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**United Nations Industrial
Development Organization**

**DEVELOPMENT OF ENGINEERING DESIGN AND CONSULTANCY
SERVICES IN THE MAGHREB UNION COUNTRIES**

INTERIM REPORT

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FINDINGS AND RECOMMENDATIONS

**DEVELOPMENT OF ENGINEERING DESIGN AND CONSULTANCY
SERVICES IN THE MAGHREB UNION COUNTRIES**

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I. INTRODUCTION

1. Terms of Reference

The purpose of the present report is to examine the current state and development prospects of the demand/supply in industrial engineering design and consultancy services (EDC) in the five countries of the Maghreb Union. The ultimate objective of the present report is to provide to both, the UNIDO and the national authorities, a factual and conceptual basis for the inception, planning and implementation of long term plans and programmes for the development of these services, including UNIDO's potential Technical Assistance to these countries for the development of their industrial engineering design and consultancy services.

2. Definition of the Industrial Engineering Design and Consultancy Services

Industrial engineering design services are the ones provided by engineers (Architects, Civil, Mechanical, Electrical, etc.) in the preparation of studies, plans, designs and drawings needed for the construction and operation of plants and infrastructures serving industries in the broad sense, i.e. activities dealing with the production and distribution of goods and services satisfying human needs. Consulting services are the ones needed by the same activities and for the same purposes which require, in addition to the services of engineers, experts with education, experience and specialization in other related fields such as economics, finance, taxation, marketing, etc. A more detailed list and classification of these services is presented below in Part II.1 as well as in APPENDIX A.

3. Scope and Objectives of the present paper

The main objectives of the present paper are :

- a. to illustrate the crucial and increasing role which industrial support services play not only in industrial development but also in the overall socio-economic development.
- b. to examine the role and position of the industrial engineering design and consultancy services within the the sector of the industrial support services as well as their contribution to industrialization and economic development.
- c. to analyse and evaluate the current state of development of these services in the Maghreb Union countries.

d. to analyse and evaluate the development prospects of these services in the Maghreb countries by examining :

- Current Demand/Supply relations in these services
- Causes of quantitative and qualitative gaps between supply and demand in engineering services
- Development prospects and potential of these services
- Cost/benefit prospects and expectations from the development of these services under the dual perspective of an income and employment generation factor as well as a development factor which appears to be the most important one on the basis of the evidence provided in the following CHAPTERS II - IV.

4. Approach and Methodology

Technical Engineering and Consultancy Services, as any economic activity, are generating employment and income and as such they are deserving special attention and mainly during the current period of persistent and recurring world-wide economic recessions and unemployment upsurges.

The analysis of the income and employment contributions of these services on the basis of past and current records discloses, however, a small part only of their potential contributions to the socio-economic development process. As it is illustrated in the next chapter, we have entered a new period of transition in which profound changes occur in the organization and functioning of the industrial sector in which industrial services play an increasingly important development role which can be fully and properly evaluated only if we take into consideration these changes and their far reaching implications.

In view of these perspectives, the present paper has been focused on the following main subjects:

- a. The identification of the general trends in industrial organization with special attention to the changing and increasing role of industrial services not only as an income and employment generation factor but also as a development one.
- b. The current development level of these services in the Maghreb countries and the prospects for their optimal development in view of the occurring and the forthcoming changes in the organization and functioning of the industrial sector.
- c. The expected contributions of the developed and upgraded industrial engineering and consulting services in the Maghreb countries to employment, income and socio-economic development.

- d. Measures needed in order these Services to be developed and upgraded to their optimal potential.

5. Organisation and structure of the Report

The present report is organized into the following six unities:

- An outline of the changes taking place in the structure of the current economic system leading to a re-allocation of tasks and functions between industries and services as well as their mutual relations, elevating the last ones to an important development factor (CHAPTER II).
- What these changes mean for the developing countries and mainly the importance of developing in time their industrial support services for keeping pace with current and forthcoming development trends (CHAPTER III).
- The role of the Engineering Design and Consultancy Services within the complex of the Industrial Support Services and mainly their catalytic contribution in initiating and accelerating the development of the last ones (CHAPTER IV).
- An evaluation of the current state and the development prospects of the Engineering Design and Consultancy Services in the Maghreb Union countries as a development, income and employment generation factor (CHAPTERS V and VI).
- Proposals and recommendations for preparing a development programme for the Engineering Design and Consultancy Services in the Maghreb Union countries as a first step towards the development of a full fledged sector of industrial support services for balanced industrial development as well as more employment and income generation opportunities (CHAPTER VII).

II. THE ROLE OF INDUSTRIAL SUPPORT SERVICES IN THE DEVELOPMENT PROCESS

1. Interrelations between industry and services

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

Demands for services arise not only at the last consumer's level but also at the intermediary ones, i.e. the level of the producer and the distributor as well of goods and services, spreading over the entire production and distribution process. Industries in the broad sense, i.e. all economic activities dealing with the production and distribution of goods and services satisfying human needs, are requiring and employing a great range and variety of services. It has been estimated that 75% of the value added created in manufacturing derive from services to production (1).

Although the basic distinction between goods and services appears clear, a generally acceptable definition of and classification scheme for services are missing causing often confusion in drawing demarcation lines and in classifying fringe cases as well as in defining categories and cases of services.

The absence of a generally acceptable definition and classification scheme for services is aggravated by the absence of detailed information in the current statistical series which, by and large, group services into very broad categories, including often heterogeneous activities such as educational services, medical and health services, legal services, religious organizations, welfare institutions, business services, motion picture production, distribution and projection, domestic services, restaurants, hotels, laundry services, etc., all together placed usually under one generic class: "other services". Besides the fact that values referred to such broad categories are meaningless for analysis and evaluation purposes, they can not be used also for measuring and evaluating critical linkages between industry and services and more generally between Services and the remaining economic activities.

¹ Pauli, Gunter, Double-Digit Growth, ESIF 3 (Berlaar, Belgium, Pauli Publishing, 1991) p. 23

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 Industrial engineering design and consultancy services (EDC) are classified in the category of professional services. The NACE code (General Industrial Classification of Economic Activities within the European Communities), harmonized with the U.N. I.S.I.C. code at two-digit level, places also, as it is indicated in TABLE II.2, these services under the general category of "Professional Business Services" and the sub-category "Technical Services".

The wide range and great variety of Services employed by industries can be classified into the following four broad categories:

- a. Up stream including all services needed before the commencement 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 overlaying the production managerial, logistic and administrative support operations.
- d. Down stream including all services needed after the end of the production process.

TABLE II.3 enlists the main industrial support services indicating also their character (Technical, Professional and Producer) as well as the phase in the production and the distribution cycle in which these services are usually employed. As technical services are classified the ones performed primarily by engineers (architects, civil, mechanical, electric, etc. assisted by lower technical staff such as draftsmen, surveyors, etc.). As professional services are classified the ones performed primarily by professionals having education, specialization and experience in a given field such as economics, law, taxation, marketing, management, E.D.P., etc. As producer services are classified all the producer services enlisted in TABLE II.1 except the professional ones. A more detailed list of Services used by industries is presented in APPENDIX A.

2. The changing role of Services in industrial and economic development

Since the industrial revolution economic development has been considered synonymous to industrialization. It has been seen as a unique, one way, process of shifting human and material resources from the primary to the secondary sector and mainly to manufacturing. The faster the growth of manu-

T A B L E II.1 : A BROAD CLASSIFICATION SCHEME FOR SERVICES (1)

1. MARKETED SERVICES

(a) Producer Services

- (i) Finance, banking, credit, insurance, real estate
- (ii) Professional Services : Engineering, Architectural, Legal and similar ones.
- (iii) Other Services : Cleaning, Maintenance, Security

(b) Distributive Services

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

(c) Personnel Services

- (i) Domestic Services: Laundry, Barbershops, etc.
- (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

(1) Introduced by :

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

TABLE II.2 : SERVICES CLASSIFICATION WITHIN THE NACE CODE SYSTEM(*)

Class	Group	Sub-group	A c t i v i t i e s
			P R I M A R Y S E C T O R
01-05			Agriculture, Forestry, Fishing
			S E C O N D A R Y S E C T O R
11-15			Extractive Industries
21-49			Manufacturing Industries
16-17			Electricity, Gas, Water
50			Building and Civil Engineering
			T E R T I A R Y S E C T O R
61			Wholesale Distribution
62			Scrap and Waste materials
63			Commercial & Trade Agents
64-65			Retail Distribution
66			Hotels and Catering
67			Repairs of Consumer goods and vehicles.
71-76			Transport
77			Travel Agents, Freight brokers and other agents facilitating the transport of passengers or goods; Storage and Warehousing
79			Communication
81-82	790		Express Services
83			Banking, Financial and Insurance Services
			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	Constuction Economists
		c	Architects
	838		Advertising
	839		Other Business Services
	839.1		Market Research and Management Consultancy
		a	Market Research
		b	General Mangement
		c	Recruitment
		d	Professional Training
	839.2		Computer Services and Office Machine Services
	839.3		Security Services
	839.3.2		Temporary Work Services
84			Renting, Leasing and Hiring of Movable
91			Public Administration
92			Sanitary Services
	921		Industrial Cleaning Services
	922		Maintenance and Repair Services
94			Research and Development
97			Recreational and Cultural Services
98			Personal Services
99			Domestic Services

(*) General Industrial Classification of Economic Activities within the European Communities.

T A B L E II.3 : INDUSTRIAL SUPPORT SERVICES

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

facturing industries and the higher their contribution to employment and to GDP formation in a given country, the bigger its success in the economic development race.

Under this view of industry as the "development locomotive" of the economy, agriculture and services have been seen as playing a secondary role in providing mere the necessary inputs and support operations to the protagonists in the development race.

The above concept, supported by empirical evidence and illustrious examples of successful industrializations, became so unquestionable and axiomatic that certain important changes which occurred in the meantime in the structure and functioning of the industrial sector as well as the overall economic development process passed rather unnoticed or, at least, they have not received the attention they were deserving.

In all industrial countries, as it is indicated in TABLE II.4, in spite of a continuous industrial expansion, industrial employment in manufacturing industries reached the level of saturation around the 35-37% on total employment while their contribution to the formation of GDP rarely passed the ceiling of 38-40%. Both, industrial employment and value added, after a period of stagnation, begun recording a continuous relative decline their lost ground being taken over by the rapid expansion of services. Yet, this phenomenon has been explained as a consequence of success. After the satisfaction, thanks to the industrialization, of all basic material needs, it had been believed that a new kind of society and economy were emerging, the so called post-industrial ones, characterized by high levels of prosperity and consumption and mainly of non-material products (services). Shadowed under the rhetorics on the merits of the post-industrial societies, certain profound changes which had occurred gradually in the structure and functioning of industries had remained either unnoticed or their true meaning and implications were not properly understood.

The wonder of the post industrial societies begun to be questioned when their economies commenced experiencing stagnation, recurring recessions, growing and persistent unemployment while poverty surveys had disclosed shocking percentages of people in the most rich countries of the world facing absolute poverty, i.e. deprived of the most essential means of living ensuring a minimum subsistence level. Recourse also to old remedies such as industrial investments for employment generation not only did not produce the results expected for sure but even contrary and paradoxical ones. Increased industrial investments led to increased unemployment in manufacturing as in most of the cases these investments have been used for rationalization and automation reducing instead of generating employment. As it is illustrated in TABLE II.6 (p. 31) the countries of the European Communities had invested in industries during the 1980-

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 G D P

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)

89 decade 1.269 billions dollars at 1985 prices succeeding finally in decreasing industrial employment from 46 to 38 million people, i.e. creating 8 million unemployed!

The above problems and experiences and mainly the persistent long-term unemployment led to a re-examination of the role of services as an employment generation factor.

Studies on the employment generation capacities of the tertiary sector were originally embarked with the assumption that this sector, being more or less domestically oriented, not facing a tough competition similar to the one of manufacturing industries and being less mechanized and automated, could present wider and more flexible margins of employment absorption which were worthwhile to be explored in a period in which long duration unemployment remains the most painful problem in many countries.

The re-examination of the employment generation capacities of the tertiary sector disclosed, as it is illustrated in TABLE II.5 and in CHARTS II.A - II.D, that it is the only sector which can generate today employment. This discovery shows, however, the tip only of the iceberg.

Studies on employment in the tertiary sector confirmed the original assumptions on its employment generation capacities but, in addition, led also to important revelations on the profound changes taking place in the organization and structure of the industries as well as in the whole economic system which are the real and very cause of the employment generation capacity of the tertiary sector and mainly in business, professional and producer services.

Taking into account that these profound changes have not been fully analysed as yet or they have remained either unnoticed or their far reaching consequences have not been fully sized up, we feel necessary to outline them briefly below as the development of the engineering and consulting capacities in the Maghreb countries, as in any country, to be placed under their proper perspective.

3. 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 the forthcoming new era marked by the advance of microelectronics, automation and informatics which is generally considered as a new, the third, industrial revolution.

In all these discussions about the undergoing or the forthcoming new industrial revolution emphasis has been given to the technological dimension of these changes while the so-

TABLE II.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	150,486	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	26.0	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)

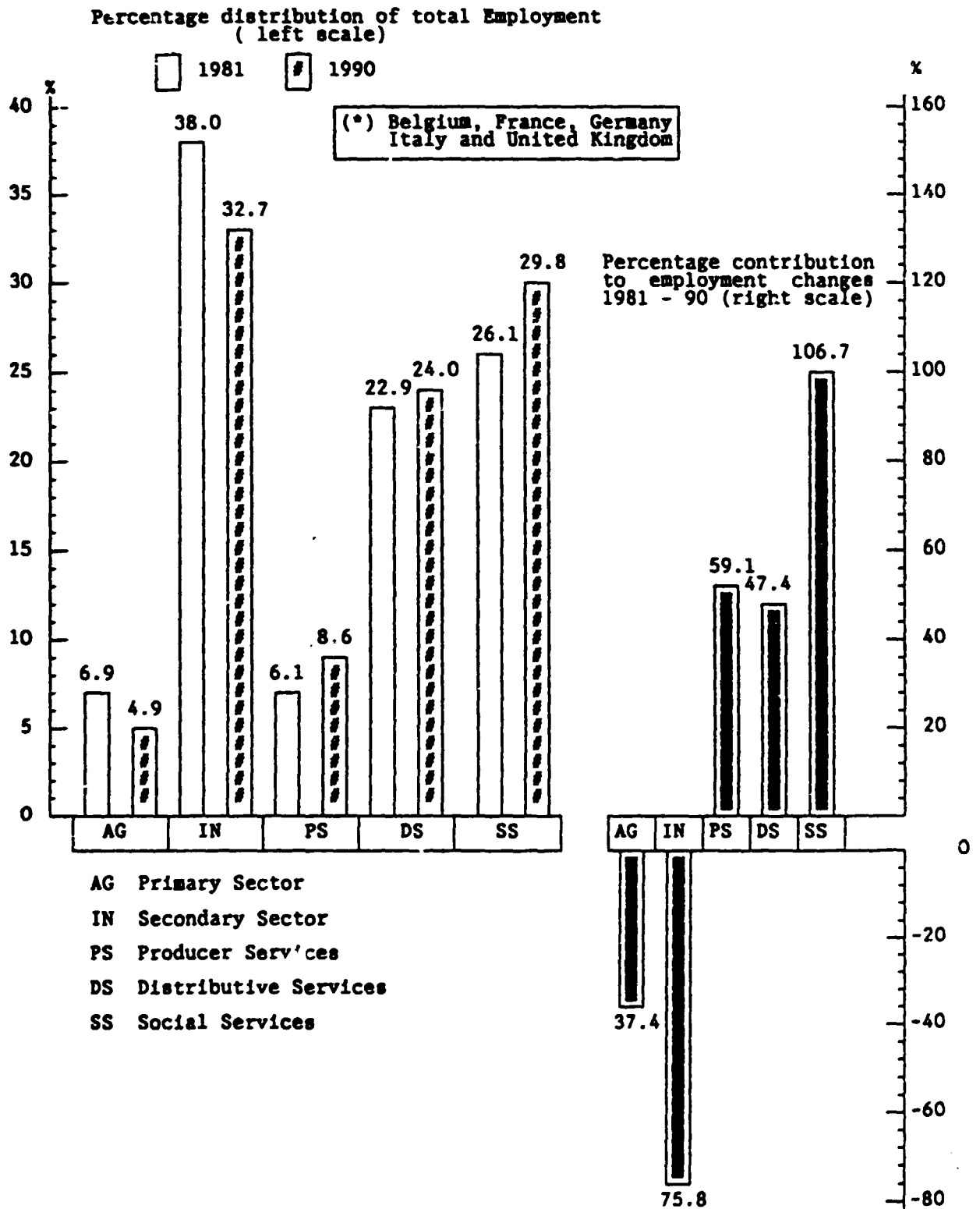
(3) NIC of Asia (S.Korea, Hong Kong, Singapore)

(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.

