great breakthrough of the USA was mainly the result of the cumulative effect of many small, improvements.¹⁰ "Better plant layouts, more efficient machinery, and new processes have been devised, both through formal, research, and through many small cost-cutting innovations, devised directly in the plants. Foreign students,

of American industry are struck by the many small ways in which, the American factory produces more output".¹¹ The strategic role of MITI in Japan's industrialization cannot be denied, but the catalytic contribution of the numerous, unknown "agents of change" must also be acknowledged.

H. Concluding remarks

The changes taking place in the structure and function of industries as described in Chapter II, with their emerging new relations between industries and services, raise new problems for the developing countries, shaking many of the long established concepts of industrialization, economic development and employment. All industrial plants are gradually becoming capital-intensive with very similar labour and technology requirements. The productivity gains of modern capital

⁹ Congress of the United States, Joint Economic Committee, Staff Report on Employment, Growth and Price Levels. (Washington, D.C., U.S. Government Printing Office, 1959), pp. 33-66.

¹⁰ OECD, The Residual Factor and Economic Growth (Paris, OECD, 1964)

p. 83.

¹¹ U.S. Congress, ibid. p. 48.

equipment (automation, CAM) are so enormous that even the substitution of capital by unpaid labour would not lead to lower ex-factory product costs. Even in classical labour-intensive industries such as mining and textiles labour is disappearing from the shop floor. But, and this is important, their capital intensity is not rising proportionately to their decreasing labour intensity: as services are externalized, labour is shifted gradually to the relevant service activities.

Developing countries may have a certain preference for IRS to be developed as specialized units of the public sector. Theoretically, this would be a good choice as these units can count on public prestige, support and resources for their take off. But, as explained above, such central government institutions are very likely to lack the flexibility needed to provide the right service at the right time, and to adapt themselves continuously to the requirements of a rapidly changing technological and economic environment. Anyhow, successful professional services in industrialized countries tend to be virtual "cottage industries" in terms of size, when compared to other economic activities (see tables IV. 2 and IV. 3)

As the establishment and re-organization of public entities require constitutional and legal formalities as well as complicated controls and procedures, it is obvious that public industrial support services will always lag behind the needs of industry. The only advisable choice, even for countries in which the sector of core industries remains public, is to have independent professional services or at least a mix of public and private industrial support services. In order to be able to compete in the field of services, all countries will have to rely on the interaction of two forces: the industrial enterprises and a well-developed network of independent professional services. Their interaction is essential to guarantee creativity, innovation and continuous adjustments of services to industrial requirements.

Apart from the fact that a well-developed IRS network is essential for the developing countries if they are to catch up with the global structural changes, such a network has certain advantages which are particularly significant for the developing countries:

- As table IV. 4 indicates, the average size and the capital requirements per unit and per employee are very small compared to the those of industrial units;
- Although they, require very modest investments, they have very high value-added and employment coefficients (see table IV. 4);
- Contrary to the core industries which require the latest technology, with extremely narrow substitution margins, industrial support services are amazingly flexible. As the developed countries have shown, they can begin as small, unspecialized units which, using their cumulative experience, can gradually can become larger, more specialized and sophisticated entities;
- Unlike manufacturing industries, professional services do not require an expensive infrastructure; they are mobile and decentralized and therefore more suited to developing countries;
- Although large transnational professional services companies do exist, and try to control markets, they have not been so successful in monopolizing markets as large companies in other activities. Small business dominates, for growing specialization requires many units which are of necessity small. Large units moreover have the usual shortcomings: inflexibility, excessive organizational control overheads, slow adjustment to new developments. It is characteristic that Ventex International, one of the largest multi-service companies in the world, with an estimated turnover around US\$ 9 billion, has only 41 people in its central office. DHL International manages its world-wide network covering 186 countries with only 140 people at headquarters;

- The combination of these advantages explains why certain developing countries have performed better in services than in industries. Tunisia, for example, is present in International Security Services (see table II. 7). India is among the leading exporters of software engineering, Mexico earns more than US\$ 130 million annually from dubbing English movies in Spanish and Jamaica has become a center for teleprocessing of, among others, medical data for US hospitals.

PART V RECOMMENDATIONS

Introduction

The need to develop professional and IRS services may be an even more immediate priority if we consider that, heavily indebted, most developing countries are under structural adjustment programmes and associated import liberalization. This means that productions of many DC's will be less and less able to compete not only in foreign markets but also in their own markets if measures are not adopted to generate/develop the IRS sector.

Though the development of IRS require a liberal trade regime, they cannot be expected to grow spontaneously as a result of market forces. The actions of governments, professional organizations and of international organizations are essential to the establishment of a suitable environment that stimulates their growth.

In this context UNIDO has conducted a series of studies on the development of industry related services, and organised a regional workshop (Rabat, December 1993), and the first consultation on consulting and engineering services (Vienna, 4-7 July 1995) where representatives of Governments, private sector industrialists and professional associations, as well as international organisations participated. (World Bank, African Development Bank, Islamic development Bank, International Federation of Consultants Engineers, GATT, etc.)

These events have resulted in recommendations on ways and means to enhance national IRS capabilities, and on the contribution of international cooperation in the process.

1. Recommendations for the development of national IRS capabilities

(i) Recommendations Concerned with the Establishment of a Favourable Environment for the Promotion of IRS

The development of IRS requires the establishment of a favourable local environment. It is recommended that the following measures be adopted:

1. Revision of system and procedures of public procurement with a view to: improve communication with national firms, facilitate the process of meeting pre-qualification standards, scheduling of programmes and projects, breaking large projects into smaller units to enable national firms to participate and promoting sub-contracting by foreign contractors.
2. Development of financial services to support national IRS firms: fiscal incentives and better access to finance are an essential part of an environment that stimulates IRS. Fiscal incentives can take many forms: tax relief, carry forward of losses, reduced tariffs on import of technologies that enhance their work. One of the most important improvements is to modify regulations as to the requirements of collateral's. Industrial loans to investors could be tied with respect to the use of national IRS when available. The Government in collaboration with independent professional associations should establish criteria and standards concerning national IRS: to both protect competent ones from the negative impact of charlatans and also to give regulations a sound bases in law
3. Externalization of IRS services now provided in-house by parastatals and public departments:
4. Establishment of a system of procedures for pre-qualifying and pre-selecting consulting and contracting firms:

- the establishment of procedures to assist national firms to assess their capabilities and to define the additional capabilities that they require for undertaking a broader range of services.
- the establishment a data base and a national service to assist national IRS firms to identify personnel, at home or abroad, that could enable it to secure additional work by enabling the firm to meet higher standards of pre-qualification.

5. **Modernization of incorporation and registration laws and regulations concerning IRS:**

6. **The promotion of networking of organizations and institutions: networking to be undertaken within the framework of a national S&T-System.** Professional associations, the chambers of commerce and industry, publishers, public institutions should endeavour to compile annual directories on organizations, institutions, IRS to enable consumers of services to establish effective communication.

7. **Information Gathering: Information sources in developing countries are generally poor on both local and international subjects.** Although access to international sources of information can alleviate the shortage of information on international subjects there is no substitute to developing national information sources on local subjects. Access to reliable, efficient, thorough and comprehensive sources of information is of considerable importance. It is recommended that reliable, comprehensive and timely information on the national economy be generated and published. The development of a wide range of library and information services should be a prime objective of all ministries and governmental organizations.

(ii) Recommendations Concerned with Professional Associations

It is recommended that considerable effort be made to promote the formation of national professional associations in the social, engineering and scientific fields. These associations contribute important services through the networking of professionals from different organizations. Professional associations and societies can play an important role by providing platforms for the diffusion of information to members of the profession and to society at large.

IRS depend to considerable extent on the support of high quality professional associations for new ideas, training, professional standards, communication channels, advisory services and introductions to international organizations when the need arises.

Developing countries lack the presence of authoritative bodies to express professional opinion on issues that challenge society. It is strongly recommended that existing associations be strengthened.

It is recommended that professional associations be supported in order that:

1. They prepare annual informative directories of their members and assessments on the standing of the profession in the country;
2. They maintain data bases on their membership which could enable IRS to locate promptly specialized manpower when needed;
3. They provide an arena where IRS interact with members of the profession to discuss technical issues of national importance;
4. They sponsor national and international conferences in their field of expertise;

5. Encourage government and the private sector to utilize national IRS in their field of expertise;
6. They sponsor regular and independent surveys of technologies and scientific developments that are of national importance with a view to eliciting public and professional interest;
7. They participate in the drawing up and/or debate performance standards and codes of conduct;
8. They act as publicly spirited lobbies of ideas and policies of public interest;
9. They publish periodicals and monographs on topics of professional importance;
10. They become affiliated with regional and international organizations of similar interest.

(iii) Recommendations Concerned with Enterprises

It is recommended that associations of enterprises producing similar services and products be established. Although these enterprises are often competitors they still have much in common and could collectively benefit if local IRS improves in quality and effectiveness. These enterprises may have common problems with consultants, contractors, government, consumers, exporters, importers, financial institutions and others.

It is to be expected that these enterprises should be able to support active and effective organizations.

(iv) Recommendations Concerned with Parastatals

A considerable amount of industrial investment in developing countries has, so far, been made by governments. It was estimated that these public and/or mixed private-public sector firms can play a considerable role in the development of IRS in their respective countries through their adoption of outsourcing policies. It is recommended that outsourcing (or externalization) of IRS locked in public industrial firms and parastatals, become a central component of industrial restructuring and/ rehabilitation schemes. It is the first step preparing for a successful privatization; it is a strong push in the generation of efficient industry related services, which are becoming a determinant factor in attracting foreign direct investment in developing countries.