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



**C H A R T II.B : CHANGES IN EMPLOYMENT DURING THE 1981-1990 DECADE
IN CANADA AND THE UNITED STATES OF AMERICA**

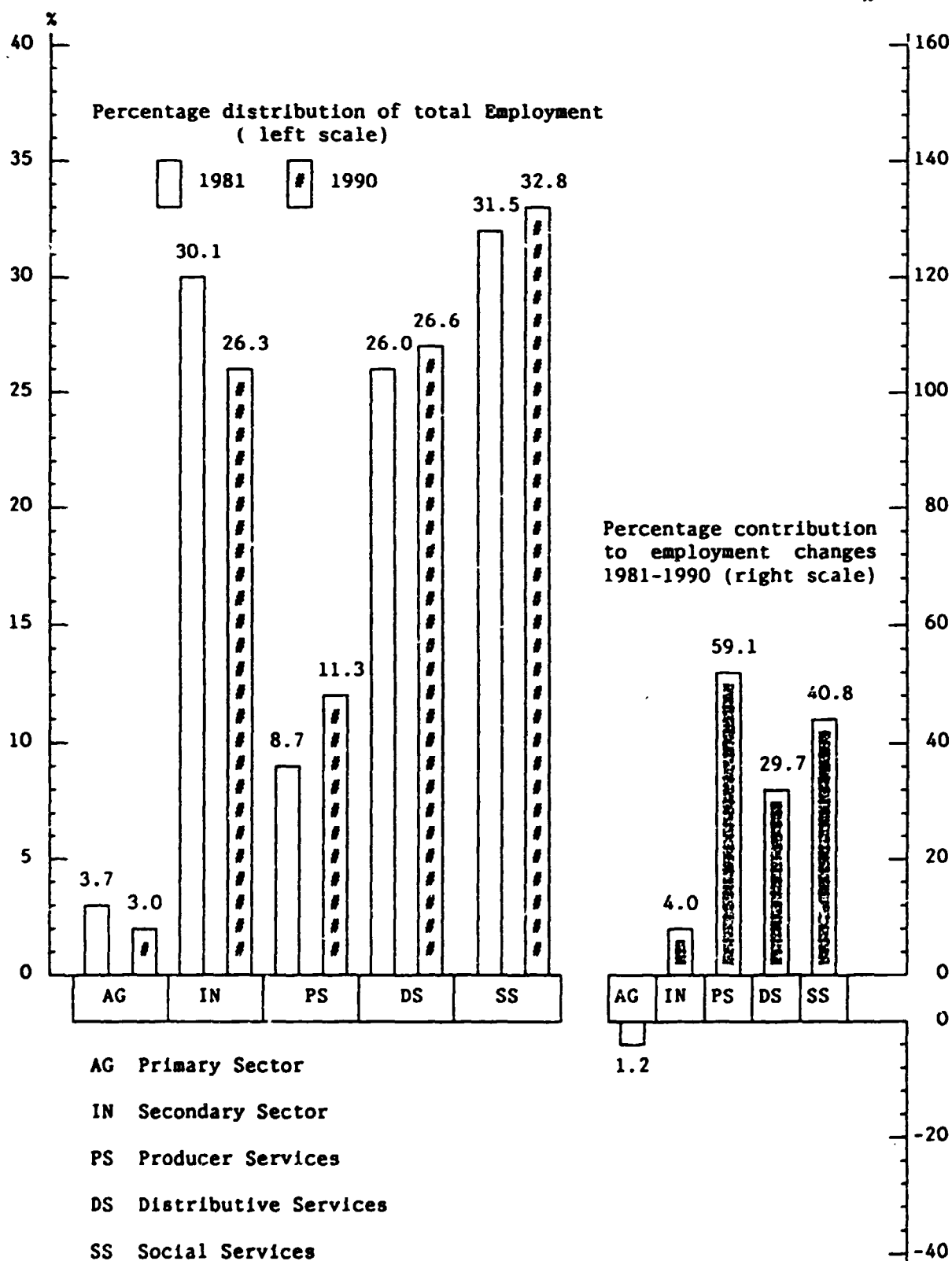


CHART II.C : CHANGES IN EMPLOYMENT DURING THE 1981-1990 DECADE
IN THE MAIN INDUSTRIAL COUNTRIES

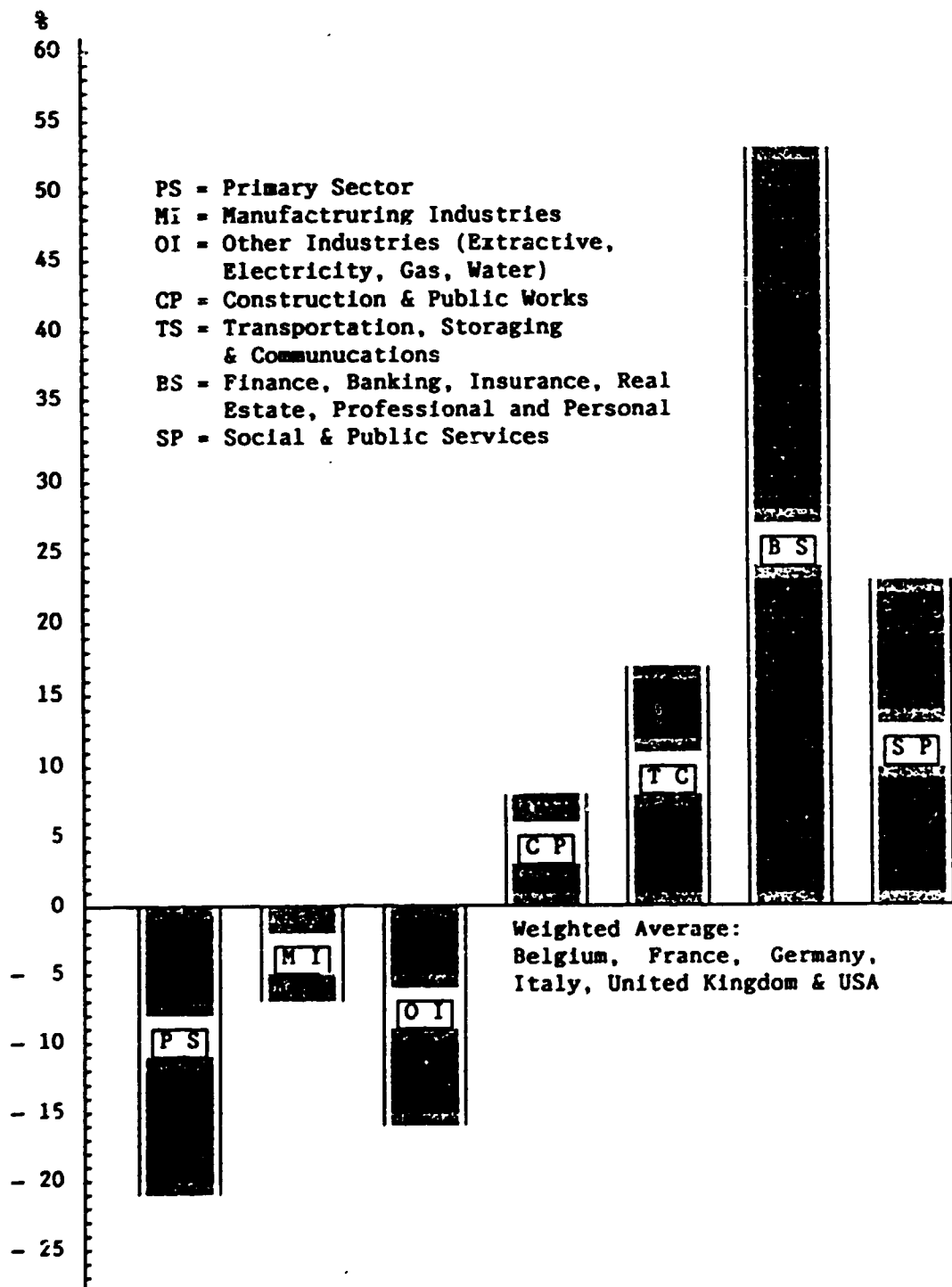
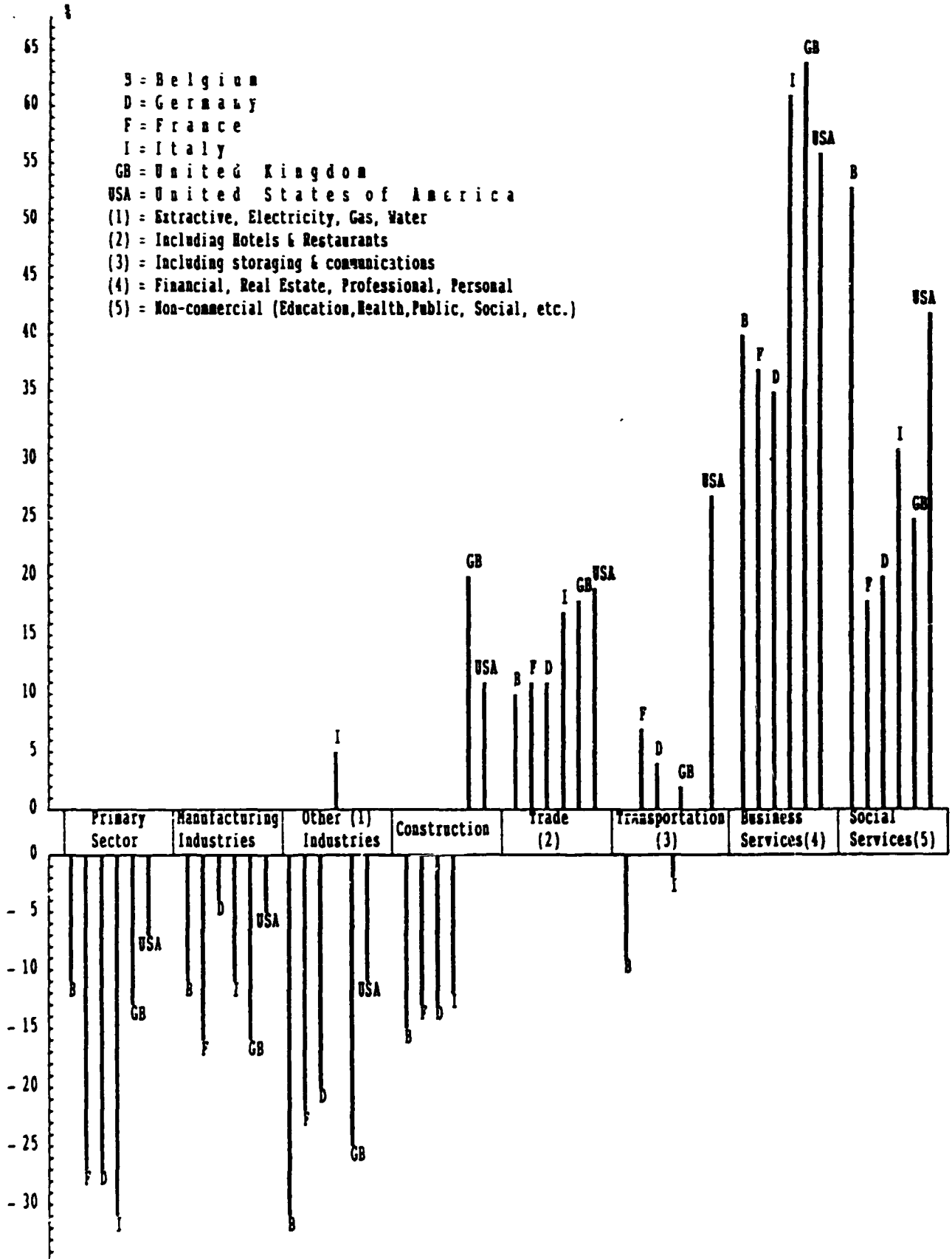


CHART II.D : CHANGES IN SECTORAL EMPLOYMENT DURING THE 1981-1990 DECADE IN SELECTED INDUSTRIAL COUNTRIES



cial and organizational dimensions preceding or associated with these technological changes are rather ignored or grossly underestimated.

The first industrial revolution had been stimulated by a long series of technological innovations which, however, are not enough to explain alone why that industrial revolution took place in England as early as after 1760, in the United States and Germany a century later and in other today industrial countries two centuries after although the same technologies were known to all at the same time. The same can be said regarding the second industrial revolution. Although England had been the champion in the first industrial revolution, United States took the leading role in the second one associated with advanced technologies and the assembly line. The factors which have conditioned these differential paces in industrialization should be sought in the different social conditions and organizational patterns and infrastructures through which technological innovations became instrumental in the socio-economic changes associated with.

It is beyond the terms of reference of this paper to enter the discussion of the above subject but we have mentioned it in order to underline that the technological dimension is not enough for assessing and evaluating the impact of technological changes and innovations upon industrialization and more generally economic development and that the social and organisational dimensions play an equally important if not a more important role in making technology instrumental to development. Without the big markets, the influx of young non qualified immigrants as a primary labour force, the corporation as the basic organisational form and the stock exchange as the main capital supplier, all advanced technologies in the assembly line could not bring alone the spectacular results and the big change recorded in the USA and other industrial countries.

We felt necessary to bring the attention on the above factors as we have seen that torrents of ink are split over the issue on the forthcoming revolution of microelectronics and automation while scant attention is paid to certain profound changes occurring rather unnoticed in the organisation of industries and more generally in the cycle of the production and distribution of goods and services.

The most profound of these changes, outlined briefly in the sections which follow, are:

1. The functional expansion and circularization of the industrial process.
2. The internationalization of national economies, the convergence of technologies and the shift of the center of competition gravity.

3. The growing externalization of industrial activities and operations.
 4. The organizational and institutional segregation of the industrial from the service operations.
 5. The shifting importance from the industrial brand to the trade mark.
 6. The sectoral desegregation of the cycle of production and the economic activities.
 7. The leading role of services in the development process.
4. The functional expansion and circularization of the industrial process

The factory gates (and the classical commercial terms "franco warehouse" and "ex-factory") begun gradually to coincide less and less with the actual terminals (beginning and end) of the industrial process. Under the combined effect of the complication of the high technology products, their service, maintenance and repair requirements, high financial costs and rapid pace of technological renewal and replacement, the user of many industrial products rarely buys "instantaneously" the body of a "nude" product. What he buys practically is a basket containing the physical product and all collateral services (guarantees, financing, repairs, maintenance, replacement options etc.). Who buys today an automobile or a computer if these services are not part of the transaction package?

Under these realities the responsibility of the manufacturer and consequently the manufacturing process are continuously expanding towards both ends. Down stream up to the consumer or user of the product and up stream beyond the procurement of the production inputs commencing from the conception, design and development of new products intended to replace the ones in current use. While this is true for many of the capital and durable goods, which represent an increasing part in the household expenditures, it becomes gradually true even for cheap, mass consumption products such as, for example, mineral water. The consumers of these products do not buy only their content but a mix of product and services (regular supply, standard quality, easy to open bottle or tin, containers return or recycling etc.). Under this reality even the term "last consumer" appears not to be the proper and precise one for many products and mainly the durable ones. In all these cases the term "current user" is, perhaps, more suitable.

Under the combined effect of the above factors the operational and organizational configurations of the manufacturing process are not only expanding up stream and down stream

but also, as it illustrated in CHART II.E, are re-shaped gradually from a linear with fixed ends process to an endless circular one.

5. The internationalization of national economies, the convergence of technologies and the shift of the center of competition gravity

It is well known and does not require any further explanation that the influence of external, international in character, factors upon national economies is increasing so rapidly that the identities and borders of national economies to become gradually and continuously more and more vague. To mention one only factor: Consumers credit being so important for the marketing of industrial products. To the original sources, the own capital and the home banking system, a long line of credit suppliers with multinational and international connections and ramifications have been added, including the "plastic money" makers.

The internationalization of national economies has narrowed the competition margins on technology options and configurations as well as of process variations. All industrial firms can and should have the most appropriate technology which is, in essence, only one: internationally competing technology. While this technological convergence narrows the industrial competition margins on one side, the "mix" of the industrial offer, containing the physical product (technology) and all collateral services not only widens the horizon of industrial competition, on the other side, but it is shifting simultaneously the center of competition gravity from the industrial to the services sector.

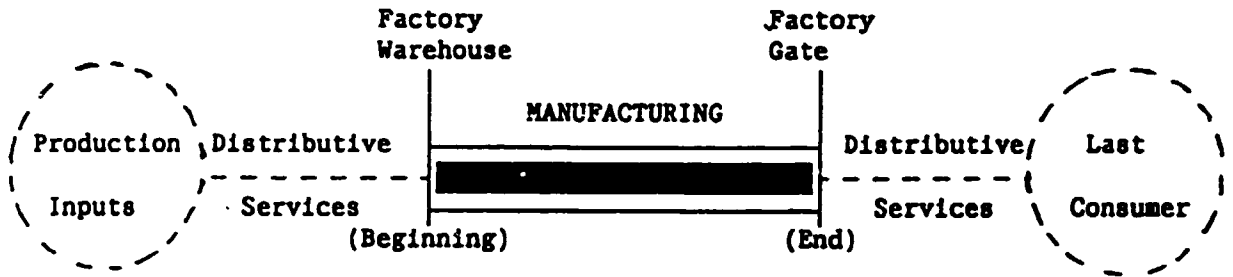
6. The "externalization" of industrial service activities and operations

The up stream and down stream expansion of the industrial process should be associated normally with increasing industrial operations, value added and employment. However, as it has been illustrated already in Tables II.4 and II.5 and in Charts II.A-II.D, industrial statistics indicate entirely opposite trends, i.e. a continuously accelerating reduction of the participation of the industrial sector in employment and GDP generation. This is due to the fact that parallel to the up stream and down stream expansion of the industrial interests other profound changes are taking also place in industrial organisation and management, the most important among them being the "externalization" of industrial activities and operations.

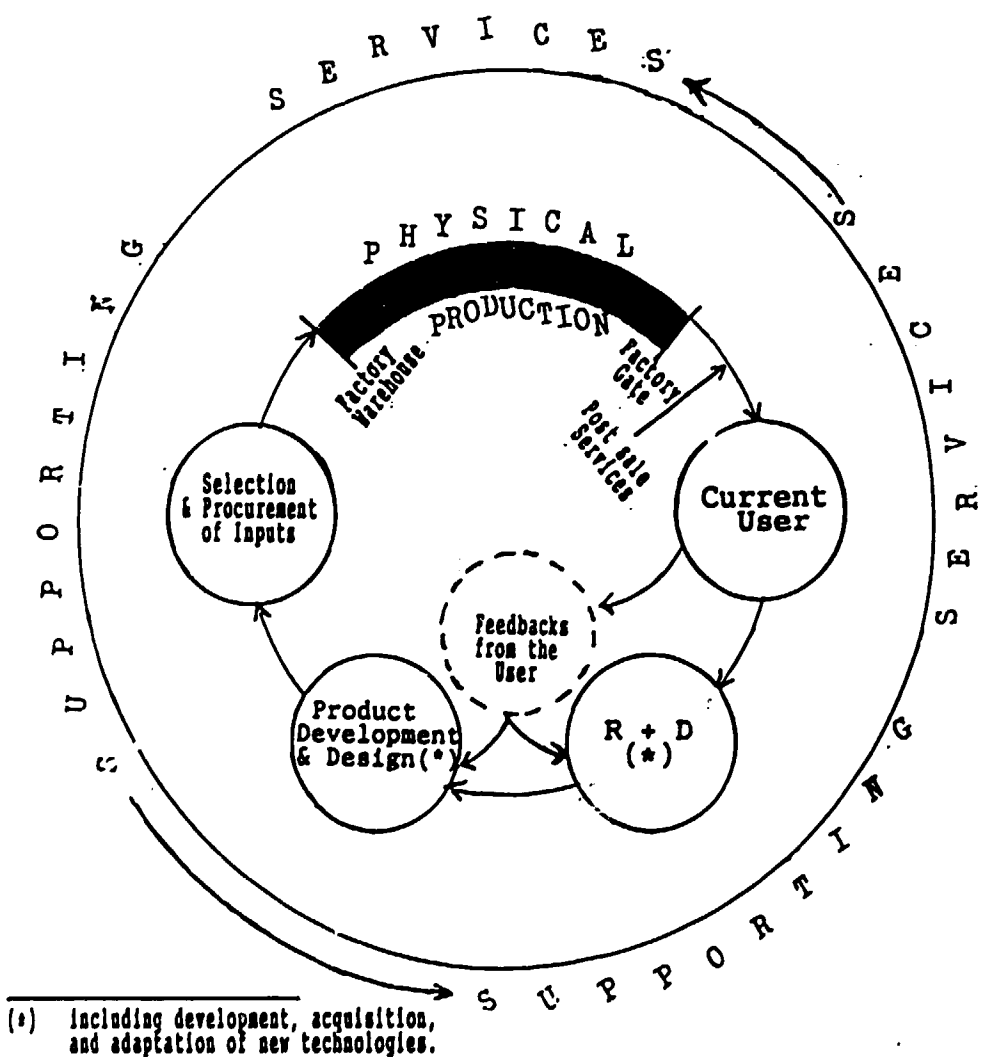
The main characteristic feature of industrial organization and management following the first industrial revolution has been the vertical integration under one roof, the industrial plant, of all operations required for the transformation of

CHART II.E : THE OLD AND THE NEW INDUSTRIAL SYSTEMS

A. The old system



B. The new system



raw materials and other production inputs to finished products. The above form of industrial concentration had been expanded and intensified by the second industrial revolution which led to the establishment of the industrial empires or agglomerations by the horizontal (functional and regional) expansion of the industrial integration (the holding and the transnational), both bringing the advantages of economies of scale and multiplication of the benefits of infra-industry linkages. Under the combined effect of technological advancements and new organizational and managerial patterns, the industrialization "miracle" of the today's developed countries had taken place.

The description and glorification of this "miracle" which became the prototype for industrialization and the effort invested for its transposition to a "tested and unquestionable" model (recipe) for the industrialisation of the developing countries has detracted our attention from other profound also changes occurred in industrial organisation and management parallel to the up stream and down stream expansion of their operations.

As it has been mentioned previously vertical and horizontal integration and industrial concentration were boosted by the advantages associated with the economies of scale and centralized direct, personal supervision. These advantages begun contradicting gradually with disadvantages arising from the requirements of specialization multiplied by problems and complications arising from the down stream and up stream expansion of industrial operations.

The services which modern industries are needing (see APPENDIX A) are so many, sophisticated, specialized, expensive and in many cases of discontinuous need as no industry can afford to maintain all of them "in-house" besides that it can not keep them updated in an era of rapid technological changes. As it has been mentioned previously (see p. 5) 75% of the value added created in manufacturing derives from services to production. Therefore, service inputs are the most critical factor in industrial success or failure. The recurring economic recessions of the last two decades which turn to problematic and money losers many reputable industries being during the buoyant years of the economic boom successful and profitable, led industrial managers to re-examine carefully their cost bills as well as their profit making and profit losing operations. This re-examination led to important changes in the structure and functioning of industries towards two directions:

1. Externalization of many services produced in-house by buying from or sub-contracting to outside service producers and concentration on core activities in which industries possessed the comparative advantages of experience and specialization.
2. Organizational and institutional segregation of the in-

dustrial and service operations.

Once industries begun using external services, they had begun appreciating many advantages associated with this "externalization", the most important being:

- a. Reduced costs, as they could profit from the competition of specialized service suppliers while not carrying charges for "idle time", a usual overhead of many in-house operations. In addition, these "externalizations" led to reductions in many direct and indirect overhead costs associated with the supervision of in-house service operations being outside the main sphere of organizational competence and specialization.
- b. Better quality services, as they could profit from the competition, the specialization and the technological updating of the competing in the open market service suppliers offering all together a far wider resources and technology basis than any, even the best developed and organized, in house-unit.
- c. More flexibility, in adjusting operational costs to the oscillations of demand and production which is not so easy with the costs of many in-house operations being more or less inflexible.
- d. More organizational efficiency, by placing certain in-house operations under conditions of an "open market competition", the merits and advantages of which proved to be superior of the conventional organizational and managerial supervisory devices.