(v) Recommendations Concerned with Sectoral Organization

1. Revision of system of taxation with a view to promoting technology acquisition, improvement of standards, enhancement of exports, staff training.
2. Establishment of a special fund to provide credit and guarantees to firms seeking to enhance their technological expertise, penetrate new markets, adopt new processes and products.
3. Revision of system of regulations and facilities that manage foreign firms with a view to promoting the utilization of local IRS.
4. Establishment and/or improvement of sectorial information services with a view to promoting networking and sub-contracting.
5. Expansion of opportunities for foreign travel in order that national IRS firms became better acquainted with international development in this industry.

(vi) Recommendations Concerned with Training in Modern Methods of Technology Management

The following group of recommendations should be aimed at the top professional levels in the country and should be available to professionals in the private and public sector. The objective is to make available to each developing country the tools that are essential to manage modern technology and technology change.

1. Expand opportunities for training in corporate management. This can be accomplished through the development of national educational institutions and professional associations.
2. Expand opportunities for training in project management. This can be accomplished through the development of national educational institutions and professional associations.
3. Expand opportunities for training in system management on the sectorial level. This can be accomplished through the development of national educational institutions and professional associations.
4. Expand opportunities for training in selecting, adapting, adopting and installing management systems to operate industrial operations. This can be accomplished through the IRS associations.
5. Expand opportunities for training in technology assessment. This can be accomplished through the development of specialized programmes within existing national research institutions or ministries.
6. Develop guidelines for evaluating IRS firms.

(vii) Recommendations Concerned with Training in Modern Business Organization and Promotion

1. Expand opportunities for training in business management. This can be accomplished through the development of national educational institutions and professional associations.
2. Expand opportunities for training in marketing. This can be accomplished through the development of national educational institutions and professional associations.
3. Expand opportunities for training in negotiation. This can be accomplished through the development of national educational institutions and professional associations.
4. Expand opportunities for training in accessing international business information. This can be accomplished through the development of IRS associations and the chambers of commerce and industry.
5. Provide information on existing directories, international regulations, international institutions that govern international trade could be of extreme importance and usefulness to entrepreneurs and government officials involved in all aspects of trade and business transactions. Expertise in, and information on, these matters is generally limited in most developing countries. The promotion of specialized professional organizations (legal, financial, technical, trading) in these areas should have important impact on the selection of products and services for import and export.
6. Expand opportunities for training in international business operations: such training to

include understanding the operations of MNE, the working and operations of GATT particularly in trade of services, FIDIC and all other institutions when relevant.

(viii) Recommendations Concerning the Undertaking of Systematic Reviews and Evaluation of Implemented Programmes

The development of a range of activities of the scope and complexity envisaged in this Report requires regular and systematic evaluation of the effectiveness of the methods adopted, the undertaking of comparative studies of the performance of policies concerning IRS in different countries, the assessment of the effectiveness of adopted incentives and disincentives. It is recommended that a substantial programme undertaken by a variety of official and independent organizations carry out this recommended annual evaluation.

2. UNIDO's contribution to the development of IRS capabilities

To translate these recommendations into national programmes and identify the corresponding technical assistance requirements, UNIDO has initiated the following activities:

The sub-regional workshop, organized by UNIDO in the framework of its IDDA programme, has outlined the components of comprehensive medium term programmes for the development of national project execution and consulting capabilities for the countries of the Maghreb (Rabat, 20-21 December 1993). It has benefitted from the active participation of representatives of Ministries of Industry of the Maghreb countries, national federations of Consultants/Engineers, the Federation of African Consultants (FEAC), The African branch of the Federation of Consultants of Islamic Countries (FCIC) and the International federation of Consulting Engineers (FIDIC).

These programmes, that requires the concerted efforts of numerous institutions and firms over an extended period of time, addresses the following issues:

- Establishment of a National Policy for Science and Technology, supported by an adequate level of public resources. The experience of the NICs such as South Korea, or Brazil which even created a bank dedicated to financing technological development (FINEP) showed that with adequate policies, the private sector ends up sharing a sizeable par. of R&D and national technological development.

- Establishment of an institutional framework and a coordination system to articulate activities of the identified key institutions and actors and to implement of a National Policy for Science and Technology; (see box). The key actors identified in the process are:

The "producers" of Science and Technology inputs: i.e. National and Scientific infrastructure including Universities, Research Centers, R&D units, and the Scientific Community;