Once the merits and advantages of "externalization" became evident, its "expansionary spiral" has been put in motion stimulated by three multipliers. The industries themselves looking to externalize as many as possible operations in order to profit from the comparative advantages of externalization mentioned above. The Service Suppliers looking for the expansion of their business by making "attractive" offers and proposals and being a de facto pressure group for the expansion of externalizations. The demonstration effect stimulating and inducing both industries and suppliers to look more carefully in capitalizing the apparent advantages of externalization.

7. The organizational and institutional segregation of the industrial from the service operations

The experience gained and the advantages of externalizations stimulated also the movement for the organizational and institutional segregation of the main, pure industrial operations from the supporting service ones.

The re-examination of the profit and loss factors have revealed as far as industrial services are concerned that:

1. Not all in-house services in all companies were performed in an inefficient or expensive way. Some companies had acquired knowledge and skills being able to produce in-house better quality services at lower costs than outside service producers, and
2. The critical factor in evaluating the efficiency and cost of in-house service producers is the absence of "open market competition" criteria. While the overall evaluation of success or failure of the industrial operations is easy and somehow "automatic" through the price mechanisms of the open market (share of the market, selling prices, price and profit margins), the evaluation of the efficiency and costs of the in-house service operations is not easy and objective due to the fact that these services enjoy a monopoly inside the organization through which their excessive costs and inefficient are hidden under the "general expenses" items.

The above observations and considerations led companies to make organizational reshufflings towards the following four main directions :

1. To separate organizationally and institutionally service operations from the pure industrial ones by establishing different and distinct service producer units.
2. To place all in-house service producers, being either integrated organizationally with the main industrial unit or operating as independent ones, under "open market" conditions competing with outside service producers for their survival. Service in-house operations which are not able to pass this competition test are externalized.
3. Service in-house producers proving that they can offer better quality services at lower prices than their outside competitors have been elevated to the status of independent, open market producers offering their services not only to the mother company but also to any other client in the market. This allows these service producers to expand their operations beyond the market potential of their mother company capitalizing on expanding markets and economies of scale improving further their competitive position, profitability and turnover. Caterpillar provides an example in this case. The company had developed a very successful spare parts distribution system being able to deliver world-wide and within 24 hours any of its 100.000 spare parts. In order to capitalize on the organizational setting and the experience acquired, it elevated this department into an independent spare parts distribution company, Caterpillar logistics, which provides distributive services not only to the mother company but many other manufacturers.

4. Taking into consideration that the contribution of services to the value added created in manufacturing is three times more than the contribution of industry's core activities (75% versus 25%) and that services are growing at rates three to four times faster than agriculture and industry combined, it is obvious that services are the "apple of discord" and the main battlefield of economic competition attracting the primary attention of investors including the ones looking for diversifications. As a result while industries are looking from one side to externalize as many as possible in-house service activities for the reasons explained previously, they look at the same time to diversify by investing or acquiring interests in promising service producers, competing successfully in the open market and mainly to the ones providing strategic inputs and technologies being important for their core industrial operations.

Putting together these apparently opposing each other movements, we can not say that industry is moving towards one only direction, i.e. externalization of services or diversification in services, but towards new forms and configurations in the relations between industry and services transcending, as it is explained in the next section, conventional demarcation and classification lines. The new configurations in the relations between industries and services, shaped under the combined effect of the trends mentioned above, do not shift merely labour from industry to services but they entail a new division of labour and functions between industrial firms and their service suppliers, helping both to specialize in their respective core activities without organizational ties bounding the opportunities of the one to the limits or chances of the other.

8. The shifting importance from the industrial brand to the trade mark.

The product brand has been and it will continue to be a very important element in the marketing of industrial products as it is offering to the consumer the guarantee of a "good product" made by a "well known" manufacturer. As the average client has neither the knowledge nor the technical means for checking the quality of a product in all its aspects, the reputation of the producer is considered as a sufficient guarantee substituting his inability in making objectively the best or at least an optimum choice.

The brand image has been associated originally with the quality and the technical characteristics of the physical product (performance, durability, safety, etc.) in relation to its price. As the "industrial offer" became gradually a more complicated one containing packages of physical products and collateral services (financing, guarantees, technical and operational support, availability of spare parts,

maintenance and repair facilities, replacement options, etc.) the "product image" has been expanded from the mere physical characteristics of the product to its "offering basket" containing the physical product and all the collateral services. At the same time the area of formation of the product image has been extended from the factory gate to the selling or use point which may be even the house or the office of the client.

This expansion has raised a series of technical, organizational and financial requirements which many industries either they were not able to face successfully, the required talents and resources being often beyond their capacities or prohibiting costs were threatening not only their success but even their survival. Searching for solutions many industries found it more feasible and convenient to concentrate their efforts on core activities, i.e. making only physical products and leaving to their distributors the task and responsibility to create under their trade mark the product image and to form the offer basket. Garments, dressing accessories, home appliances, electrical and electronic products, TV, even computers and a long line of industrial products are offered today in the market by department stores, chain stores, super markets and specialized distributors either under their own trade mark or under a disguised brand hiding the unknown producer. The critical factor in these cases is that the confidence of the consumer has been shifted from the product or industry image to the distributor's image who the consumer trusts that he makes the technical choice on his behalf and offers 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 appearing as the maker of industrial products under its own brand which organization, however, does not possess any industrial production facility subcontracting to real industries the manufacturing of its products which simply it markets and distributes providing also all the collateral services (credit, maintenance, repairs, operational support, etc.).

In all cases mentioned above the common characteristic is that the division of tasks and functions between industries and services (distributors) does not follow the classical demarcation line of producing industries and distributing services but transcending this line establishes new relations between industries and services. Many classical industrial functions such R&D, Product development and design, technical and performance norms, packing, presentation, etc. have been shifted from the producer to the distributor. The last one gathering feedbacks 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 develop-

ment departments as fashion, colours, sizes, materials used and technical specifications of the products they produce are determined by their distributors.

9. The sectoral desegregation of the cycle of production and economic activities.

Since the first industrial revolution economic theory and practice have accepted as self-explanatory and somehow axiomatic the tripartite division and classification of economic activities into Agriculture, Industry and Services with distinct and very clear definitions, borders and demarcation lines.

The upwards and downwards expansion of industrial operations coupled with increasing in number, volume and content externalizations and at the same time diversifications in services, all transcending conventional and historically established demarcation lines, raise the question to what extent the tripartite conceptual and statistical scheme for the classification of the economic activities corresponds any more to the very realities of economic life. Long time ago the distinction between industry and services had disappeared in the economic vernacular by calling industries all economic activities (Insurance industry, Real estate industry, Show business industry, etc.) satisfying human needs. The distinction also between material products (goods) and non-material ones (services) is in reality less clear and important as it appears in theory. As a matter of fact both satisfy human needs which rarely can be covered by purely material or non-material products as they require usually a package of goods and services mentioned already in a previous part. Beyond that needs which can be satisfied interchangeably by material or immaterial products are rather a rule than an exemption. The need to have some "small pleasure", a "little fun" or a small entertainment can be satisfied by eating, for example, an ice-cream (good), going to a movie theatre (service) or to a gym (service).

The trends examined in the previous pages have indicated that:

1. The tripartite distinction of economic activities is replaced gradually by a binary one: Producers-Consumers.
2. Producers, indiscriminately for goods or services, can be either specialized ones concentrated on core activities or diversified ones.
3. Diversifications move more and more towards the direction of segregating institutionally and organizationally services from industries at the plant's or office level while twinning them at the financial "cluster" or concern level contrary to the prevailing trends during the first two

thirds of this century when vertical and horizontal industrial integrations had been the prevailing trend.

The main causes behind these trends (specialization, segregation, twinning) is the search for balancing the advantages of economies of scale requiring increasing sizes and concentrations in the industrial establishments, coupled with increasing investments for accumulation and replacement of fixed assets, with the requirements of specialization which necessitate, on the contrary, split of original activities to many new, specialized ones, which means, in essence, the creation of smaller units. The balancing of these two opposite requirements is sought by the functional and organizational segregation of the core industrial activities from the supporting industrial services which is changing the role of services in the development process from an auxiliary to a main one of strategic importance. Besides the quantitative factor that 75% of the value added created in manufacturing derives from services, services had become gradually the main depository, developer, producer and distributor of development knowledge and technologies and in the last analysis the development "locomotive". In addition, industrial support services, being the "flexible" factor of production, become the most, if not the only, determinant of industrial and more generally economic competitiveness. While industrial technologies will tend to converge world-wide leaving little room for technological and process differentiations, allowing differentiations in market competitiveness on these grounds, services associated with the industrial production either as a part of the "product offer" (see pp. 19, 25-26) or as development and support activities will be the main and most crucial factor in determining industrial competitiveness and more generally success in industrialization and economic development.

10. Automation and the changing role of services

It is widely believed that externalization and more 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. This is not true as the externalization of many industrial operations as, for example, the procurement from or the subcontracting to "outsiders" of many parts and accessories in the automobile industries as well as in many other assembly line industries had begun long time before the applications and impact of microelectronics were felt in the market. Crucial also activities such as industrial design, R & D, quality control, management consultancy etc. had been established and flourished as independent and respectable "outsiders" long before the microelectronics revolution.

The main force behind the development of independent service units had been specialization which required concentration on narrow fields of targets, activities and operations necessitating, in turn, wider markets and clienteles for ensuring profitability of specialized units.

Microelectronics, CAM, automation and robotization may have accelerated the externalization process but they have not provoked it. On the contrary one can say, in the absence of relevant studies, that they have perhaps decelerated these trends as they were offering powerful tools for the effective management and control of in-house produced services. We feel necessary to clarify this before examining the impact of the microelectronics revolution upon the re-shaping and reshuffling of the industrial system as we consider this clarification important for the developing countries. Developing countries, misinterpreting externalization trends and more generally the leading role of the industrial support services in the development process as being associated with advanced stages of industrialization and automation, could fail to make in time the adjustments needed in their current industrial structures and operations for keeping pace with specialization and the development of services essential to the competitiveness of their industries and economies.

The first industrial revolution had replaced the manual tools by the machine helping the worker to produce with his hands and brain more and better products in a faster way.

The second industrial revolution associated with advanced technologies and the assembly line brought a new division of labour and functions. The machines in the assembly line were making all physical production operations under the guidance and control of their operators.

The third industrial revolution of microelectronics, information and communications made the machine operator useless and obsolete replacing him by a new kind of machine operator, the "modem", the "chip", the "CAM diskette". This change towards the "worker-less", automated industrial plant will bring obsolescence also to a series of overlaying managerial functions such as personnel management, workers selection, supervision, motivation etc.

While the industrial plant is emptied gradually at the shop-floor level from the human operators of machines as well as the collateral managerial functions, a new series of operators, professions and experts are required outside and paralleled to the shop-floor level for its efficient operation (analysts, programmers, system engineers, designers, etc.). Industries will continue to create jobs but indirectly in the services sector. Although these new jobs will be needed for the performance of the very old task of "ma-

chine running", they appear and are classified statistically as a non industrial labour force, located not in the industrial but in the services sector.

Conventional statistics, classifying in-house produced industrial services as industrial operations while the ones provided by outside suppliers as service activities, lead to paradoxes as the one illustrated in TABLE II.6 according to which the countries of the European Community invested in their industries, during the 1980/90 decade, 1209 billion US dollars (at 1985 prices and exchange rates) succeeding in reducing their industrial employment from 46 to 38 million people, i.e. in creating 8 million unemployed!! In reality, however, these investments, together with another 1.547 billion dollars invested directly in services, had increased GDP at constant prices by 25% and employment in services from 66,8 to 77,0 million, i.e. in creating 10,2 million new jobs, i.e. 2,2 million more than the losses in industrial employment.

11. The leading role of Services in industrialization and economic development

The industrial sector, undergoing profound structural and functional changes under the combined effect of the trends mentioned in the previous parts (specialization, externalization, organizational segregation of service activities from the core industrial ones, increasing dependence and reliance on external professional services for improving or maintaining its competitiveness, twinning with strategic services), is becoming gradually something entirely different from what has been known and used to be. The most salient features of this transformation are :

- a. The industrial plant is becoming gradually a "park" of "man-less" operating machines 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 lose gradually meaning, significance and purpose as the generalization and internationalization of industrial competition will lead to increasing convergence in technologies and industrial processes. All these do not mean that all industrial plants will be like that. It is a general trend with variations regarding forms, places and timing.
- b. The industrial sector is becoming less and less a distinct, self-contained and self-sufficient economic activity. It becomes gradually a part of a broader cluster of interdependent activities. It has to satisfy, on one side, the consumers of its products by offering sophisticated packages of industrial goods and services (see pp. 19, 25-26) and it is depending increasingly, on the other

T A B L E II.6 : EUROPEAN ECONOMIC COMMUNITY - PRODUCTION , INVESTMENTS AND EMPLOYMENT, 1980 - 1990

S E C T O R S	V A L U E A D D E D L (1985 prices and exchange rates)				I N V E S T M E N T S 1980 - 1990 (1985 prices and exchange rates)		E M P L O Y M E N T			
	1 9 8 0		1 9 9 0				1 9 8 0		1 9 9 0	
	Mill. \$	%	Mill. \$	%	Mill.	%	(1000)	%	(1000)	%
PRIMARY SECTOR	93,072	4.0	90,999	3.1	186,640	3.8	11,887	9.5	9,762	7.8
SECONDARY SECTOR	920,537	39.1	1,013,203	34.4	1,269,348	25.6	45,849	36.8	37,755	30.3
Fuel and Power	108,318	4.6	115,707	3.9	383,894	7.7	1,942	1.6	1,677	1.3
Manufacturing	647,946	27.5	724,513	24.6	795,071	16.0	34,112	27.4	27,896	22.4
Building and Construction	164,273	7.0	172,983	5.9	90,383	1.8	9,795	7.9	8,182	6.6
TERTIARY SECTOR	1,214,284	51.6	1,658,509	56.3	2,151,922	43.4	66,751	53.6	77,025	61.8
<u>Distributive Services</u>	432,061	18.3	544,843	18.5	757,707	15.3	20,630	16.6	21,967	17.6
Transport and Storage	99,976	4.2	123,915	4.2	272,404	5.5	1,211	1.0	1,283	1.0
Communications	45,652	1.9	59,613	2.0	161,974	3.3	932	.7	1,049	.8
Trade	286,433	12.7	361,315	12.3	323,329	6.5	18,487	14.9	19,635	15.8
<u>Producer Services</u>	456,819	19.4	723,212	24.6	789,593	15.9	23,812	19.1	29,626	23.8
Financial & Insurance	103,745	4.4	150,096	5.1	344,660	7.0	3,144	2.5	3,610	2.9
Professional and Business Services	301,518	12.8	495,664	16.8	371,694	7.5	16,459	13.2	21,052	16.9
Hotels & Catering	51,556	2.2	77,452	2.6	73,239	1.5	4,209	3.4	4,964	4.0
<u>Non Market Services</u>	325,404	13.8	390,454	13.3	604,622	12.2	22,309	17.9	25,432	20.4
owner occupied Dwellings	127,157	5.4	182,828	6.2	1,348,010	27.2				
E C O N O M Y	2,355,050	100.0	2,945,540	100.0	4,955,920	100.0	124,487	100.0	124,542	100.0

N o t e : The above data have been elaborated and adjusted from the 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)

- side, on outside professional services for keeping its competitive edge. Although the industrial sector is and it will remain a key development factor it can not perform any more this role alone and without the assistance of the services sector. On the other side, the services sector alone can not be developed independently, as its operations are closely interlinked with the ones of the industrial sector.
- c. The character and role which the industrial sector is gradually assuming resembles more the one of the infrastructures and mainly the infrastructure industries like Electricity and Gas and less the one known up today. Although vital to the economy, their final contribution depends on the parallel development of a wide range of inter-linked activities. The data presented in TABLE II.7 provide a good illustrative example. Fuel and Power industries as well as Transport and Communication Services require high proportion of investments per operator (\$ 197.680, 224.941 and 173.841 respectively) compared to the low investments required in other sectors as, for example, Agriculture (15.701), Construction (9.227) or Trade (17.490). These differentials, however, do not leave margins in substituting investments in power generation or transportation by investments in trade as the first ones are essential to all economic activities.
- d. The most important of all these changes is the relocation of the "industrial brain", i.e. the functions related with the development, technological updating and management of industrial operations from the industrial plant to the service suppliers and mainly the professional ones, which are elevated to the role of a critical catalyst and multiplier in industrialization and economic development as they are becoming the main depository, producer, distributor and animator of technology and development knowledge and, in the last analysis, the main determinant and "locomotive" of socio-economic progress.

T A B L E II.7 : PRODUCTION, INVESTMENTS AND EMPLOYMENT IN SELECTED INDUSTRIAL COUNTRIES, 1980 AND 1990
(Belgium, France, Germany, United Kingdom)

	V A L U E A D D E D (1985 prices and exchange rates)				E M P L O Y M E N T				I N V E S T M E N T S (1980-90)				
	1 9 8 0		1 9 9 0		1 9 8 0		1 9 9 0		T o t a l (1985 prices & exchange rates)		P e r e m p l o y e d		
	Mill. \$	%	Mill. \$	%	(1000)	%	(1000)	%	(Million \$)	%	at 1980	at 1990	Per one new job
PRIMARY SECTOR	44,201	2.8	43,333	2.2	4,049	5.3	3,287	4.5	88,369	2.7	21,825	26,884	(115,969)
SECONDARY SECTOR	628,430	40.2	673,440	34.5	29,735	39.2	23,938	32.7	837,747	25.2	28,174	34,996	(144,529)
Fuel and Power	73,424	4.7	70,027	3.6	1,763	2.3	1,338	1.8	236,758	7.1	134,293	176,949	(557,078)
Manufacturing	448,527	28.7	492,453	25.2	22,358	29.5	17,873	24.4	542,968	16.3	24,285	30,379	(121,071)
Building and Construction	106,479	6.8	110,950	5.7	5,614	7.4	4,727	6.5	58,022	1.7	10,335	12,274	(65,437)
TERTIARY SECTOR	800,115	51.2	1,103,776	56.6	42,086	55.5	46,027	62.8	1,495,118	45.0	35,549	32,505	379,628
<u>Distributive Services</u>	273,957	17.5	338,463	17.4	15,351	20.2	15,396	21.0	486,940	14.7	31,720	31,628	10,820,888
Transport & Storage	65,516	4.2	76,354	3.9	3,104	4.1	2,861	3.9	172,260	5.2	55,496	60,210	(708,890)
Communications	34,387	2.2	43,440	2.2	1,449	1.9	1,486	2.0	119,461	3.6	82,444	80,391	3,228,676
Trade	174,054	11.1	218,669	11.2	10,798	14.2	11,049	15.1	195,219	5.9	18,079	17,668	777,764
<u>Producer Services</u>	300,599	19.2	503,611	25.8	13,978	18.4	16,431	22.4	599,264	18.0	42,872	36,472	244,297
Financial and Insurance	72,202	4.6	105,920	5.4	2,726	3.6	3,067	4.2	240,477	7.2	88,216	78,408	705,211
Professional and Business Services	201,184	12.9	355,809	18.2	9,067	12.0	10,790	14.7	312,472	9.4	34,463	28,959	181,354
Hotels & Catering	27,213	1.7	41,882	2.1	2,185	2.9	2,574	3.5	46,315	1.4	21,197	17,993	119,058
<u>Non Market Services</u>	225,559	14.4	261,702	13.4	12,757	16.8	14,200	19.4	409,914	12.3	32,132	28,867	284,071
Dwellings	89,854	5.8	130,031	6.7					901,565	27.1			
E C O N O M Y	1,562,600	100.0	1,950,580	100.0	75,870	100.0	73,252	100.0	3,323,799	100.0	43,809	45,375	(1,269,888)

Note: The above data have been elaborated and adjusted from the 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)

III. THE IMPORTANCE OF SERVICES FOR THE DEVELOPING COUNTRIES

1. The underestimation of services in developing countries and their causes

In agrarian economies and the ones being at the first stages of industrialization, the sector of services is dominated by rather primitive and menial trade and domestic assistance operations considered as the backward part of the economy offering refuge to parasitic activities and to labour non qualified for industrial employment. Under this perspective services have been seen as a "burden" for the economies of developing countries requiring modernization in order to keep pace with industrialization and economic development.

While modernization of Financial, Trade, Transport and Communication Services have received proper attention in developing planning, the development of industrial support services being so essential to industries has received generally scant attention. It is true that the last two decades increasing emphasis has been given to the so-called "Institutional Infrastructures" for development but this has been limited mainly to public institutions dealing with R+D, Planning and Administration of development incentives and formalities and it has not been extended to industrial support market services. The main reason for this underestimation is that their development has been seen as a consequence and not as a precedent of industrialization.

Industrial support services, be seen as an integral but of secondary importance part of industrial operations, are expected to be developed either by the industries themselves as in-house activities, following the expansion of their core industrial operations, or as independent professional services expected to be created and developed in time, if and when needed, by the market forces.

Another reason is that developing countries are focusing their main attention on new investments out of which they expect to quicken their industrialization neglecting past investments. In new investments the technical design and consultancy services required for their realization amount around 8-12% of the investment costs which appear as an aggregate leaving small margins for economies compared to the rest of the investment. In addition, as these services are closely associated with transfers of technology and generally special knowledge and expertise, it is appreciable that a great part of these service inputs can not be locally available and they have to be bought, by necessity, from abroad besides that often these services are integrated in composite deal packages associated with turn key agreements, foreign loans and investments or aid.

As it has been mentioned above, post investment industrial support services required for the operation and updating of existing industries and which contribute about 75% to the value added derived from industries, are expected to be developed "physiologically" by the industries alone and the market forces.

2. The way of developing industrial support services

The expectation that industrial support services will be born and developed "automatically" by the market forces is questionable. This had been, of course, the way industrial support services have been born and grown in the today industrial countries but under a very critical and exclusive condition: the absence of competing forces in the market when needs had created conditions favouring the birth and growth of industrial support services. On the contrary, the today developing countries can not count on such a competition vacuum. Their needs for industrial support services will be covered immediately by the service organizations of the developed countries which will not leave to them a breathing time for developing their own industrial support services besides that their financial and organizational superiority will overcome very easily the competition of the weak and ill developed, if they have been developed at all, local services. It is characteristic that 30% of the Consulting Engineering and 23% of Management Consulting Services produced in the European Community are exported mainly to developing countries.

3. The main reasons for developing industrial support Services

The trends outlined in the previous Chapter have indicated that economies are undergoing, world-wide, profound structural changes among which the most important are the re-allocation of tasks and functions between industries and services and the elevation of the last ones not only to an important development factor but to a decisive also determinant of industrial competitiveness.

The main factors spurring and diffusing these structural changes are increasing specialization, internationalization coupled with sharpening of economic and industrial competition and technological convergence narrowing the number and range of technology options as competition differentials. In view of these profound changes all countries, including the developing ones, must undertake in time the necessary structural adjustments among which the development of the industrial support services is extremely important for the reasons explained already.

It seems that the developing countries have not realized as yet the attention they should pay to these structural changes and mainly to the need of developing in time their industrial support services for the following reasons :

- They see these changes as being associated with advanced stages of industrialization and automation and, therefore, they think that they consist a problem which is not eminent but of the rather remote future.
- Expecting the development of the industrial support services to come "physiologically" and "automatically" as a by-product of their industrialization, they are failing to see that industries themselves and market forces alone are not enough for the timely development of these services and that deliberate efforts are needed besides the fact that the development of these services is not a by-product but a pre-condition for successful industrialization.
- They have grossly underestimated the meaning and significance of the functional expansion of the industrial operations (see pp. 18-20) and the composite character of the industrial offer (mixes of products and services) (see pp. 25-26). Neglecting the development of the collateral industrial support services and limiting their offer to "nude" industrial products not only lose an increasing part of their already slim share in the market but also the corresponding labour content of that lost share. These losses in employment opportunities have a two-fold effect. They reduce employment at home and they create abroad through increasing imports of industrial support services.

As we see that developing countries are not paying to these problems of structural adjustments and mainly to the one of developing in time their industrial support services, the attention this problem deserves, we feel necessary to mention, in addition to the general trends analysed briefly in the previous Chapter, a series of factors which present specific significance for the developing countries in this respect and which are :

- a. The implications of these change on their market shares, employment and capital requirements.
- b. The qualitative and residual factors which increase the importance of developing industrial support services.
- c. The expansion of international trade and competition to Services.
- d. The need for a better balance between public and private sectors

4. Market share, employment and capital content of services

The shifts of tasks and functions from the industrial to the services sector are associated with an increasing share of services on the final selling price of industrial products. A rough estimate, based on the data given in TABLE II.6, indicates the following changes in the countries of the European Communities during the last only decade which reflect more or less the 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
	<u>100,0</u>	<u>100,0</u>	

(*) Agriculture, Dwelling and Government Services are excluded

The reduced share of industries on the final selling price of industrial products is associated with reduced, at higher proportion, labour content. On the basis of the data given in TABLE II.6, the labour content for a hypothetical volume of sales amounting to one million US \$ at 1985 prices, estimated on the basis of the value added per employed, has been evolved in the same countries as follows :

	1 9 8 0		1 9 9 0		Change 1980/90 %
	N	%	N	%	
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
	<u>49,9</u>	<u>100,0</u>	<u>39,2</u>	<u>100,0</u>	- 27,3

N = Number of employed

In addition to losses in market share and employment, the shifts of tasks and functions from industries and services are associated with uneven capital costs as the following comparisons demonstrate:

	Value Added 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 1980/1990

Industries	+ 33,7	+ 33,1
Distributive Services	+ 18,4	+ 21,9
Producer Services	+ 27,2	+ 14,7

The above comparisons indicate that industries have recorded in the past decade the higher increase of productivity per employed (33,7%) and therefore the lowest employment generation capacity, coupled with the higher increase of fixed capital per employed (33,1%).

Although the above trends and coefficients represent, in absence of detailed and accurate data, more rough estimates than measurements, they provide enough evidence on the magnitude of the costs for the developing countries in terms of market shares, value added and employment caused by neglecting to develop in time their industrial support services. Insisting on concentrating their efforts to "classical" industrialization and not seeing the importance of a parallel development of their services, they are not only staying on a ground in which they possess more comparative disadvantages than advantages and reduced income and employment generation opportunities but they choose a development course necessitating increasing capital requirements coupled with cancelling jobs at home and creating employment opportunities abroad. These losses in employment opportunities are taking place under the following three forms:

- a. Directly at home by the relative reduction of industrial employment for improving their competitiveness through an increase of labour productivity (value added per employed) following international trends.
- b. Indirectly at home and abroad by 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 including service inputs at its production phase as well as for its transportation, insurance, financing, distribution and post sale services.
- c. Directly at home by the import of service inputs consumed by their industries which services could be produced locally.

In order to have a rough quantitative indication on domestic losses and transfers abroad of income and employment opportunities in a developing country from the non development of its industrial support services, we present in TABLE III.1 the case of a hypothetical (not entirely) developing country which had undergone in the 1980-90 decade structural changes in its industrial sector following international trends but it had neglected the development of its indus-

trial support services while TABLE III.2 presents the losses in Income and Employment from the non development of industrial support services. Although the figures presented in this Table are neither measurements nor even rough estimates but mere indications of magnitudes and directions, they show that during this decade the economic losses can be figured around the 5,2% on the GDP and 12,9% on employment in 1980.

5. Other qualitative and residual factors related to the development of industrial support services.

The quantitative factors mentioned in the previous section tell a part only of the story. As in all development aspects, qualitative and residual factors in the development of industrial support services and mainly the Engineering and Consulting ones play a far more decisive role than the quantitative ones and mainly in the areas of:

- Project inception, generation and implementation
- Post-investment performances
- Technology development, transfers, adaptations and modifications as well as innovation
- Research and Development, Product Development and Design
- Brain drain and human resources for development

As the above factors are more closely related with the Engineering and Consulting Services, they are examined in the next chapter.

6. The expansion of international trade and competition to services

International competition is expanding, if not shifting, from industries to services as it is confirmed by the following trends:

- i. Services, being historically a local activity, are becoming gradually an international and tradeable one. Only 8% of total services produced today are traded, as compared to 45% for manufacture goods and 65% for agricultural commodities but the tradeability of services is increasing rapidly expanding from the traditional commercial services (freight, insurance and other services related with merchandise movements) to professional, business and industrial support services. Although trade in this last category of services is grossly underestimated statistically as international payments are not recorded or hidden within various items of invisible transactions in foreign exchange, the higher growth rates of trade in services (9% in 1989 and 12% in 1990) indicate increasing tradeability and internationalization (see also p. 36 on exports of Consulting Engineering & Management Services).

TABLE III.1: PROFILE DATA OF A DEVELOPING COUNTRY

BASIC AGGREGATES	1980
Gross Domestic Product(1)(2)	25,500
Value added(1)(2)	
Industries	5,800
Production & Distribution Services	6,400
Agriculture	8,800
Other activities	4,500
Employment (000)	10,600
Industries	2,240
Production & Distribution Services	2,800
Agriculture	4,400
Other activities	1,160
Gross industrial output (1)(2)	17,200
Output per employed (1)	
Industries	7,679
Value added per employed (1)	
Industries	2,589
Production & Distribution Services	2,286
Agriculture	2,000
Other activities	3,879
ECONOMY	2,406
Manufacturing Imports (1)(2)	5,000
Manufacturing Exports (1)(2)	800
Imports of Services (1)(2)	500
Exports of Services (1)(2)	50
 STRUCTURAL RELATIONS	
Industrial sales	
Total (1)(2)	17,200
Gross operational margin (1)(2)	5,800
Labour productivity	
Margin per employed (1)	2,589
Industrial Employment (000)	2,240
Support Services	
Local Services	
Total Sales (1)(2)	2,400
Operational margin (1)(2)	1,650
Employment (000)(3)	720
Imported Services	
Total Sales (1)(2)(5)	500
Operational margin (1)(2)(5)	340
Employment content-(000)(4)(5)	14

(1) US\$ at 1980 prices

(2) Million

(3) in industrial support services

(4) Labour content-EEC value added per employed

(5) Foreign operators

TABLE III.2: ESTIMATES ON INCOME AND EMPLOYMENT LOSSES FROM STRUCTURAL CHANGES CONFINED TO INDUSTRIES AND NEGLECTING THE ADJUSTMENT AND DEVELOPMENT OF INDUSTRIAL SERVICES IN A DEVELOPING COUNTRY

STRUCTURAL CHANGES	Factors of change	Effects of changes	
		on Income (A)	on Employment (B)
Reduced share of industries on the final "composite" selling price			
- Industries	(a)	(696)	(269)
- Other activities	(b)	(538)	(228)
Increased Labour Productivity			
- Industries	(c)		(496)
- Other activities	(d)		0
Increased fixed capital per employed			
- Industries	(e)		(366)
- Other activities	(f)		0
Increased imports of industrial support services	(g)	(90)	(6)
		<hr/>	<hr/>
		(1,324)	(1,365)

(A) Million of US \$ at 1980 prices

(B) Thousands

(a) Reduced share of Industries (Value added) on final consumption EEC countries, 1980-1990, from 39.1% to 34.4%, i.e. 12,0%

(b) Industries inducing effect

(c) Reduced turnover (MVA) as above and increased labour productivity as in the EEC countries, 1980-1990, 33,7%

(d) Reduced turnover as above and labour productivity at the 1980 level

(e) Increased capital requirements per employed by 33,1%, decreased savings (and investments) proportionally to (a) above, reduced employment to match available capital

(f) Fixed capital per employed at the 1980 level, decreased savings (and investments) proportionally to (b) above, reduced employment to match available capital

(g) Assuming that the increase of imported foreign services to be equal to the "backwardness" of the local services measured in gaps of value added per employed.

- ii. Trade in services becomes increasingly more profitable and foreign exchange earning than merchandise trade as it is manifested in the following comparisons referred to the European Community (1987/89, Billion US \$, excluding inter-EC trade):

Merchandise Trade		Earnings (net - %)
Imports	612.2	
Exports	630.8	
Balance	18.6	60
Trade in Services		
Imports	129.2	
Exports	141.6	
Balance	12.4	40

Although trade in services represents the 18% of total trade, it earns the 40% of net foreign exchange balance.

- iii. Transnational and Multinational Corporations, being in the past an exclusivity of the industrial and the financial services sectors, are mushrooming and growing rapidly in all service activities spanning from highly sophisticated ones such as R&D, Industrial Design and Quality Control up to menial activities such as floor cleaning, security, key copying and tyres replacement as it is illustrated in TABLE III.3. This is a trend which developing countries have to take into serious consideration. Misinterpreting the rapid growth of industrial support services recorded the last decades in the developed countries as a phenomenon associated with advanced stages of industrialization, computerization and automation, they risk not only to be caught unprepared in capitalizing the opportunities offered in these activities but also, and this could be the worst, to lose share and employment in their own domestic markets of services, being the only area offering employment opportunities
- iv. Industrial countries, seeing the increasing tradeability, share, profitability, importance, leading role as well as the employment generation capacities of the tertiary sector are looking aggressively to expand their foreign trade to services as it is proved by their strong pressures in the GATT rounds for the liberalization of the trade in services.
- v. The shifting competition from merchandise to services trade and generally from the industrial to the services sector is confirmed by the rapidly increasing share of services in direct foreign investments. Since 1987 75% of the Japanese DFI are in services. The same trends are manifested by all major foreign investors as this is illustrated in TABLE III.4.

TABLE III.3: SOME TRANSNATIONAL COMPANIES IN CLEANING, SECURITY & FAST SERVICE

Main Activities	Name - Title	Base Country	Area of Operation	Organization	
Cleaning	ISS-International Service Systems	Denmark	15 countries 3 continents	Subsidiaries Employees Turnover (Mil. \$)	53 137,000 1,450
Cleaning (Hospitals)	Service Master	USA	USA, Japan		
Cleaning (Airports)	Pritchard	UK	UK, USA		
Cleaning (Offices, Hospitals)	Pedus	Germany	Germany, Italy, Poland		
Cleaning	Tokyo Biso Kogyo	Japan	Japan, Taiwan Singapore, Philippines	Employees Turnover (Mil. \$)	6,000 800
Cleaning- Security	GOM- General Office Maintenance	Nether-lands	Netherlands Belgium France	Outlets Employees	30 10,000
Security	Group 4 - Securitas	Nether-lands	W. Europe USA	Clients Employees Turnover (Mil. \$)	28,000 10,000 850
Security	Security Holding	Tunisia	Africa, Middle East	Employees	5,000
Fast Consumer Services (tyres, exhausts)	Kwik-Fit Holdings	UK	UK, Ireland, Belgium, Netherlands	Outlets Employees Turnover (Mil. \$)	650 3,500 460
Fast Consumer Services (Key copying, Shoe repairs)	Minit International	Belgium	15 countries 3 continents	Customers (Millions) Outlets	60 4,700

S o u r c e :

Pauli, Gunter, DOUBLE-DIGIT GROWTH: How to Achieve it with Services
(Berlaar, ESIF 3, 1991)

T A B L E III.4 : 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		(Million US\$)	%	(Million US\$)	%
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
		FRANCE		GERMANY	
REST OF THE WORLD					
DFI 1981-87 (Net)		(Million ECU)	%	(Million ECU)	%
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
		FRANCE			
U. S. A.					
Stocks - 1987		(Million US\$)	%		
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		
		BELGIUM/LUXEMBOURG			
U.S.A.					
DFI 1981-88 (Net)		(Billion US\$)	%		
Manufacturing		3,679	47.2		
Services		3,586	46.0		
Other		536	6.9		
TOTAL		7,801	100.0		

S o u r c e :

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

7. The balancing of the public and the private sectors

An excessive public sector overflowed with problematic and non-profitable industries is not an unusual phenomenon for many developing countries regardless of political or economic system. Scarcity of private funds and local entrepreneurship, failures of private investors to operate successfully their industries, unemployment pressures and often doctrinaire or political affiliations led many developing countries to support an excessive augmentation of their public sector which now they try desperately but rather unsuccessfully to privatize or at least to reduce it as to bring a better balance between public and private sectors.

The segregation of the core industrial activities from their supporting services and the privatization of the last ones could be proved a first step towards this end and perhaps a very clever and successful movement presenting the following advantages:

- It does not require but minor capital expenditures.
- It overcomes the unemployment fear which proved to be a serious obstacle to privatization as employment is not cancelled but merely shifted from the public to the private sector.
- It ensures the preservation of the "national" character of the part taken out from the public sector which has been proved also a serious "sentimental" or "ideological" bottleneck.
- It appears more a positive than a negative measure as the main objective is not the dismantling of the "national public sector" but the development of national capacities in industrial support services, enhancing national development capabilities and potential.
- It facilitates privatization as it cleans industries from existing "burdens" of inefficient services and excessive personnel commitments.
- It presents minimum risks of unpredictable "disturbances" and "noises" as the newly established services have already a ready and existing market and clientele, while the industries can count on service suppliers familiar to their specific needs and requirements.
- It establishes a "soft" precedent and it offers a reliable test ground for the privatization process.

IV. THE ROLE OF ENGINEERING DESIGN AND CONSULTING SERVICES IN INDUSTRY AND MORE GENERALLY THE DEVELOPMENT PROCESS

1. Development Services - an overview

The leading role of services in the development process has been outlined briefly in the previous chapter. Services have been elevated to an important, strategic position in industrial and more generally economic development due to:

- a. Their quantitative contribution to the value added created by Industries which in developed industrial countries is three times more than the contribution of the core industrial activities (75% versus 25%). Although we do not have data regarding the dependence on services of the remaining economic activities, i.e. agriculture and services themselves, the respective figures might be even higher.
- b. Externalization, organizational and institutional segregation of services from core industrial activities, coupled with the creation and rapid growth of independent service producers, once being mere in-house units of industrial establishments, have shifted from the industrial to the services sector the main activities determining the competitive edge of the first one such as Research and Development, Product Development and Design, Market Research, Transfer, adaptation and application of technologies, etc.
- c. The new configurations in the relations between industries and services, shaped under the combined effect of the trends mentioned above, do not shift merely labour from industry to services but they entail a new division of labour and functions between user firms and service suppliers, helping both to specialize in their respective core activities. Professional Business Services have become therefore an important, if not the most important factor of competitiveness; for industry by disseminating innovation, new technologies, information and skills.

As it has been repeatedly mentioned throughout this report, the real position and the dynamics of services are badly covered and grossly underestimated in statistics for the reasons mentioned at the beginning of this paper (see p. 5). In addition, as the changes and trends in the relations between industries and services, mentioned in the previous chapters, have begun and have been noticed very recently, both historical and current statistics, even with the most complete and systematic coverage, can offer little help in understanding what all these changes mean, which are their current consequences and more their far reaching implica-

tions. Extrapolations of past trends can lead to gross underestimations of future realities and current situations could indicate little about forthcoming changes.

In a period of recurring economic recessions and unemployment upsurges as the current one, many services are growing constantly and steadily at double digit growth being the only sector generating employment. These trends, not properly understood due to very poor statistical coverage, could lead to a hasty and erroneous glorification of another "miracle", the miracle of services generating on their own and from nothing income and employment.

In reality, the rapid growth of industrial support services recorded the last decades in the developed countries is due to the structural changes outlined in the previous chapters which lead to internal shifts of tasks, activities, functions and employment from industries to services surpassing conventionally established classification and demarcation lines.

The role and growth of industrial support services can not be autonomous and independent from the structural changes and growth of Industries as well as the remaining economic activities employing these services otherwise the absence of such a correspondence could bring structural unbalances and inflationary pressures.

Growth of services above the economy averages have been recorded in all countries, developed and developing. The difference is in the kind of services which are growing. In developing countries the growth is mainly, if not exclusively, in conventional, backward services such as trade, catering, personal and domestic services providing practically an informal "social scheme of unemployment assistance" contributing little to the development process, while the growth of industrial support services in the industrialized countries has been the outcome and main instrument as well of profound structural changes aiming at improving their industrial and economic competitiveness.