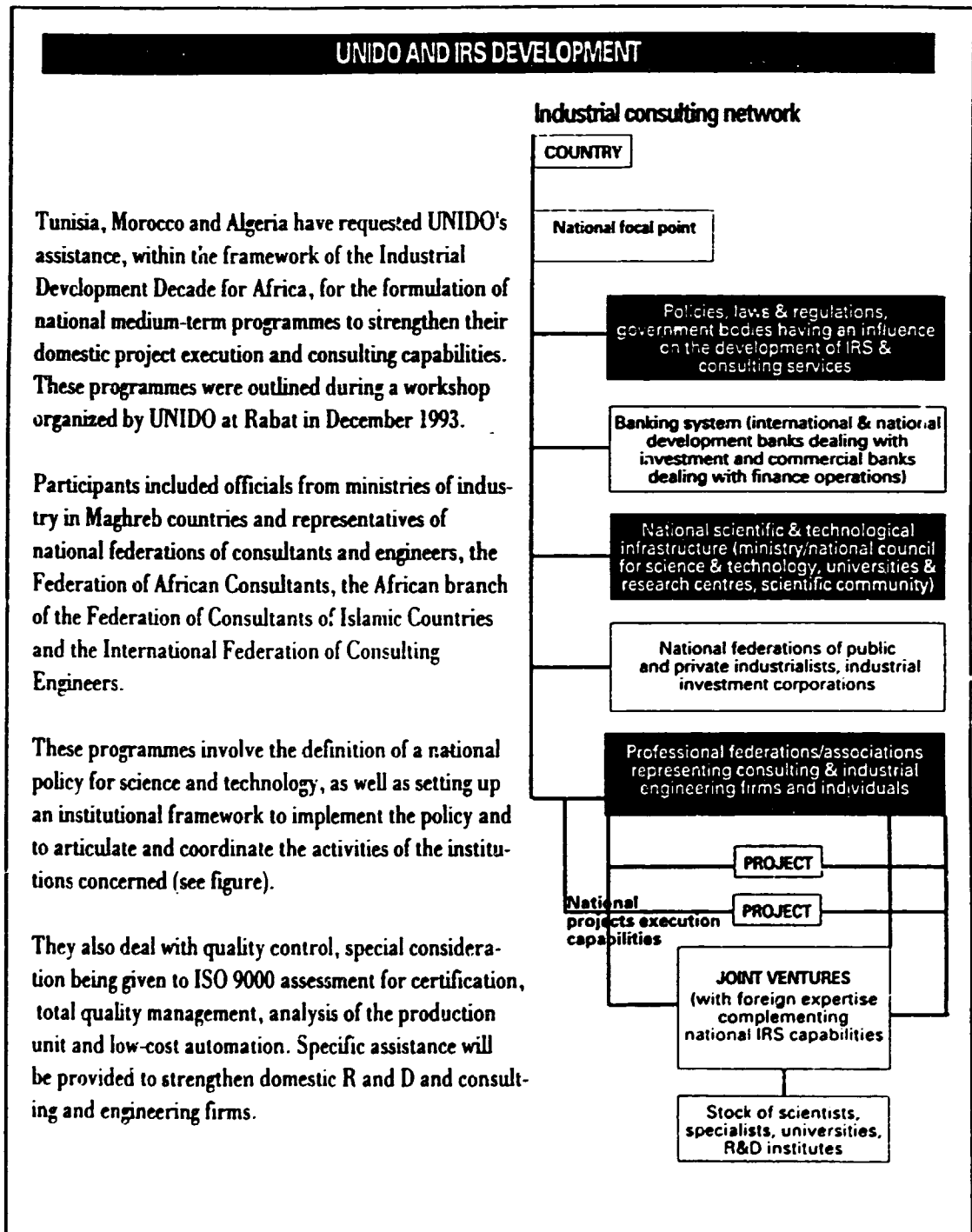
The "end-users" of Science and Technology inputs: i.e. the industrial sectors, the Secretariat of Industry, the Chamber of Commerce and Industry and its specialized Committees, or any other relevant national institution;

The Consulting and Engineering firms which act as a bridge between "producers" and "end-users" of science and technology, through their professional federations/associations that require a more focused representation

The Banking System, particularly Finance development institutions as the main users of consulting/engineering services for investment.

The programme being developed deals also with production process and covers subjects related to product design and quality control development. Special consideration is given to ISO 9000 assessment for certification, implementation of total quality management, low cost automation and strategic management.

Other components of the programme are aimed at providing specific assistance to domestic R&D and consulting/engineering firms in terms of training and expertise to complement local R&D and consulting firms during project execution capabilities.



The mobilization of international cooperation towards IRS and Consulting capabilities development

Finance Development Institutions, as the main users of Consulting and Engineering firms for investment projects play a central role in IRS and consulting capabilities development. African Development Bank, like the World Bank and other regional and sub-regional development banks, attaches a particular attention to the participation of domestic consulting firms in the execution of projects. This principle is strongly expressed in the "Guidelines - Use of Consultants by World Bank Borrowers and by the World Bank as an Executing Agency", p.5, paragraph 1.11, 1.12 and 1.13. In particular, paragraph 1.11 states:

"It is the Bank's policy to encourage and foster the development of domestic consulting firms. The Bank encourages borrowers to employ domestic consulting firms in connection with Bank-financed projects where such firms are qualified to perform the work either alone or in combination with foreign firms."