Although the correspondence between structural changes and growth of industrial support services is a key factor, this does not mean that in all countries the relations and trends will be identical. International specialization and division of labour will bring up differences. Some countries will develop more their industrial support service capacities and production exporting their surpluses while others will rely on service imports for the support of their industries. The trends recorded so far (see pp. 30-32, 36-40) indicate that developing countries neglecting industrial support services are losing dramatically ground in their development drive.

2. Engineering Design and Consultancy Services as a development factor

Among the industrial support services, professional services and more specifically Industrial Engineering Design and Consultancy Services present a particular interest for the following reasons :

- a. They are needed in all activities and in all phases of the development cycle as rarely an activity does not require some physical infrastructures and facilities necessitating, in turn, some kind of basic and detailed engineering design and consulting.
- b. Engineering consulting and design provide a starting point or a basis for many interrelated activities such as construction economics, finance, insurance, taxation, labour regulations, which need often engineering data, inputs and advice.
- c. Engineering consulting and design services as a core activity, can become the seedbed for the generation, as it is confirmed historically from the development record of many Engineering Consulting firms, of advanced and specialized consulting activities such as R&D, Quality control, Product Development and Design, etc. which are of vital importance to industries and more generally to economic development. The eminent role and the wide application of the engineering design and consultancy services in industrial support operations are illustrated in TABLE II.3 (p. 9). As a matter of fact the long list of the services mentioned in this table are "offsprings" of three original professions: Accountants, Lawyers and Engineers. The process of proliferation of specialized Industrial Support Services is indicated in TABLE IV.1.

The importance of Engineering and Consultancy services is illustrated also in TABLE IV.2 indicating the phases in the development cycle in which these services are employed as well as their contribution expressed in terms of costs which are, in essence, inputs to the respective development processes.

3. The importance of Engineering Design and Consultancy Services for the developing countries.

Developing countries are generally underestimating the importance of services in the development process for the reasons mentioned already in a previous part (see pp. 35-36). Within this "low profile" appreciation for services, Engineering Design and Consultancy Services make no exemption and in addition the following considerations place their development in a secondary priority:

TABLE IV.1: THE SPECIALIZATION FAN IN SELECTED PROFESSIONAL SERVICES

ORIGINAL ACTIVITIES	FIELDS OF SPECIALIZATION (Branches or new entities)
Accountancy Services	Bookkeeping Accounting EDP and recording Tax Advice Management Consultancy Insolvency Trustee and Administrative support
Consulting Engineers	Infrastructure for transport systems Buildings Public Utilities Industrial Infrastructures Industrial processes & equipment Agricultural infrastructures & facilities Mining and natural resources Environmental protection
Construction Economists	Calculation and estimates on construction costs Expert evidence in arbitration & disputes Tax expenditure statements & advice Expert evidence on replacement costs for insurance purposes
Management Consultants	Information systems technology Finance Administration, O + M Corporate strategy and development Production, service, technology and organizational support management Cost and quality control Research and development Communication systems and methods (internal and external) Marketing and Public relations Human resources management & development Training Government and public administration Procurement methods and systems Economic and Environmental impact studies Project planning and management
Software Services	Package software Custom software and consultancy Turnkey systems Systems integration Processing Services Network services Electronic information services Training
Advertising	Mass media advertising Direct Marketing Telemarketing Mailing houses
Security Services	Manned guarding services Transportation of cash & valuables Alarm systems

**TABLE IV.2: COEFFICIENTS OF PROJECT IMPLEMENTATION COSTS
INCURRING BY TECHNICAL & PROFESSIONAL SERVICES**

<u>Types of Works requiring Engineering Design and Consultancy Services</u>	<u>Percentage on total costs</u>
<u>Architecture</u>	
- Architectural design and contract administration	3.0 - 6.0
<u>Buildings and Infrastructures</u>	
- Feasibility studies	0.5 - 2.0
- Detailed design	3.0 - 6.0
- Construction Supervision	5.0 - 8.0
Total	<u>8.5 - 16.0</u>
<u>Process and Industrial Engineering</u>	
- 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
Total	<u>10.0 - 17.0</u>
<u>Procurement</u>	
- Procurement Services	1.0 - 5.0

Source :

The Export Marketing of Technical Consulting Services
from Developing Countries (Geneva, International Trade
Centre UNCTAD/GATT, 1986) p 31

- a. Developing countries giving priority to new investments as a means of accelerating their industrialization see the engineering design and consultancy services as an activity related with transfers of technology and generally development knowledge and therefore with limited chances for substitution by local services.
- b. In addition and as the costs of these services cover something between 8-16% of the total investment, their substitution, partial necessarily, by locally developed services appears as a movement leaving small margins for economies as well as income and employment generation besides that these services are integrated often in package deals associated with turn-key agreements, foreign investments, loans or aid limiting, if not prohibiting, their substitution.

A pre-condition for the proper development of the engineering design and consultancy services in developing countries is the understanding of their very role and importance for the industrialization and more generally the economic development of these countries in view of the changing role of services outlined in the previous two chapters and more specifically the role of the engineering and technical consulting services in the development process. To this end, we consider necessary to outline briefly the role of the Engineering and Consultancy Services in the development process of the DC's in:

- Project inception, generation and implementation
- Post-investment performances
- Technology development, transfers, adaptations and modifications as well as innovation
- Research and Development, Product Development and Design
- Brain drain and human resources for development
- The qualitative and residual factors acting as catalysts and multipliers

4. The role and importance of the Engineering Design and Consultancy Services in project inception, generation and implementation

Many developing countries asking for increased foreign aid have proved low absorbing capacity of funds disposable due to their inability to select the proper projects and to implement them within specified time limits. It has been observed also that in many countries utilization of local funds has been better than the one of foreign funds. Many factors have contributed to these negative trends and mainly planning and implementing deficiencies of their Public Administration. The main reason for both trends has been the inadequate development of local technical engineering and consulting capacities. As foreign funding agencies place usually higher standards for disbursements, delays and defi-

ciencies in preparing feasibility studies, details designs and coordinated implementation have been among the main causes of retarded absorption of foreign aid. This provides an indication on the importance in developing and utilizing properly as well domestic engineering and consulting capacities in expediting project generation and implementation.

The delays in projects generation and implementation tell a part only of the story, the quantitative one. More important is the remaining qualitative part. A common phenomenon in many developing countries is that industries established with great hopes and sacrifices turn soon after their establishment to be more a burden than an asset due to original mistakes in the selection of appropriate projects and technologies, inadequate feasibility and marketing studies, poor detailed design and insufficient technical supervision in the implementation. These deficiencies explain the phenomenon that the same inputs have produced varying outputs in different countries and provide also another indication on the importance of endogenous consulting capacities. The most crucial factor in new industrial projects is not the industrial plant per se, but its fitness to the technological level of the country, the culture and behaviour of its industrial labour force and the multiplication of its benefits through the backward and forward links of the new plant within the country's industrial and more generally socio-economic structure, as well as the opportunity of access or development of higher technologies according to the country's development objectives. Foreign experts can provide advice on the technical aspects of industrial plants, drawn mainly from the experience and socio-cultural milieu of developed countries. The adjustment and modification of technical proposals to fit to the country's needs and conditions require the assistance of local experience and expertise. That is confirmed by the fact that foreign consultants and consulting firms seek always to find a local expert to assist them on these matters even in cases in which such an association is not mandatory at all.

The most crucial decisions regarding the appropriateness of new industrial plants to the country's needs and development targets are taken usually by national authorities whose staff plays, consciously or unconsciously, the dual role of the decision-maker and the local consultant, lacking generally the expertise required for the second role. The underestimation of the importance of local expertise by policy-makers and a "self-contained" attitude of the administration's rank and file proved to be one of the most crucial barriers for the development and proper utilization of endogenous consulting capacities. This subject has been discussed in more details by the present writer in another re-

port⁽¹⁾, in which it has been found, inter alia, that in a developing country a new sugar mill of crushing capacity of 2000 tons has been chosen at an investment cost of 18 million dollars (1972), while an equivalent expansion of an existing mill required only 1,2 millions. The offer had been made by a foreign "turn-key" supplier and was connected with some kind of 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 an expansion of an existing mill with obvious advantages in foreign exchange savings as well as local income and employment generation.

5. Post-investment performances

A phenomenon common to many developing countries is the deteriorating performances of their industries due to the mistakes at the inception and design stage, inadequate maintenance, poor management and mainly inadequate technological, product and marketing adjustments and renovations.

During the first stages of industrialization new investment provided the main development force. As development goes on, the proportions between new and past investments are reversed and the overall performances of their economies depend more and more on past investments. Yet, a wide-spread phenomenon is that in many developing countries attention is paid to the establishment of new modern industries while their existing industries undergo an accelerating deterioration. This tendency explains, partly, the fact of diminishing increments in the GDP with the same value of investments. A part of the industrial expansion generated by new investments is offset by the declining performances of past investments.

The improvement of past-investment performances 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 once imported, assimilated and adopted in the country and the record of successes and failures, being locally available and accessible, can serve as the best guide on what has to be done for their up-lift.

¹ Regional Cooperation Network in Industrial Consulting between the Developing countries in the ESCAP Region (DP/RAS/83/013), pp. 19-92

It must be noted also that technological updating is a continuous and daily 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. That is increasing exponentially the updating costs. If developing countries continue to bestow the modernization of their industries to foreign expertise and services, their updating costs will weaken further their competitive position.

6. Innovation, Transfer, Adaptation, Modification and Development of Technology

Developing countries pay increasing attention on technology development which becomes nowadays the most crucial factor in their industrialization. Shifting emphasis from import substitution to export-oriented industries they need eagerly and desperately new sophisticated technologies in order to compete effectively in the international markets. The subject became a hot issue and has occupied a key position in the development literature during the last years. UNIDO has estimated that payments of developing countries for technology transfers (fees, royalties and technical know-how) have reached the amount of US \$ 9 billions in 1990.

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

- a. Payments for technology transfers do not coincide with actual transfers of technology as most of the "technology suppliers" transfer "use" but not "knowledge" on new technologies perpetuating the technological dependence of their "buyers" and consequently the importing countries. In South Korea, for example, a study on technology transfers⁽²⁾ disclosed a general trend of technology suppliers to give peripheral technology in an attempt not to make open core technological know-how. In about 22% of technology transfer projects insufficient transfer of know-how has been reported.
- b. Under joint ventures and bilateral agreements between local and foreign firms, the same technology is imported multiple times under varying technology "brands" and "trade marks" costing to the country multiple times its real value. In Pakistan, for example, a survey of IACP (Industrial Advisory Center of Pakistan) disclosed that only 20% of technology transfers were bringing a new product while 80% were duplications or modifications of the same product. In S. Korea, where technology transfers

² Young Hun Kim, Korean Experience on Transfer of Technology, UNIDO, ID/WG 355/6-1981

are under government's control, similar trends have been identified also. A survey⁽³⁾ disclosed that 20,8% of the imported technologies were already locally developed (the same or similar), 28,3% had been already imported previously or at the same time and only 50,9% were really new technologies non available in the country. Such a "waste" in technology transfers is often higher than physical investment costs.

- c. Technologies practically are not "bought" by the developing countries but "sold" by the technology suppliers. This fact coupled with restrictive clauses referring to the use and export of acquired technologies makes technology transfers more a device of penetration to their domestic markets than a tool for boosting their development and exports. In Thailand, for example, where a liberal policy on technology imports has been adopted in order to accelerate industrialization, it was found that 57% of the payments for technology transfers were regarding the promoted sectors, i.e. the ones receiving development priorities according to the country's needs and development plans, and 43% the non-promoted sectors. Food, Beverages, Cosmetics and Pharmaceuticals accounted to 31% of all technology transfer payments in 1980-81.
- d. Acquired technologies need always adaptations and modifications in order to become operational within the country's techno-economic structure and compatible with its development targets and export objectives. The development record of the USA stands a good example of successful adaptation and development of imported technologies. During the period of their industrialization all technologies used were imported or imitated from Europe. Yet, these technologies applied in the USA produced spectacular gains in productivity, multiple to the ones recorded in the countries of their origin. A great part of this success is attributed to the adaptation of these technologies and their further development in order to make best use of the available at that time industrial labour force, brought by the great influx of young and unskilled immigrants. Dismantling technology packages and developing machines, devices and processes suitable to these labour inputs, being different from the ones for which the original core technologies had been developed, have been the main causes of these productivity gains.

"Dismantling" technology packages and adapting, modifying and further developing their components in order to be "re-assembled" according to the country's needs and conditions is the essence of successful transfer and devel-

³ A study on the transfer of technology - Korean case, Technology Transfer Centre, KIST, 1977, pp. 67-68

opment of technology. 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 on the prospects of a wide diffusion to the benefit of the country. This is the very meaning of appropriate technology which does not imply necessarily to be either intermediate or less advanced. This is an area in which technology suppliers have shown generally a negative attitude. Restrictive clauses impede the use of local materials and inputs as well as the development of ancillary activities, thus blocking the strengthening of the technological base of the importing countries.

Developing countries tend to blame exclusively "technology suppliers" of the developed countries for all these problems. This is, however, only partly true as they have also their own share due to the inadequate development of their capacities and resources for the acquisition, development and adaptation of technologies. The import of costly and non appropriate technologies, limiting instead of widening their technological base, is in part due to the attitude of the "bad guys", the technology suppliers, and in part and mainly due to the inability of the importing countries to select the most appropriate technologies and to make the best use of them.

Regarding the above problem, a study referred to the ESCAP developing countries⁽⁴⁾ which is, however, valid for all developing countries, has identified the following main causes:

- a. Low level of science and technology. Acute shortage of scientific and technological resources pose a serious barrier to the choice of the most fitting technologies as well as their best use and wide diffusion.
- b. Transfer of managerial technology is more difficult than that of physical production technology since it involves more social, cultural and mental elements.
- c. Many of the developing countries have inadequate infrastructures for technology transfers including knowledge and access of sources of technological information, evaluation of the appropriateness of technology options as well as control of technology transfers.
- d. A bias in favour of foreign products and technologies inhibits indigenous innovative efforts.

⁴ ESCAP, Expert Group on ASEAN and Pacific Economic Cooperation, ASEAN-Pacific Cooperation in Technology Transfer, Bangkok, May 1982

e. Many governments, believing that massive introduction of foreign technologies could lead to a rapid industrialization, have overseen that such policies could be also associated with negative effects on the development of indigenous technological capabilities as well as on the balanced development of the technological basis of their countries. The cases of Thailand and S. Korea are illustrative. The case of Thailand has been already mentioned previously. In S. Korea excessive investments in heavy industries had resulted in imported technologies that emphasized immediate production over domestic technology development⁵). It 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.

Many developing countries in order to cope with the above problems have established institutional infrastructures to handle and control technology transfer paying increasing emphasis on terms and conditions in technology transfer agreements. On the other side, they have established R&D institutions focused on acquisition, development and adaptation of new technologies. Although both measures improved considerably the transfer of technology process in favour of the acquiring countries they have failed to provide a decisive response to the problems mentioned above for three main reasons:

(i) Centralized systems miss the flexibility and dynamism required for rapid and diversified industrialization.

(ii) Emphasis has been given to the legal, financial and administrative aspects of technology transfer rather than to knowledge transfers.

(iii) The "interfaces" connecting technology transfer and development "main frames" with end-users are still inadequately developed.

(iv) Lack of continuous effort in "breaking down" technology packages and in own development of technology components.

The main "failure" of developing countries in creating proper mechanisms for acquisition and development of technology as well as for facing other problems mentioned already as the ones of project inception and implementation and post-investment performances, is the underestimation of

⁵ Young-Woo 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. All the structural changes occurred in the developed countries and described in CHAPTER II have not been the outcome either of governmental planning or recommendations of specialized Public or Private Institutions involved in Development theory and practice. They have been the outcome of two main forces: The Industries, 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, i.e. the industries. Central Planning Authorities and Study Centres in developed countries began to realize that something "was going on" after the interaction of these two main forces began to provoke the structural changes described in CHAPTER II. This missing dualism is the main handicap of many developing countries in creating the proper development mechanisms and capacities and the only force which can cover this vacuum is the same one operating in the developed countries, i.e. the development of local Engineering and Consulting capacities which, however, can not be developed automatically by the market forces for the reasons explained already (see p. 36).

One of the "success secrets" in Japan's industrialization has been the recognition of the need for "grass roots" mechanisms. The Japanese experience in technology transfers⁶) 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. When domestic consultants are seen as "agents of change", then their role and importance can be properly assessed and evaluated.

Local Engineering and Consulting Services, provided that they have been sufficiently developed and properly used, can:

- (i) improve the selection of appropriate technologies, as well as the terms and conditions on technology transfers
- (ii) accelerate the diffusion of acquired technologies and eliminate duplications in technology transfers
- (iii) improve the real transfer of technical knowledge, thus lessening the technological dependence of the importing countries

⁶ Eiji Ogawa, "Technological development in Japan's small business", Monthly of the Public Corporation of Small and Medium-sized Business Finance, June 1976

(iv) bring continuity and consistency in turning the acquisition, adaption, modification and development of technology from an array of ad hoc cases into a process

(v) create a national depository of knowledge and experience in transfer, adaptation, modification and further development of new technologies.

7. Research and Development - Product Development and Design

Developing countries in order to lessen their technological dependence and to reach self-reliance in their industrialization efforts have established R&D institutions for basic, applied and adapted industrial research. These institutional settings present in many developing countries a series of common problems, same in kind but different in degree, at both ends of the R&D process. The selection of research subjects is loosely connected with the real or emerging problems of potential end-users being poor in outside the system inputs relevant to the very needs of their industries. The diffusion and application also of R&D products is suffering by inadequate connections between R&D institutions and end-users. Here again, the absence of an intermediary (change agent) proved to be the missing link between R&D institutions and end-users. In S. Korea, in order to cover this vacuum, the KAIST (Korea Advanced Institute for Science and Technology) has established a subsidiary, the K-TAC (Korea Technology Advancement Corporation), aiming at the commercialization of 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 other countries, like Thailand and Philippines, R&D institutes have established special units shopping for research contracts in the market in order to link their research and development projects with the very needs of their industries. Although these institutional arrangements have improved substantially the relevance of R&D efforts to the very 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:

- a. Centralized systems miss generally the flexibility and dynamism required in complex a rapidly changing economies as the case of many developing countries tend to become after 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. Here is a wide scope for national Engineering and Consultancy Services.

- b. Entrepreneurs and managers, mainly in countries without industrial tradition, have very often a wrong perception of the very problems they face and hardly can identify technological changes needed. An independent expert, after a study and analysis of their operations, can identify properly their very demands in technological changes and indicate areas in which new products, processes, machinery and equipment are required. This is another area in which national Engineering and Consultancy Services can play a great role as "agents of change", better than the one foreign consultants can play, as the first ones are more familiar and they have better insights on the complexity of social, cultural, structural and politico-economic factors associated with technological changes.
- c. Underutilization and expatriation of R&D outputs is not an unusual phenomenon in many developing countries. Costly R&D products remain finally non-utilized at home, while the best ones are leaked outside the country and even to be re-imported with some modifications and adaptations to the country under the form of imported new technologies.

Some of the issues raised above confirm the fact that the role and involvement of local Engineering and Consultancy Services in developing countries is much wider than in the developed ones.

8. Human resources for development and brain drain

A bottleneck for the industrialization of developing countries is often scarcity of qualified scientists and professionals. Many developing countries have tried to develop their scientific and professional resources with serious efforts and sacrifices. Yet, the results have been in many cases discouraging. While the initial development bottleneck remains, two other problems are emerging : Growing unemployment at home and brain drain abroad of university graduates.

The main causes for these problems have been :

- a. The scarcity remains not in terms of number and formal qualifications of graduates but in terms of applications and practical experience due to limited opportunities at home. Even in cases when these graduates have acquired practical experience abroad, this experience may be proved irrelevant at home due to different local conditions (degree and fields of specialization, sizes of establishments etc.). What is missing in many developing countries is the absence of "practising opportunities" offered in the developed countries by the great number of "practising laboratories", i.e. the Engineering and Consulting Firms which provide the critical "extension services" of their educational and research institutional settings.

- b. The non development of engineering and consulting services limits career opportunities to two only choices: Academic pursuits or public administration in which often scarce professional resources are not properly utilized performing routine administrative tasks. Then, the gap between number and qualifications in terms of practical experience and mainly up-dating and on-the-job experience is widening.
- c. The main reason for scientific and professional emigration (brain drain) is not salary differentials in as much as opportunities for professional advancement in comprehensive terms including updating, acquisition of practical experience, wider range of employment opportunities. Incentives for halting or reversing brain drain have been proved of limited effectiveness as they have been based by and large on salary differentials and academic or public service employment neglecting the wide area of independent professional career in the sector of engineering and consulting services.

9. Qualitative and residual factors associated with the development of Engineering Design and Consultancy Services and acting as catalysts and multipliers in the development process

The broad areas in which industrial support services and more specifically Engineering Design and Consultancy Services can contribute to the acceleration of industrialization and improved performances of existing industrial establishments, outlined in the previous sections, do not exhaust all the benefits which deliberate efforts for developing these services can bring to developing countries. As in all aspects of development strategic, qualitative and residual factors provide often critical catalysts and multipliers in the development process, the same is true regarding Engineering Design and Consultancy Services.

Developing countries facing scarcity of capital resources and excessive labour surpluses, growing faster than their economies, have tried to invent development strategies minimizing capital requirements and maximizing employment opportunities. To this end they have chosen by and large a strategy looking for:

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

The needs of developing countries for foreign exchange and the pressures exercised upon them for liberalizing their economies as a precondition for receiving foreign aid, loans and investments as well as the demonstration effect of the success of the newly industrialized countries, all together led developing countries to a basic re-orientation of their industrialization strategies towards export oriented industries.

Export oriented industries require, regardless of technologies and processing methods, products being able to compete in the international markets with the best products of the most advanced industries of the World. The understanding of this reality led developing countries to pay increasing attention to acquisition of technologies and the development of their own technological basis, undertaking, at the same time, major revisions of their original concepts and approaches regarding labour intensive industries and intermediate technologies.

Developing countries conceived originally their shift to export oriented industries as meaning the procurement of the technology needed at the starting up time of a new industry. Realizing soon that technology is neither a static nor an at once operation but a continuous process, they begun paying increasing emphasis in developing and organizing their own technological basis and the necessary institutional infrastructures for the acquisition, adaptation and modification of foreign technologies but also for developing their own ones.

As it has been mentioned previously (see pp. 58-59), Developing countries, trying to profit from the experience of the developed ones, have copied their central systems (Development Banks, R+D Institutions, Quality Control and Standardization Organizations, Export Promotion Organizations, Productivity Centres, Vocational Training Schools, Documentation and Information Centres for the diffusion of Technology, etc.) but they have missed to see that these central systems alone could not produce the results recorded in these countries without the concurring interaction and contributions of thousands small, decentralized and specialized organizations, the professional services, which had become a catalytic and multiplying factor in the process.

Although central systems are essential for determining the directions and targets of technological and economic development, they are by nature inflexible and slow moving. Their main shortcomings lie usually in their narrow initiative basis and their tendency, inspired by and compatible with their statutory duties, to concentrate their efforts on the "big" questions of development neglecting the "small deals". As this is a very critical factor, we feel necessary to mention the following :

- a. Scientific and technological discoveries do not bring alone change and progress. Their applications in the daily life determine their progress effects. The cases of the U.S.A. and Japan stand a very good example. Many important technological discoveries, like TV, were made in Europe but they have been adapted, modified, further developed and commercially exploited by the U.S.A.. The same has been done by Japan and some of the newly industrialized countries. The U.S.A. were running their extremely expensive space programme but many scientific and technological discoveries of this programme in micro-sensors, photographic instruments, isolation materials, new materials and instruments, etc., have been adapted, further developed and commercially exploited by Japan and other industrial countries. This adaptation and commercial exploitation has been the combined contribution of their central institutions focused on adaptive research and also of the great army of "front line" consultants mainly Consulting Engineers and Management Consultants but even Lawyers (patent rights), Advertising consultants and Trade experts. Thanks to the contributions of these "front line" consultants the adaptive research products have been moved from the selves of the research institutes to the factory floors.
- b. Researchers all over the World, in developed and in developing countries, have the tendency to direct their efforts on "great subjects" (the Nobel price) paying minor attention to "small deals". They spent more time in new discoveries than in applying better existing ones. Again, the pressures and requests of the "front line" consultants exercise a balancing effect between pure research and its practical applications.
- c. Centralized development institutions paying more if not exclusive attention on "big issues" they fail to see that the big economic progress of many countries has been the outcome not so much of great strategies or big discoveries (which very soon are diffused around the World) in as much as of the cumulative effect of many daily and continuous small improvements made systematically over a period of time. In the U.S.A., for example, labour productivity (physical output per worker) rose during the 1889-1957 period more than 500 %. A series of studies conducted on the factors which have contributed to these spectacular productivity gains had disclosed that only 13-26% of this growth could be attributed to the increase of fixed capital per worker while the rest to residual factors such as technological inventions and innovations,

R+D, education, health, etc.(?). It is interested to be noted that their big breakthrough has come not so much by major scientific or technological discoveries in as much as through the cumulative effect of many small improvements which brought the big change (8). "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" (9). The strategic role of MITI in Japan's industrialization has been duly recognized but one should not forget the catalytic contribution of the numerous, unknown "agents of change" (see p. 59)

While developing countries by and large have not found as yet a balance between the requirements of export oriented industries and employment pressures at home, the changes taking place in the structure and function of industries, described in CHAPTER II (pp.5-33), raise new problems and dilemmas which, we afraid, developing countries have not perceived fully or properly as yet.

These problems and dilemmas, hidden behind the emerging new relations between industries and services, are shaking many of the long established concepts on industrialization, economic development and employment upon which developing countries had based their plans and development efforts. The emerging new "production clusters" segregating from one side core industrial activities from supporting services and increasing, on the other, their linkages and interdependence, question the distinction between capital intensive and labour intensive industries as well as between advanced and intermediate technologies, appearing up today so important for the developing countries, as all industrial plants are becoming gradually only capital intensive with very narrow margins for labour and technology differentiations. The productivity gains from capital intensity (Automation, CAM) are so enormous that even the substitution of capital by unpaid at all labour can not come out with lower ex-factory product costs. Classical labour intensive industries such as extractive or textile industries turn gradually not merely to less labour intensive ones but to "labour-less" (at the shop floor level) ones without, and this is important also, increasing proportionally to their labour substitution ra-

7 Congress of the US, Joint Economic Committee, Staff Report on Employment, Growth and Price Levels, (Washington, D.C., U.S. Government printing Office, 1959), pp.33-68.

8 OECD, The Residual Factor and Economic Growth (Paris, OECD, 1964) p. 83.

9 U.S. Congress, Ibid, p.48

tio, their capital intensity. The most important of these changes is that labour intensity differentials are shifted gradually but steadily from the industrial to the services sector. As it has been already mentioned industries create unemployment in their own sector while creating more employment in the sector of services (see p. 30).

One can argue that the development of industrial support services is a pseudo-dilemma as it does not make any difference whether or not the necessary industrial support services are developed inside the industrial sector as "in house" activities or outside the sector as independent professional services. After all the income and employment benefits will be the same. This, however, is the critical factor making the great difference.

The limits of "in house" service units to provide in an economic and efficient way the great variety of sophisticated and specialized services, technologically updated, which modern industries need, their adjustment inflexibility, excessive costs and overheads have been mentioned already in a previous part (see pp.22-23). In addition, the shift from "in house" to "external" professional services is a structural change which developing countries can not either ignore or underestimate for all the good reasons explained already (see pp.29,36-40). Discrediting this alternative, two other alternatives appear as feasible. Industrial Support Services to be developed either as specialized units of the public sector, one unit serving more than one industry, or as private professional services. Although theoretically either alternative could not make difference, in reality it makes a great difference and this is a critical choice for developing countries.

Public industrial support services appear theoretically as the best choice as they can count on public prestige, support and resources for their take off. This logic has dominated the establishment of the organizations making the institutional infrastructures for development. Many good reasons, however, discredit this alternative regarding professional services. These are:

- The size of these units which should remain by necessity small in order to be efficient and flexible. As it is indicated in TABLES IV.3 and IV.4, Professional Services in the European Communities, as in all industrial countries, are very small in size. Compared with industries, transport, financial and distribution services, they are practically "cottage industries".
- The rapid expansion of specialization (see APPENDIX A, TABLE A.2) necessitates continuous adjustments by establishing new units, split of existing units to specialized ones, re-orientations of activities and services and finally discontinuation of service operations

which had become obsolete as, for example, mimeographing replaced by photocopying, telex taken over by fax, hand made drawing replaced by CAD etc.

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 be always behind the needs and requirements of the served industries and the only choice which appears the most advisable, even for countries in which the sector of core industries remains public, is the one of independent professional services or, at least a mix of public and private industrial support services. In this respect one should never forget that the structural changes (see pp.58-59) by which industrial countries were able to advance internationally competing industries, setting at the same time the levels, terms and conditions of competition for all countries, developed and developing, has been the outcome of interaction of two forces: the industries and the independent professional services. This interaction multiplied creativity, innovation and betterment initiatives advanced from both sides instead to be expected to come out from inflexible and slowly moving centralized organizations while it led to a continuous adjustment of the industry-services interrelations matching the industrial scale requirements with the ones of specialization necessitating a great number of small, specialized service units.

Besides the fact that the development of industrial support services and mainly Engineering and Consultancy ones is a must for the developing countries in their efforts to be aligned with the structural changes taking place and determining world wide the competitiveness, specialization and division of labour, they are associated with certain advantages which acquire particular significance for the developing countries:

- a. As it is indicated in TABLES IV.3-IV.5, the average sizes and the capital requirements per unit and per employed are very small compared to the ones of industries.
- b. Although they require very moderate establishment, updating and expansion investments, they demonstrate very high value added and employment coefficients (see TABLE IV.5)
- c. Contrary to the core industries requiring latest technology at any cost with extremely narrow substitution margins, industrial support services present an amazing flexibility. As it has been demonstrated from the record of the developed countries, they can begin with small, low specialization units which gradually can be evolved to bigger, more specialized and sophisticated entities (see pp. 49-50 and TABLE IV.1) without this "low profile" start to constrain their future development to advanced,

highly specialized and sophisticated industrial support services. This is a more "organic" and advisable way as the lessons learned at the first stages will be useful at the later, more advanced ones, avoiding more expensive mistakes in later stages.

- d. Professional services do not require, as they do industries, expensive environmental infrastructures (heavy load bridges, roads, ports, etc.), they are mobile and decentralized and therefore more suitable to developing countries than industries. It is characteristic that VENTEX INTERNATIONAL, one of the largest multi-service companies in the World, with an estimated turnover around 9 billion dollars, has only 41 people in its central office. DHL International manages its world wide network covering 186 countries with only 140 people in its Head Quarters.
- e. Although big, multinational companies in professional services do exist and they try as in all economic activities to increase their shares monopolizing the markets, they have not been so successful as in other activities like industries, retail trade, transports, banks, insurance, cleaning or fast services. The small business dominate the markets as the growing specialization requires many, small by necessity units besides that in this kind of activities big units present the usual shortcomings of big organizations, i.e. inflexibility, excessive organizational control overheads, low adjustment and updating pace.
- f. The combination of these advantages explains while certain developing countries have demonstrated better performances in services than in industries. Tunisia, for example, is present in International Security Services (see TABLE III.3, p.44). India is among the leading exporters in software engineering and movie films, Mexico earns more than 130 million dollars annually from dubbing English movies into Spanish and Jamaica has become a centre for teleprocessing handling, among other things, medical data for U.S.A. hospitals.

T A B L E IV.3 : ORGANIZATIONAL CHARACTERISTICS IN SELECTED BRANCHES OF INDUSTRIAL SUPPORT SERVICES IN THE EUROPEAN COMMUNITY

Branches of Services	Number of Firms	Employment(1)	Average size(2)	Turnover (Million US \$)	Exports (Million US \$)
Real Estate		147,680			....
Legal Services		300,000		15,000	---
Notarial Services	27,400	112,900	4.1		---
Accountancy Services		268,229			
Consulting Engineers	4,912	140,432	28.6	9,840	2,966
Construction Economists	10,563	92,954	8.8	3,870	406
Management Consultants	2,367	43,860	18.5	4,800	1,100
Architects		210,450			
Advertising	1,500	46,000	30.7	37,200	
Public Relations	335	2,490	7.4	445	....
Market Research	1,250	23,000	18.4	1,960	274
Industrial Cleaning	47,356	1,789,579	37.8	18,448	....
Security Services		304,836		7,410	....
Temporary Work	13,023	850,000 (3)	65.3	12,500	---
Expres Mail		8,140		815	....
Software & Computing		357,000		33,280	4,950

Notes :

The above data have been compiled from :
 Commission of the European Communities, Panorama of EC Industry 1990
 (EC, Brussels 1991) Chapters 27, 28, 29 and 30

(1) Professional staff only

(2) Employees per establishment

(3) Person-year equivalent including temporary workers engaged

(...) Data non available

(---) Non applicable or data unimportant

T A B L E IV.4 : AVERAGE SIZES OF ENTERPRISES IN SELECTED INDUSTRIES AND PROFESSIONAL SERVICES IN THE EUROPEAN COMMUNITY - 1988

ECONOMIC BRANCH	Number of Enterprises	Employment	Turnover (Million ECU)	Per Enterprise	
				Employment	Turnover (000 ECU)
I n d u s t r i e s					
Iron and steel	581	406,000	57,000	699	98,107
Glass and glassware	949	223,000	19,460	235	20,506
Chemical industries	1,000	1,900,000	263,983	1,900	263,983
Paint, Varnish, Ink	1,056	115,000	23,310	109	22,074
Waxes, Polishers, etc.	550	25,000	3,000	45	5,455
Pharmaceuticals	1,034	460,000	48,378	445	46,787
Light Metal Packing	400	60,000	6,000	150	15,000
Domestic Heating	112	17,450	1,065	156	9,509
Mechanical Engineering	21,180	2,372,000	209,867	112	9,909
S e r v i c e s					
Consulting Engineers	4,912	140,432	9,840	29	2,003
Construction Economists	10,563	92,954	3,870	9	366
Management Consultants	2,367	43,860	4,800	19	2,028
Advertising	1,500	46,000	37,200	31	24,800
Public Relations	335	2,490	445	7	1,328
Market Research	1,250	23,000	1,960	18	1,568

S o u r c e

Commission of the European Communities, Panorama of EC Industry 1990
(EC, Brussels 1991)

T A B L E IV.5: EEC- LABOUR CONTENT, MARGIN AND INVESTMENTS PER SALES OF ONE BILLION US\$ AT 1985 PRICES AND EXCHANGE RATES - 1988/1990

SECTORS AND ACTIVITIES	TOTAL SALES (Million US \$	VALUE ADDED of 1985)	EMPLOYM. (1000)	INVESTMENTS 1980-1990 (A)	LABOUR CONTENT (B)	VALUE ADDED X	IN/MENT ON V.A X
PRIMARY SECTOR	130,000	91,000	9,750	186,640	75.000	70.0	20.5
SECONDARY SECTOR	3,025,000	1,020,000	37,750	1,269,348	12.479	33.7	12.4
TERTIARY SECTOR	2,549,500	1,656,000	77,140	2,153,200	30.257	65.0	13.0
<u>Market Services</u>	2,149,500	1,266,000	51,690	1,548,200	24.047	58.9	12.2
<u>Distributive Services</u>	1,050,000	544,000	21,980	758,000	20.933	51.8	13.9
Transport & Storage	310,000	124,000	1,280	272,000	4.129	40.0	21.9
Conv. Communications	140,000	60,000	1,050	162,000	7.500	42.9	27.0
Wholesale Trade	250,000	140,000	7,300	125,000	29.200	56.0	8.9
Retail Trade	350,000	220,000	12,350	199,000	35.286	62.9	9.0
<u>Producer Services</u>	1,099,500	722,000	29,710	790,200	27.021	65.7	10.9
Money and Banking	235,000	100,000	2,350	230,000	10.000	42.6	23.0
Insurance	125,000	50,000	1,250	115,000	10.000	40.0	23.0
<u>Professional and Business Services</u>	522,500	402,000	13,110	301,200	25.091	76.9	7.5
Real Estate	19,000	15,000	300	9,000	13.789	78.9	6.0
Legal Services	75,000	60,000	1,500	36,000	20.000	80.0	6.0
Notarial Services	30,000	24,000	570	15,600	19.000	80.0	6.5
Consulting Engineers	21,500	17,000	500	16,000	23.256	79.1	9.4
Architects	12,000	10,000	400	7,000	33.333	83.3	7.0
Construction Economist	12,000	9,000	300	5,500	25.000	75.0	6.1
Management Consultants	22,000	20,000	450	16,800	20.455	90.9	8.4
Quality Control	12,000	10,000	250	10,600	20.833	83.3	10.6
Accountancy Services	60,000	45,000	1,100	30,000	18.333	75.0	6.7
Software & Computing Service	65,000	55,000	870	50,000	13.385	84.6	9.1
Data Banks and On-line Informatio	30,000	20,000	500	22,000	16.667	66.7	11.0
Temporary Work Service	85,000	60,000	4,900	23,000	57.647	70.6	3.8
Market Research	5,000	3,500	300	2,500	60.000	70.0	7.1
Public Relations	2,000	1,500	70	1,000	35.000	75.0	6.7
Advertising	25,000	20,000	350	24,500	14.000	80.0	12.3
Direct Marketing and Telemarketing	6,000	5,000	100	5,500	12.971	83.3	11.0
Sales Promotion	10,000	8,000	150	6,800	11.773	80.0	8.5
Languages-Translations- Interpretations	8,000	7,000	120	5,500	15.000	87.5	7.9
Conferences-Exhibition	1,000	800	40	600	40.000	80.0	7.5
Executive Search	700	600	20	400	28.571	85.7	6.7
Design Services	2,000	1,400	40	1,200	20.000	70.0	8.6
Fast Customer Services	1,600	1,300	60	1,200	37.500	81.3	9.2
Int'l. Moving Services	700	400	20	500	28.571	57.1	12.5
Telecommunication Ser.	15,000	6,000	180	8,500	12.000	40.0	14.2
Express Couriers	2,000	1,500	20	1,500	10.000	75.0	10.0
<u>Industrial Services</u>	38,000	31,000	4,500	19,100	118.421	81.6	6.2
Cleaning & Maintenance	30,000	25,000	3,800	11,000	126.667	83.3	4.4
Security Services	8,000	6,000	700	8,100	87.500	75.0	13.5
<u>Personal Services</u>	179,000	139,000	8,500	124,900	47.486	77.7	9.0
Hotels and Catering	100,000	77,000	5,000	73,000	50.000	77.0	9.5
Audiovisual Services	9,000	7,000	400	6,900	44.444	77.8	9.9
Repairs	70,000	55,000	3,100	45,000	44.286	78.6	8.2
<u>Non Market Services</u>	400,000	390,000	25,450	605,000	63.625	97.5	15.5
Dwellings		180,240		1,348,010			
E C O N O M Y	5,704,500	2,947,240	124,640	4,957,198	21.849	51.7	16.8

N o t e s :

The above data represent more estimates than measurements and they have been elaborated and adjusted from the following sources:

1. Commission of the European Communities, Panorama of EC Industry 1990 (Brussels, EC, 1991)
2. OECD, National Accounts 1977-1989, Volume II, Detailed Tables, (Paris, OECD, 1991)
3. OECD, Labour Force Statistics 1989-1989 (OECD, Paris, 1992)
4. Pauli, Gunter, DOUBLE-DIGIT GROWTH: How to Achieve it with Services (Berlaar, ESIF 3, 1991)

(A) Cumulative- Million US\$ at 1985 prices and exchange rates

(B) Number of fully employed yearly per one billion sales (in US\$ 1985)

V. TECHNICAL ENGINEERING SERVICES IN THE MAGHREB UNION COUNTRIES

1. Introduction

Maghreb Union, established in 1964, is still on the way to its formation and in spite of the good political will and actual close cooperation in many fields, it has not been developed as yet to an economic union or a common market. It is not, for the time being, something more or different economically from the sum of its constituent member States.

In view of these realities the present report, aiming at a synthesis of the country ones, can not go further than to employ a broad regional outlook and framework for examining the actual state of affairs and the development prospects of the Technical Engineering and Consulting Services in each individual country looking also for commonalities, complementarities as well as forms of cooperation at regional level.