The Regional Development Banks such as the African, Asian and Inter American Development Banks follow the same principles and have translated this objectives into their guidelines.

The AfDB (and the Islamic Development Bank) went even a step further, and initiated the establishment of a Federation of African Consultants and a Federation of Consultants of Islamic Countries, to which the Banks provides various forms of assistance (financial contribution to the budget of the Federation, office space, and a full time AfDB staff member to manage the Federation). However, to enhance domestic capabilities in IRS requires a more systematic and long-term assistance at the national and regional levels. Stronger cooperation between UNIDO and the AfDB (and other development banks), could bring a definite advantage to this end.

In this context, the establishment of an African Network for the Development of Industrial Consulting has been recommended by the first Consultation organized by UNIDO. It would facilitate the formulation of national programmes for the enhancement of industrial consulting/engineering services, support the creation and/or the reinforcement of national federations of industrial Consulting, and assist in the mobilization of resources for the implementation of these programmes.

Such regional networks could also be considered for other regions.

The establishment of this Network should associate existing institutions such as the Federation of African Consultants, the Association of African Financing Institutions, Governments representatives, National and Regional Federations and Unido.

In adopting the assistance to industry related and consulting services development in developing countries as a new line of activity, UNIDO will contribute to develop "National Execution" capabilities, which is a major objective of the United Nations system, the World Bank and the Regional Development Banks.

The approach outlined in this report is not only limited to production of manufactured goods; it aims at taking into account the linkages between production of industrial goods and services and is in line with the new patterns shaping up the world industry

It is also in line with the objectives of major international organisations, particularly GATT, UNCTAD and WTO who extended their mandate to cover trade of goods and services.

But before trading these services, they have to be produced, and their generation in developing countries, particularly industry related services has proven to be difficult and in need of a strong assistance particularly during the preliminary stages of their development.

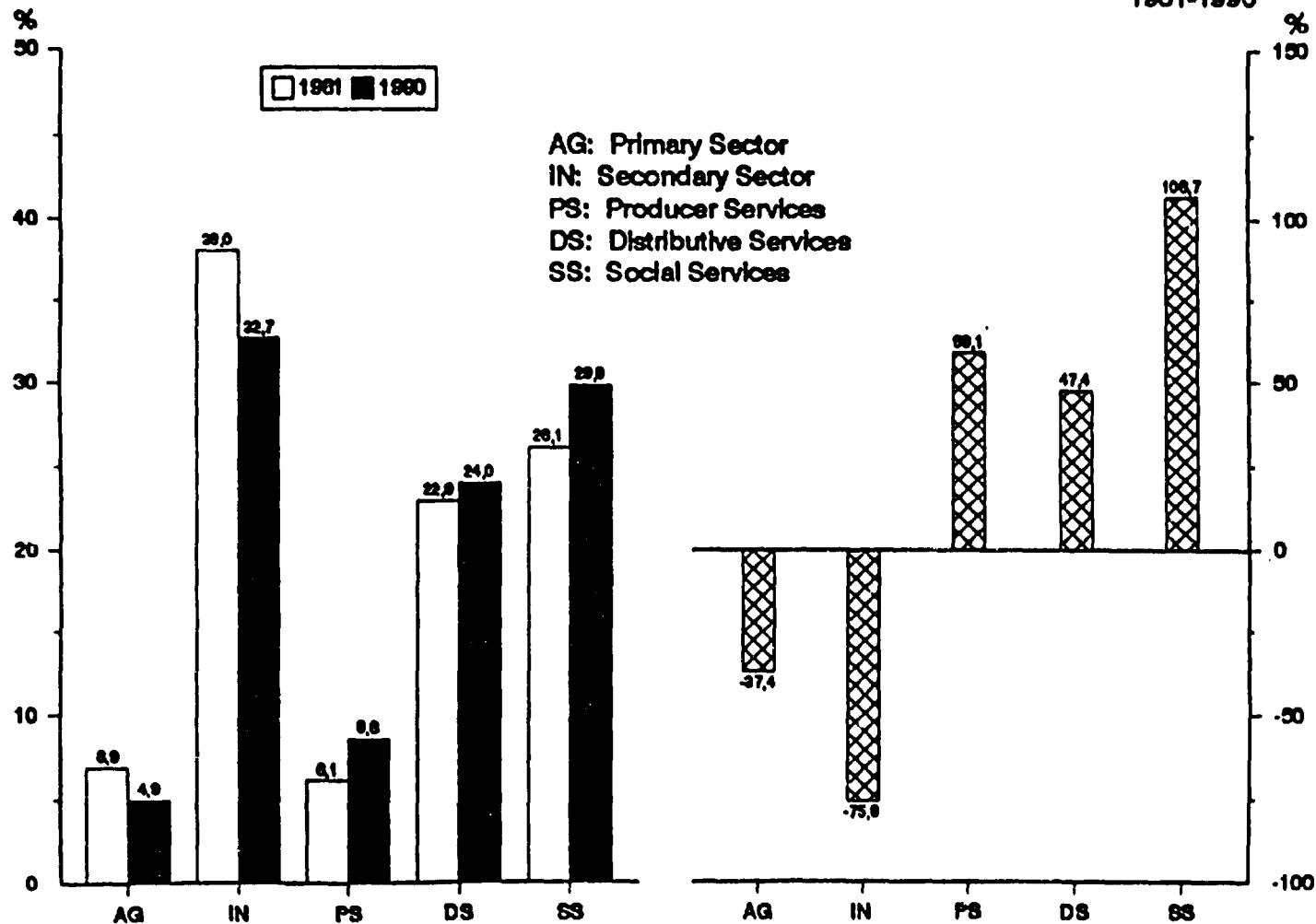
A participant to the First Consultation on Consulting/Engineering services organized by UNIDO (Vienna, 4-7 July 1995) has stressed that "it is no exaggeration to say that the services' agreement (of GATT) could open trillions of dollars of business to international competition under comprehensive multilateral rules involving the participation of some 120 member countries, with more to follow" - (see information paper no. 1 - 25 June 1995 - First consultation) In European countries, where the process of industrial restructuring is still underway, manufacturing (secondary sector) and business and professional services (tertiary sector) amounted in 1990 to 41.4% of value added, 32.5% of investment, and 39.3% of employment .

These trends which are shaping up a completely different distribution between value added, investment and employment distribution between traditional sectors cannot be ignored when designing scenarios, approaches to industrial development beyond horizon 2000.

CHART II.A: CHANGES IN EMPLOYMENT DURING THE 1981-1990 DECADE IN SELECTED INDUSTRIAL COUNTRIES OF WESTERN EUROPE (*)

Percentage distribution of total employment

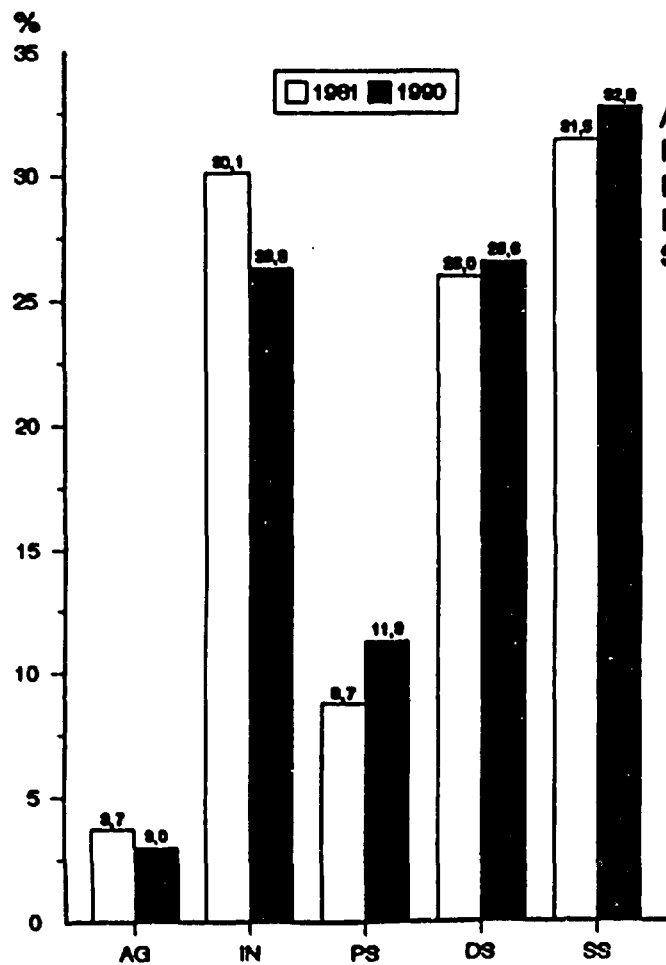
Percentage contribution to employment changes
1981-1990