2. A sketchy socio-economic profile of the Maghreb Union Countries and their development prospects

TABLE V.1 presents the most characteristic economic data of the Maghreb Union countries while more detailed data, covering the last fifteen years, are given in the Tables of APPENDIX B.

The countries of the Union present substantial variations in size (Area and Population), resources (Oil and non-Oil) and development levels expressed in terms of per capita GDP ranging from \$ 440 (Mauritania) to \$ 5.730 (Libya) and 2342 (Algeria) with Morocco (\$ 1.046) and Tunisia (\$ 1463) in the middle.

In spite of these variations, their geographic, cultural and religious proximity enforce the spirit and the need for co-operation which are further enhanced by a series of common and pressing socio-economic problems the majority of them are facing. The most serious of these problems is the one of employment. In spite of great efforts and sacrifices, their economic development, in terms of employment generation, has fallen behind the development of their labour forces. Indeed, their labour force has increased between 1975 and 1989 from 16,2 to 25,0 million people, i.e. by 54,8% while employment in manufacturing grew from 505 to 1016 thousands covering only 5,8% of the total increase. The data presented in TABLE V.1 as well as the more detailed ones of APPENDIX B

indicate that substantial progress has been recorded as this is manifested by a series of social indicators (infant mortality, life expectancy, school enrollment, etc.) but economic progress has been very slow. Per capita GDP has been practically stagnant increased at the regional level by 7,5% from 1975/1980 to 1985/1989 with very moderate increases in Algeria (14,3%), Morocco (11,7%) and Tunisia (17,1%) and contractions in Libya (-36,6%) and Mauritania (-3,1%). Generally speaking these countries, in spite of serious investments, ranging between 25% - 30% of their G.D.P., have failed to make their development breakthrough while their prospects appear even more gloomy as their own endogenous development resources (see TABLE V.2 as well as TABLE B.13 in APPENDIX B) are negative forcing them to enter the borrowing spiral for just keeping their economies going on. It is characteristic that new loans are made not for initiating exclusively new development projects but to a substantial portion for just repaying old debts as the following data, referred to the 1980 - 1985 period, illustrate:

Country	Long Term Loans (Million US \$)		
	A. Disbursements	B. Repayments	B/A %
Algeria	24.044	20.630	85.8
Mauritania	693	288	41.5
Morocco	5.930	2.964	50.0
Tunisia	4.185	3.114	74.4

It is obvious that these countries can not continue their past and current development course, based by and large on old style, "classical" industrialization and they have to look for major initiatives and development alternatives.

3. The role of Services in alternative development courses

It is not the purpose of this report and it is beyond its frame and terms of reference to enter into the discussion of and the search for alternative development courses for the countries of the Maghreb Union. As such a search becomes, however, indispensable, coinciding chronologically with the profound structural changes taking place world wide, we felt necessary to bring to the attention of planners and policy makers these changes and mainly the important role which services have acquired in the development process devoting the first part of this report on this subject.

T A B L E V.1: BASIC PROFILE DATA OF THE MAGHREB UNION COUNTRIES

	1975	1980	1985	1989	Index (3)
Algeria					
Population (000)	16,020	18,670	21,850	24,600	133.9
G.D.P. (1)(2)	31,351	42,342	53,959	56,895	150.4
Investments(1)(2)	12,415	14,312	17,429	17,524	130.8
Per capita GDP(1)	1,957	2,259	2,477	2,342	114.3
Labour force (000)	5,620	6,650	7,860	8,920	136.8
Employment in Manufacturing	245	312	400	467	155.7
Libya					
Population	2,446	3,043	3,786	4,395	149.0
G.D.P. (1)(2)	12,766	35,592	28,585	25,127	111.1
Investments(1)(2)	5,057	12,025	9,220	9,018	106.8
Per capita GDP(1)	9,240	11,692	7,550	5,730	63.4
Labour force (000)	850	1,060	1,320	1,530	149.2
Employment in Manufacturing	15	18	21	24	136.4
Mauritania					
Population	1,420	1,550	1,770	1,970	125.9
G.D.P. (1)(2)	614	709	746	867	121.9
Investments(1)(2)	210	170	163	144	80.8
Per capita GDP(1)	433	457	422	440	96.9
Labour force (000)	595	640	750	840	128.7
Employment in Manufacturing					
Morocco					
Population	17,310	20,050	22,120	24,520	124.8
G.D.P. (1)(2)	14,417	18,997	21,562	25,545	141.0
Investments(1)(2)	3,575	4,217	4,981	5,186	130.5
Per capita GDP(1)	833	980	979	1,046	111.7
Labour force (000)	6,880	8,160	9,150	10,250	129.0
Employment in Manufacturing	145	191	252	330	173.2
Tunisia					
Population	5,610	6,390	7,260	7,990	127.1
G.D.P. (1)(2)	5,676	8,742	10,733	11,699	155.6
Investments(1)(2)	1,459	2,474	2,876	2,463	135.9
Per capita GDP(1)	1,143	1,369	1,478	1,463	117.1
Labour force (000)	2,220	2,680	3,120	3,490	134.9
Employment in Manufacturing	100	125	162	195	158.7
Maghreb Union					
Population	42,806	49,703	56,786	63,475	130.0
G.D.P. (1)(2)	64,824	106,382	115,585	120,133	137.7
Investments(1)(2)	22,716	33,198	34,669	34,340	123.4
Per capita GDP(1)	1,514	2,140	2,035	1,893	107.5
Labour force (000)	16,165	19,190	22,200	25,030	133.6
Employment in Manufacturing	505	646	835	1,016	160.8

N O T E S :

(1) US Dollars at 1980 prices and exchange rates

(2) Millions (3) 1985 & 1989 average (1975,1980 = 100)

SOURCES : Tables of APPENDIX B

We had another reason for looking more scrupulously on the subject of services. An analysis of the endogenous development resources of the Maghreb countries, presented in TABLE V.2 and in APPENDIX B (TABLE B.13) and re-grouping these resources disregarding conventional classification and demarcation lines, had disclosed that their main shortages in development resources are originated primarily in the sector of services and secondarily in the sectors of material production (Agriculture and Industries). We have to repeat once again that these shortages might be substantially bigger due to insufficient recording systems in which many transactions of the Services Trade are lost and hidden behind various obscure items of the invisible transactions in the Balance of Payments (see pp. 5, 30, 40-41, 47).

4. Services in the Maghreb Union Countries

We feel necessary, before examining the gaps of development resources in the Maghreb countries, to indicate the incompatibility and the distortions of reality which conventional approaches and classification schemes can create. Remittances of emigrants working abroad, for example, are not recorded as factor income but as private transfers under the items of invisible transactions considered socially and psychologically as "unemployment exports" being a "shame" for the respective countries indicating their failures in industrialization. If, however, these emigrants were hired by a national agency, private or public, and placed as temporary workers in various companies abroad doing exactly what they are doing today, the picture and its recording could be, without, of course, any change of the very reality, entirely different. Their wages and salaries plus the agency's margins will be recorded as factor income increasing respectively the G.D.P. while the "shame" could turn to a "pride" as this Agency could be the biggest multinational service producer company of the country with a turnover exceeding the 5%-10% of the GDP which no other industry can reach.

In the first part of TABLE B.13 (APPENDIX B), under the title "Earnings in foreign exchange", we have grouped by major categories the "usual" revenues of the economy from various sources and activities at home and abroad except capital transfers, and in the second part, under the title "Payments in foreign exchange", the "usual" expenses and inputs in foreign exchange for "running the economy" including long term interests and repayments of loans engaged in current economic activities. A summary of these accounts is presented in TABLE V.2, while in TABLE V.3 we have converted the same figures to per capita coefficients for comparability purposes.

T A B L E V.2: ENDOGENOUS DEVELOPMENT RESOURCES IN THE MAGHREB UNION COUNTRIES
(Million current US Dollars)

	1975	1980	1985	1989	Percentage distribution			
					1975	1980	1985	1989
Algeria								
Material Products	-951	4056	4223	1288	-50.7	190.6	165.3	19.4
Financial Services	-470	-3918	-4913	-7072	-25.1	-184.1	-192.3	-106.5
Other Services	-453	-2266	-1865	-855	-24.2	-106.5	-73.0	-12.9
Balance	-1874	-2128	-2555	-6639	(100.0)	(100.0)	(100.0)	(100.0)
Libya								
Material Products	1994	11551	4599	-109	244.4	123.6	163.7	-8.4
Financial Services								
Other Services	-1178	-2204	-1789	-1182	-144.4	-23.6	-63.7	-91.6
Balance	816	9347	2810	-1291	100.0	100.0	100.0	(100.0)
Mauritania								
Material Products	-42	-125	38	94	-26.8	-53.2	13.7	52.2
Financial Services	-39	-30	-76	-80	-24.8	-12.8	-27.4	-44.4
Other Services	-76	-80	-239	-194	-48.4	-34.0	-86.3	-107.8
Balance	-157	-235	-277	-180	(100.0)	(100.0)	(100.0)	(100.0)
Morocco								
Material Products	-737	-1355	-1368	-1678	-119.3	-65.4	-90.5	-99.3
Financial Services	-163	-1209	-1005	-1683	-26.4	-58.3	-66.5	-99.6
Other Services	282	491	861	1672	45.6	23.7	56.9	99.0
Balance	-618	-2073	-1512	-1689	(100.0)	(100.0)	(100.0)	(100.0)
Tunisia								
Material Products	-449	-981	-867	-1206	-162.7	-139.7	-78.9	-155.4
Financial Services	-103	-486	-727	-935	-37.3	-69.2	-66.2	-120.5
Other Services	276	765	495	1365	100	109.0	45.0	175.9
Balance	-276	-702	-1099	-776	(100.0)	(100.0)	(100.0)	(100.0)
MAGHREB UNION								
Material Products	-185	13146	6625	-1611	-8.8	312.3	251.6	-15.2
Financial Services	-775	-5643	-6721	-9770	-36.7	-134.1	-255.3	-92.4
Other Services	-1149	-3294	-2537	806	-54.5	-78.3	-96.4	7.6
Balance	-2109	4209	-2633	-10575	(100.0)	100.0	(100.0)	(100.0)

S o u r c e : TABLE B.13 - APPENDIX B

TABLE V.3: PER CAPITA ENDOGENOUS DEVELOPMENT RESOURCES IN THE MAGHREB COUNTRIES
(Million current US Dollars)

	1975	1980	1985	1989	Percentage distribution			
					1975	1980	1985	1989
Algeria								
Material Products	-59	217	193	52	-50.7	190.6	165.3	19.4
Financial Service	-29	-210	-725	-287	-25.1	-184.1	-192.3	-106.5
Other Services	-28	-121	-85	-35	-24.2	-106.5	-73.0	-12.9
Balance	-117	-114	-117	-270	(100.0)	(100.0)	(100.0)	(100.0)
Libya								
Material Products	815	3796	1215	-25	244.4	123.6	163.7	-8.4
Financial Service	0	0	0	0				
Other Services	-482	-724	-473	-269	-144.4	-23.6	-63.7	-91.6
Balance	334	3072	742	-294	100.0	100.0	100.0	(100.0)
Mauritania								
Material Products	-30	-81	21	48	-26.8	-53.2	13.7	52.2
Financial Service	-27	-19	-43	-41	-24.8	-12.8	-27.4	-44.4
Other Services	-54	-52	-135	-98	-48.4	-34.0	-86.3	-107.8
Balance	-111	-152	-156	-91	(100.0)	(100.0)	(100.0)	(100.0)
Morocco								
Material Products	-43	-68	-62	-68	-119.3	-65.4	-90.5	-99.3
Financial Service	-9	-60	-45	-69	-26.4	-58.3	-66.5	-99.6
Other Services	16	24	39	68	45.6	23.7	56.9	99.0
Balance	-36	-103	-68	-69	(100.0)	(100.0)	(100.0)	(100.0)
Tunisia								
Material Products	-80	-154	-119	-151	-162.7	-139.7	-78.9	-155.4
Financial Service	-18	-76	-100	-117	-37.3	-69.2	-66.2	-120.5
Other Services	49	120	68	171	100	109.0	45.0	175.9
Balance	-49	-110	-151	-97	(100.0)	(100.0)	(100.0)	(100.0)
MAGHREB UNION								
Material Products	-4	264	117	-25	-8.8	312.3	251.6	-15.2
Financial Service	-18	-114	-118	-154	-36.7	-134.1	-255.3	-92.4
Other Services	-27	-66	-45	13	-54.5	-78.3	-96.4	7.6
Balance	-49	85	-46	-167	(100.0)	100.0	(100.0)	(100.0)

Source : TABLE B.13 - APPENDIX B

As it is indicated in these Tables material products cover, at regional level, the 15,2% of these deficits, while services are accountable for the rest (84,8%).

All Maghreb countries present big deficits in the financial services balance while in the remaining services Morocco and Tunisia present surpluses thanks to Tourism and Emigrants' remittances. Disregarding these two sources the deficits in development resources by individual countries appear in 1989 as follows :

	<u>Material Products</u> (Percentage distribution)	<u>Services</u>
Algeria	+ 250,6	- 350,6
Libya	- 8,4	- 91,6
Mauritania	+ 60,3	- 160,3
Morocco	- 55,9	- 44,1
Tunisia	- 64,1	- 35,9

The above data speak by themselves of the financial importance of the services for the Maghreb countries and they consist an element and an aggregate which any development plan and policy can not ignore.

5. Engineering Design and Consultancy Services as a development factor for the Maghreb Union Countries

There are two ways one can look on the development prospects of the Engineering Design and Consultancy Services in a country. The first can be confined to their examination as an activity, one of the many, of the economy generating income and employment. The second can go further by taking into consideration the entire spectrum of benefits and synergic effects which the development of these services can bring to the country's economy.

The profound structural changes taking place in the international and national economies, the emerging role of services as a development factor of strategic importance, the economic significance of services for the Maghreb countries outlined in the previous pages and mainly the urgent need of these countries in finding new development alternatives in order to get out of their economic stalemate forcing them to enter more deeply the "borrowing spiral" in which they have been trapped, leave no doubt that the second approach is the preferable one and for this reason it has been adopted by the present report.

The discussion on the role and prospects of Services for the developing countries is neither novel nor strange and it has occupied already an important position in the development

literature and rhetorics. The critics which one can make on the movement "more technical services in developing countries" is that it is still conditioned by the old logic of import substitution focused mainly, if not exclusively, on savings and earnings in foreign exchange from the substitution of imported engineering, technical and consulting services through the development of local ones. This logic has influenced strongly the writers of the country reports.

Although the import substitution dimension is one which by no means should be ignored or underestimated, the catalytic and multiplier's role of these services in the development process should receive also proper consideration in drafting policies and drawing development plans and programmes for these services which should be integrated with broader plans and programmes aiming at re-orienting and accelerating industrialization by strengthening the technological basis and capabilities of the developing countries and seeing these services as the most important element of these capabilities.

In case that developing countries confine their efforts for the upgrading of their engineering design and technical consultancy services to the import substitution dimension, they risk to repeat the mistake made with the import substitution industries. While they can offer some additional income to their domestic engineering services and save foreign exchange as well, they risk to lose in the remaining service activities if they do not grasp the opportunity to make the upgrading of the engineering design and consultancy services instrumental in building up a full fledged sector of industrial support services being essential in keeping pace with the profound changes taking place in the structures of industries and economies world wide.

6. Estimates on the global demand for Engineering and Consultancy Services in the Maghreb countries

The estimates of the country reports on the global demand for engineering and technical consultancy services have been confined to studies and engineering consulting works referred mainly or exclusively, with the exemption of the country report for Morocco which is more comprehensive, to new projects envisaged in the respective development plans and programmes or projections of anticipated new investments and mainly or exclusively in the industrial sector. The estimates of the country reports regarding the present and future demand of Engineering Design and Technical Consultancy Services are summarized in TABLE V.4.

T A B L E V.4 : ESTIMATES OF THE COUNTRY REPORTS ON THE VALUE OF THE MARKET FOR ENGINEERING AND TECHNICAL SERVICES

	1985/1989		2 0 0 0	
	(A)	%	(A)	%
Algeria (2)				
Global demand				
Value	3,400	100.0	3,400	100.0
Manpower inputs	38,600	100.0	23,800	100.0
Local capacities				
Value	400	11.8	400	11.8
Manpower inputs	6,800	17.6	6,800	28.6
Foreign imports				
Value	3,000	88.2	3,000	88.2
Manpower inputs	31,800	82.4	17,000	71.4
Mauritania (1)				
Global demand				
Value (B)	10.600	100.0	29.900	100.0
Manpower inputs	49	100.0	211	100.0
Local capacities				
Value (B)			14.900	49.8
Manpower inputs			101	47.9
Foreign imports				
Value (B)	10.600	100.0	15.000	50.2
Manpower inputs	49	100.0	110	52.1
Morocco				
Global demand				
Value	544	100.0	1,651	100.0
Manpower inputs	14,700	100.0	37,700	100.0
Local capacities				
Value	163	30.0	496	30.0
Manpower inputs	8,050	54.8	14,000	37.1
Foreign imports				
Value	381	70.0	1,155	70.0
Manpower inputs	6,650	45.2	23,700	62.9
Tunisia (3)				
Global demand				
Value	125	100.0	380	100.0
Manpower inputs	3,140	100.0	8500	100.0
Local capacities				
Value	30	24.0	90	23.7
Manpower inputs	1,480	47.1	2550	30.0
Foreign imports				
Value	95	76.0	290	76.3
Manpower inputs	1,660	52.9	5950	70.0

(A) Values in Million US dollars- Manpower inputs in Man/Years unless otherwise indicated

(B) Thousands

(1) Estimates are confined only to the Development Plan

(2) Estimates are confined to the Public Industrial Sector only.

(3) Estimates are based on investments envisaged in the development Plan.

Engineering design and technical consulting services are closely related with investments as all economic units, operating ones and the ones planned to be established, implement financially their plans for the establishment of new activities as well as the expansion or re-organization of existing ones through the investments account. It has been found and it has been confirmed as well by the country reports that the cost of these services is around 10% to 12% of the value of the respective investments. As the country reports have employed different bases and methods in estimating the demand for technical services, we have made our own, uniform estimates, presented in TABLE V.5, in which we have estimated the value of these services on the 12% of the total investments of the economy (excluding agriculture), adding an amount of 0.65% on the value of the G.D.P. for technical services charged to the current expenses accounts of the economic operators and representing usually the technical component of Management Consultancy. In TABLE V.6, we have broken down the global demand by main sectors, project phases, categories of studies and kinds of Engineering Works as well as their coverage by local engineering services.

In order to have an estimate on the global demand for Technical and Professional Services under the assumption that these services can play a role in the Maghreb economies similar to the one they are performing in the developed countries, we have made a series of estimates presented in APPENDIX B (TABLES B.14-B.20). The basis of these estimates has been the Turnover, Value Added and Employment coefficients of four categories of professional services (Consulting Engineers, Architects, Construction Economists and Management Consultants) in the European Communities¹ adjusted to the level of development of each Maghreb country (Per capita GDP and Value added per employed in Manufacturing). These estimates have been made under two variations. A low one (minimum) representing an estimate on the part of their business covering conventional engineering services and a high one (maximum) including also services offered or ought to be offered by a full fledged sector of industrial support services similar to the one of industrialized countries.