(*) Belgium, France, Germany, Italy and United Kingdom

CHART II.B: CHANGES IN EMPLOYMENT DURING THE 1981-1990 DECADE IN CANADA AND THE UNITED STATES OF AMERICA

Percentage distribution of total employment



Percentage contribution to employment changes 1981-1990

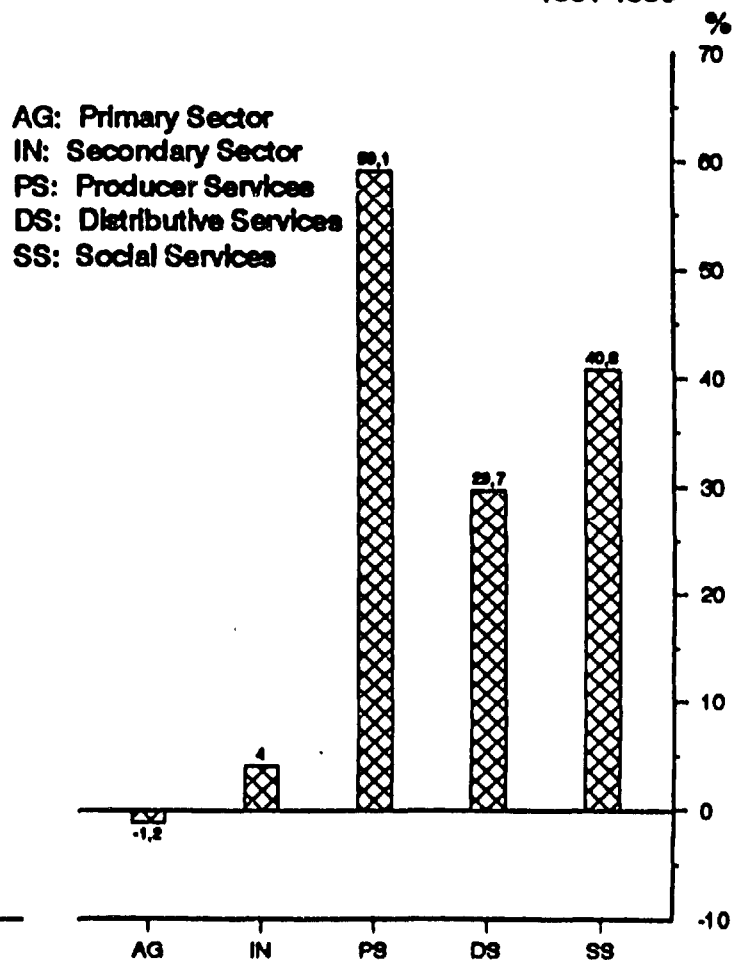
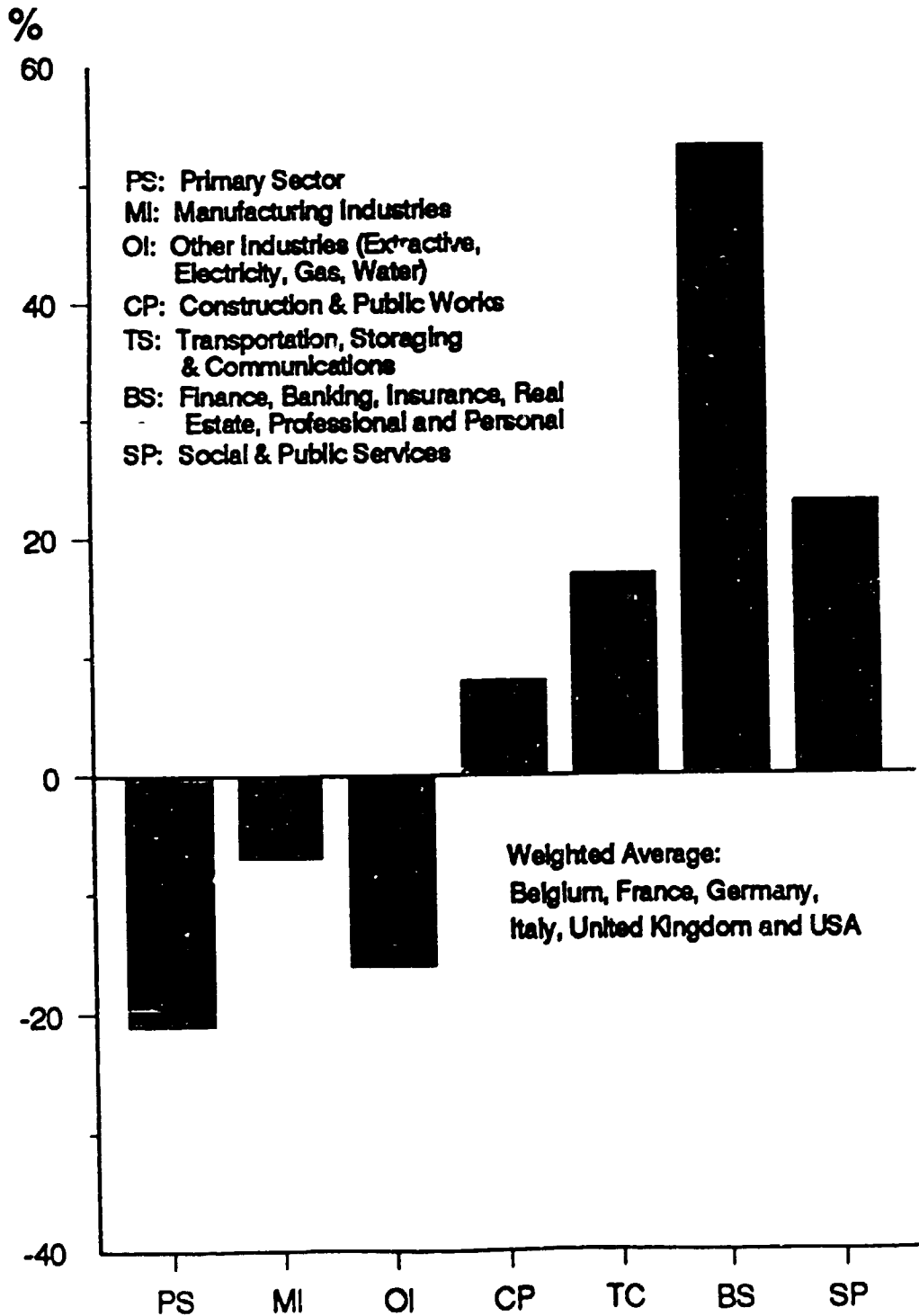


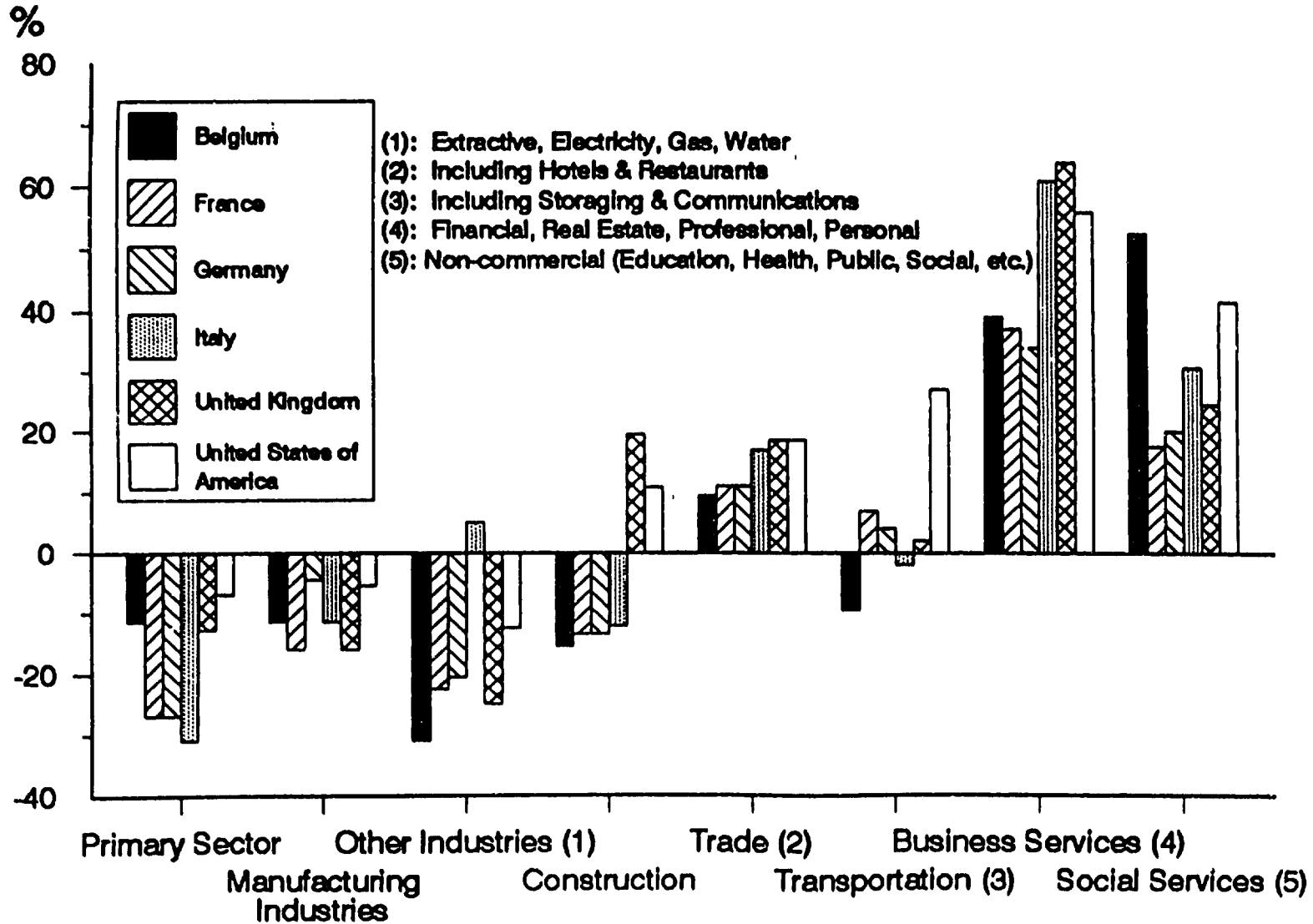
Diagramme 2C

CHANGES IN EMPLOYMENT DURING THE 1981-1990 DECADE IN THE MAIN INDUSTRIAL COUNTRIES



CHANGES IN SECTORAL EMPLOYMENT DURING THE 1981-1990 DECADE IN SELECTED INDUSTRIAL COUNTRIES

Diagramme 2D



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