¹ see TABLES IV.3 & IV.5 (pp. 69,71) and TABLE A.2 in APPENDIX A

TABLE V.5: ESTIMATES ON THE GLOBAL DEMAND FOR TECHNICAL SUPPORT SERVICES IN THE MAGREB UNION COUNTRIES AT 1989

A L G E R I A		DEMAND FOR TECHNICAL SERVICES (1B)	
		Studies related with :	
Memo data		New Investments	2,103
Per capita GDP (1)	2.159	Operating Units	371
Investments (1B)	17,523	out of which :	
G D P (1B)	56,895	industries (2)	1054
Industries (2)	38.9	Other sectors (3)	1420
Other sectors (3)	52.4	Corresponding Employment (4)	
		Professionals	13.904
		Assistants & others	28.230
L I B Y A		DEMAND FOR TECHNICAL SERVICES (1B)	
		Studies related with :	
Memo data		New Investments	1,083
Per capita GDP (1)	4.927	Operating Units	164
Investments (1B)	9,021	out of which :	
G D P (1B)	25,127	Industries (2)	1029
Industries (2)	79.4	Other sectors (3)	218
Other sectors (3)	16.8	Corresponding Employment (4)	
		Professionals	6.054
		Assistants & others	12.292
M A U R I T A N I A		DEMAND FOR TECHNICAL SERVICES (1A)	
		Studies related with :	
Memo data		New Investments	17.280
Per capita GDP (1)	440	Operating Units	5.653
Investments (1B)	144	out of which :	
G D P (1B)	867	Industries (2)	9.218
Industries (2)	28.5	Other sectors (3)	13.714
Other sectors (3)	42.4	Corresponding Employment (4)	
		Professionals	111
		Assistants & others	226
M O R O C C O		DEMAND FOR TECHNICAL SERVICES (1B)	
		Studies related with :	
Memo data		New Investments	622
Per capita GDP (1)	1.046	Operating Units	167
Investments (1B)	5,186	out of which :	
G D P (1B)	25,545	Industries (2)	300
Industries (2)	31.8	Other sectors (3)	489
Other sectors (3)	51.8	Corresponding Employment (4)	
		Professionals	4.733
		Assistants & others	9.610
T U N I S I A		DEMAND FOR TECHNICAL SERVICES (1B)	
		Studies related with :	
Memo data		New Investments	296
Per capita GDP (1)	1.463	Operating Units	76
Investments (1B)	2,468	out of which :	
G D P (1B)	11,699	Industries (2)	124
Industries (2)	29.2	Other sectors (3)	249
Other sectors (3)	58.7	Corresponding Employment (4)	
		Professionals	2.180
		Assistants & others	4.425
M A G H R E B U N I O N		DEMAND FOR TECHNICAL SERVICES (1B)	
		Studies related with :	
Memo data		New Investments	4,124
Per capita GDP (1)	1.893	Operating Units	783
Investments (1B)	34,365	out of which :	
G D P (1B)	120,133	Industries (2)	2437
Industries (2)	44.8	Other sectors (3)	2470
Other sectors (3)	45.4	Corresponding Employment (4)	
		Professionals	137.871
		Assistants & others	280.557

- (1) 1980 US \$ (A) Thousands (B) Millions
 (2) % - Including Construction, Public Works and Housing
 (3) % - Excluding Agriculture
 (4) in Man/Years estimated for US\$ 50 per Man/hour (1.760 yearly),
 adjusted to 1980 US\$ and to per capita GDP of each country

T A B L E V.6 : ESTIMATES ON THE BREAK DOWN OF CURRENT DEMAND AND NATIONAL RESOURCES IN ENGINEERING WORKS AND TECHNICAL CONSULTING

CATEGORIES OF ENGINEERING AND TECHNICAL CONSULTANCY WORKS	ALGERIA		LIBYA		MAURITANIA		MOROCCO		TUNISIA		T O T A L	
	Value (A)	Man/ Years	Value (A)	Man/ Years	Value (A)	Man/ Years	Value (A)	Man/ Years	Value (A)	Man/ Years	Value (A)	Man/ Years
CURRENT DEMAND - Total	4,132	42,134	2,082	18,346	38	337	1,318	14,343	621	6,605	8,191	81,765
brocken down by :												
SECTORS												
Industries & Construction	1,760	17,949	1718	15,135	15	135	515	5,606	207	2,203	4,215	41,028
Other Sectors	2,372	24,185	364	3,211	23	202	803	8,737	414	4,402	3,976	40,736
IMPLEMENTATION PHASES												
Engineering Design	1,446	14,747	729	6,421	13	118	461	5,020	217	2,312	2,867	28,618
Supervision	649	6,615	327	2,880	6	53	207	2,252	98	1,037	1,286	12,837
Procurement	921	9,396	464	4,091	9	75	294	3,198	139	1,473	1,827	18,234
Construction	938	9,564	473	4,165	9	76	299	3,256	141	1,499	1,859	18,561
Start up	178	1,812	90	789	2	14	57	617	27	284	352	3,516
T o t a l	4,132	42,134	2,082	18,346	38	337	1,318	14,343	621	6,605	8,191	81,765
CATEGORIES OF STUDIES												
Pre-Investment Studies	211	2,149	106	936	2	17	67	731	32	337	418	4,170
Project Implementation	3,214	32,780	1,620	14,273	30	262	1,025	11,159	483	5,139	6,373	63,613
Start up												
Training	219	2,233	110	972	2	18	70	760	33	350	434	4,334
Organization	488	4,972	246	2,165	5	40	155	1,692	73	779	967	9,648
T o t a l	4,132	42,134	2,082	18,346	38	337	1,318	14,343	621	6,605	8,191	81,765
KIND OF ENGINEERING WORKS												
Pre-feasibility studies	165	1,685	83	734	2	13	53	574	25	264	328	3,271
Basic Engineering	537	5,477	271	2,385	5	44	171	1,865	81	859	1,065	10,629
Detailed Engineering	1,570	16,011	791	6,971	15	128	501	5,450	236	2,510	3,113	31,071
Procurement- Inspection	992	10,112	500	4,403	9	81	316	3,442	149	1,585	1,966	19,624
Supervision of Construction	620	6,320	312	2,752	6	51	198	2,151	93	991	1,229	12,265
Start up	83	843	42	367	1	7	26	287	12	132	164	1,635
Exploitation	165	1,685	83	734	2	13	53	574	25	264	328	3,271
T o t a l	4,132	42,134	2,082	18,346	38	337	1,318	14,343	621	6,605	8,191	81,765
CURRENT LOCAL CAPACITIES												
	Units	%	Units	%	Units	%	Units	%	Units	%	Units	%
Categories of Personnel												
Engineers	1,600	...	...	...	...	...	479	29.9	497	33.7	...	...
Technicians	?	...	...	...	...	...	737	46.0	977	66.3	...	...
Employees	?	...	...	...	...	...	386	24.1			...	...
TOTAL	?	...	...	...	...	...	1,602	100.0	1,474	100.0	...	...
SECTORS												
Industries & Construction	1,600	12.0	...	...	...	...	626	11.2	1,106	50.2	...	...
Other Sectors	?	0	...	...	...	...	976	11.2	369	8.4	...	...
KIND OF ENGINEERING WORKS												
Pre-feasibility studies	300	24.0	...	...	...	...	77	13.4	59	22.3	...	...
Basic Engineering	167	4.1	...	...	...	...	206	11.0	192	22.3	...	...
Detailed Engineering	267	2.2	...	...	...	...	604	11.1	560	22.3	...	...
Procurement- Inspection	167	2.2	...	...	...	...	381	11.1	354	22.3	...	...
Supervision	267	5.7	...	...	...	...	239	11.1	221	22.3	...	...
Start up	167	26.7	...	...	...	...	31	10.8	29	22.3	...	...
Exploitation	267	21.3	...	...	...	...	64	11.2	245	92.7	...	...
							1,602	11.2	1,660	25.1		

(A) Million current US\$ (1980 x 1,67)

C % Percentage coverage of respective demand

7. Needs in Engineering studies and Consulting and their coverage by local Engineering Services

As it is indicated in TABLE V.4, local services cover a small part of the current total demand for Engineering Design and Technical Consultancy Services as follows:

	Part of the demand covered by :	
	Local Services	Foreign Services
Algeria	11.8	88.2
Mauritania	-	100.0
Morocco	30.0	70.0
Tunisia	24.0	76.0

The deficit between total demand and domestic supply is not due to scarcities of local human resources but to the non proper utilization of existing ones which, in turn, is caused by the fact that endogenous engineering capacities have not been properly and timely developed. While all countries pay substantial amounts for imported foreign engineering services, they face excessive unemployment of Engineers and Technicians at home as this is indicated in TABLE V.6 regarding Algeria and Morocco. In Tunisia, who faces excessive also unemployment of engineers and technicians, a recent survey had disclosed that only 20% of the Engineers and Scientists educated abroad are currently working in the country, the rest 80% has contributed to her "brain drain".

The reasons for the negligence in developing endogenous capacities in engineering services are many and they have been mentioned already in previous parts (see pp.35,37,49-52). In the case of the Maghreb countries the concept that their core problem has been underdevelopment coupled with excessive unemployment which could be solved only through rapid industrialization, led policy makers to pay increasing emphasis on foreign expertise hoping to expedite industrialization and not to jeopardize its pace with "experiments" in using local resources. In addition, the delays and deficiencies demonstrated by local authorities in implementing big, complicated or special projects gave preference to turn-key agreements, reinforced by suggestions of funding agencies, composite package deals and "attractive offers" advanced by the respective suppliers. Among the Maghreb countries the ones who had the benefit of the oil endowment, they had demonstrated also an attitude of liberal spending in foreign exchange, including payments for imported services, up to the moment they had realized that oil resources were not enough to cover their debt repayments (see TABLE V.2, p. 77).

TABLE V.7: DEFICITS OF NATIONAL CAPACITIES IN ENGINEERING DESIGN AND TECHNICAL CONSULTANCY SERVICES AND NUMBER OF UNEMPLOYED ENGINEERS, SCIENTISTS AND TECHNICIANS IN ALGERIA AND MOROCCO

	ALGERIA	MOROCCO
National Capacities in Engineering design and Technical Consultancy		
Number of employed	1,600	1,328
Coverage of National needs %	11.8	30.0
Deficit expressed in local jobs equivalent (Man/Years)	13,560	4,450
UNEMPLOYED	100,392	97,596
Ph.D.	62	] 700
Doctoral - 3rd cycle	650	
Medical Doctors	226	
Veterinarians	4	
Engineers (State Licence)	362	721
Architects	77	] 175
Urban Development	98	
M.S.	553	
Applied Engineering	359	] 20,000
B.A.	21,698	
Informatics specialists	69	
Journalists - Media experts	39	
Technical College	5,109	5,000
Baccalaureate	49,788	50,000
Technical assistants	20,854	21,000
Various others	444	

Note : The national capacities in terms of number of currently employed and the percentage of the total country demand covered by local engineering services have been taken from the respective country reports. The estimate of this coverage and of the residual deficit in Algeria has been limited to the public industrial sector and confined to the part of studies associated with the investments programme of this sector while the respective estimates for Morocco cover all sectors and activities.

While it is true that local engineering services did not have the knowledge, capacities, experiences and resources development projects, it is equally true that they could cover a substantial part, 70% - 80%, of these services as partners or subcontractors of specialized foreign consulting firms and this is the very point for which these countries can be blamed. The negligence in undertaking deliberate efforts for developing endogenous capacities in engineering services has caused that the prospects in the gap between needs and resources do not show any sign of improvement as this is indicated in TABLE V.4.

VI. PROBLEMS AND PROSPECTS IN DEVELOPING ENGINEERING DESIGN AND TECHNICAL CONSULTANCY SERVICES IN THE MAGHREB COUNTRIES

1. Main causes and factors inhibiting the development of national capacities in Engineering Services.

The value of the global Market for Engineering Design and Technical Consultancy Services in the Maghreb countries is estimated to exceed the six billion US dollars (at current prices and exchange rates on the basis of the data given in TABLE V.5) out of which about 17%, i.e. close to one billion, is covered by local engineering services, including foreign ones established in the area, and the rest 83%. i.e. about five billions is imported⁽¹⁾.

The questions raised for this low participation of local services in satisfying such a demand and in exploiting a substantial and steadily growing market are the following:

- Why local engineering services which exist, operate in the area and they are quite developed and dynamic, proved by their continuous expansion, have not capitalized on these market forces in extending their participation share ?
- If national local services have failed for many reasons (perhaps due to lack of capacities, experience, specialization, or resources) to catch up this market why foreign interests, among the ones established already in the area or others which could move in, have failed also to cover this vacuum ?
- If local and foreign interests have shown indifference or inability in serving these markets, why governments which face excessive unemployment of Engineers and Technicians at home (see TABLE V.6) while paying huge amounts in precious hard currencies for importing engineering services including their foreign labour content, have not taken measures in facing this problem and reversing these trends ?

The above problems and questions are not peculiar for and pertinent only to the Maghreb countries. They are common to the majority of the developing countries (see also pp.35-36) and the main causes behind them are the following:

¹ Excluding Libya for which reliable data are not available. Including our own rough estimates for Libya, the global Market can be estimated to eight billion US dollars and the value of the imported engineering services to five billions.

- Markets do exist but not market forces in the classical and widely accepted meaning of the term as the functioning of these markets is heavily, if not completely, distorted by the monopsonistic position of governments, funding agencies and foreign donors which deciding more or less arbitrarily and in a discretionary way on study assignments condition that way completely the market forces and, consequently, the development of the respective services. Even for studies assigned directly by private economic operators, the role and intervention of public services is decisive as the majority of these studies is concerning projects related with expected public grants and other concessions implementing development incentives for which approval or favourable response of the authorities plays a decisive role. It is characteristic that private construction, which is a sector with the least governmental intervention regarding study assignments, covers about 65% in the turnover of the local engineering services although it represents around the 5% only of the GDP and the 10%-15% of the investments.
- More negative role than the monopsonistic position of governments has played their conviction and attitude that their main development target is rapid industrialization for which only imported foreign engineering services could provide the proper inputs thanks to their proved specialization, expertise and experience. Although the development of local engineering services had been declared rhetorically as a very desirable objective, the benefits expected from the imports of foreign engineering services were safeguarded from the risks of "experiments" in developing local services by assigning to them studies for which doubts existed regarding their capacities, experience and resources in carrying over successfully these assignments.
- The decisive role and direct involvement of governments in study assignments has nursed, in turn, a negligence in drawing long term plans and programmes for the development of local engineering services as they thought that such plans were not necessary thanks to their daily involvement and influence which were ensuring continuous and proper adjustments and interventions far better and realistic than the ones, "theoretical" by necessity, of long term plans and programmes.

The negative effects of the above factors have been reinforced in the Maghreb countries by an excessive public sector (Algeria, Libya), a liberal attitude in foreign exchange spending thanks to oil revenues and a prevailing concept of rapid large scale industrialization by using resources in

foreign exchange (oil, tourism, emigrants' remittances, loans) in order to get advanced technologies and high level engineering services.

2. Development versus Support

Serious and pressing shortages in foreign exchange which all the countries of the region are facing even the rich oil ones like Algeria and Libya, alarming augmentation of the number of unemployed scientists and engineers at home, accelerated from the increasing stream of repatriating emigrants and the drastically reduced one of expatriations due to persistent or recurring economic recessions in European and in the golf states, all together force their governments to assign high priorities in employment generation and drastic savings in foreign exchange spending. Within these priorities it is logical that the potential of the national engineering services for savings in foreign exchange, perhaps income earnings and employment generation has received special attention.

As it has been mentioned already the prevailing idea on the development and use of these services is mainly the one of import substitution which appears very easy to be implemented through special measures of support and protection. As national governments were assigning for decades the most important development projects to foreign engineering companies who can blame them if now, in view of the problems they face, assign all or a part of current and forthcoming projects to their domestic services or ask funding agencies as well as their donors and lenders to help them in giving to their national services an increased share in view of the special difficulties they face ?

Although the above argument appears very simple and unquestionable, it does not and it can not work. As it has been mentioned already, the liberalization of the Services Trade is a basic, "tough" term of the developed countries in the GATT negotiations. It is characteristic that E.E.C. has a special service identifying very scrupulously on a country by country basis all direct and indirect barriers to trade for all services, one by one, including Consulting Engineering and issues a continuously updated "EEC Catalogue of third countries obstacles to Trade in Services" which Catalogue all EEC negotiators carry with them in all dealings with third World countries ranging from technical assistance to commodity agreements, grants, or re-scheduling loans. Similar approaches and methods have been adopted by the OECD, Japan, USA, Canada, United Kingdom, Netherlands and many other major industrial countries. As developing

countries need the cooperation of the developed ones, they can not ignore the fact that protective measures for engineering services can not be acceptable by the international economic community. Therefore, developing countries do not have a dual alternative: protection or free trade in Engineering Services, but only one: free trade, which means that they have to develop their engineering services as to be internationally competitive in order to stay competitive in their own domestic markets.

The fact that the absence of normally functioning markets is accountable for the non development of national engineering services does not mean that restoring conditions of free competition in the markets, local engineering services will be developed and flourished automatically. On the contrary, as it has been mentioned already (see p. 36), it is for sure that they will lose even the slim shares they enjoy today.

3. Main problems in developing endogenous capacities in Engineering Design and Technical Consultancy Services.

If closed and protected national markets are excluded, the main problems faced by national engineering services in becoming competitive in the international markets and consequently in the domestic ones, can be grouped into the following four broad categories :

- a. Non favourable business environment (Regulations, public policies, public procurement practices, public attitudes)
- b. Low level of sectoral development (support facilities and infrastructures, special credit lines and business guarantees, common services, access to and contacts with regional and international contract awarding centres, development plans and programmes)
- c. Inadequate organizational development of the consulting firms (capacities, experiences, specialization, technical infrastructures, economic resources)
- d. Inadequate business organization and promotional practices including the organization of the profession

4. Business environment

In an opened market the best protection of the engineering profession is a set of public rules and regulations ensuring entry to and stay in the business of competent only professionals together with provisions for the elimination of the non competent ones. These regulations built up the image and

credibility of the profession, being precious marketing assets, strengthening simultaneously its "esprit de corps". The importance of such a regulatory framework is disclosed by the fact that professional associations in the developed countries are among its main promoters.

While the entry of individuals in the engineering profession is regulated in the Maghreb countries satisfactorily and in a similar way as in the developed countries, it is not the same regarding consulting engineering firms for the incorporation of which the general provisions of the commercial law are applicable without any distinction between consulting engineering firms and any other commercial activity as well as between consulting engineering and construction firms.

In addition to the regulation of incorporation and operation of consulting engineering firms, three other measures have been proved to be extremely conducive to sound business practices in the engineering services market:

- a. Registration, after a screening procedure, of firms qualified to participate in public tenders for studies and engineering works.
- b. Registration can be degenerated to a mere bureaucratic formality if it is not associated with a serious pre-qualification process which, after screening candidates, classifies them to categories of works in terms of fields and amount, in which they are entitled to participate in public tenders.
- c. Registration and pre-qualification are meaningful and effective only within a complete system of regulation of public procurement for engineering services and generally consultancy services ensuring objectivity in awarding public contracts. This is particularly important in awarding engineering services and generally services as the quantity and price can not be so objective criteria as in commodities.

In the Maghreb countries, besides the modernization of the corporate law for engineering services, a revision of the whole system of registration - pre-qualification - public procurement appears necessary as the current one is either not developed at all (Algeria, Mauritania, Libya) or inadequately developed (Morocco, Tunisia).

The regulatory framework is a pre-condition for the creation of an environment conducive to the development of national engineering services but it can remain a plain empty frame if not completed by a series of policies and measures aiming at reversing and correcting the impact of all factors which

have contributed to the non proper utilization and development of endogenous engineering services during the last decades and which have been:

- a. The negative attitude of the authorities and the administration's rank and file versus the local services blamed as non qualified ones without being credited that the blame for their alleged lower qualifications can not be debited all to them but a part also to the State which had failed to take measures promoting their development.
- b. The competition between in-house engineering services of various governmental departments and outside, independent, private or state owned, consulting engineering organizations for the same assignments without the clear division of tasks and functions prevailing in the developed countries and according to which engineering studies, designs and works are implemented by specialized engineering firms while governmental in-house engineering departments are confined to the administration only of the tendering procedures and the implementation of study contracts. Externalization of Consulting Engineering activities carried over by in-house governmental departments is a precondition for the development of national engineering services.
- c. The low esteem and the competition of the in-house public services led to very low compensation rates for the independent engineering services as public servants salaries were used as a basis in determining consulting fees which ought to include salaries, materials, general expenses, overheads, risks as well as margins for financing updating, investments and further development.

5. Sectoral development

The existence of a market does not mean that its forces can cure automatically as a panacea all ills which its economic operators are suffering from. In all activities a prior proper development is a precondition for penetration and consolidation in a given market. Food is always in a great demand but a steadily growing food market can not bring the automatic development of agriculture without deliberate efforts, important allocations of resources and serious development programmes. The same remarks are valid regarding engineering services.

The sector of engineering services in the Maghreb countries, as in the majority of the developing ones, has not been organized and developed in a level ensuring saucerful confrontation with the competing engineering services of the developed countries. The main points of weakness are the following:

- a. Inadequate development of support facilities and infrastructures. In the developed countries a thick and vast network of universities, research centres, laboratories, libraries, documentation centres, data banks and the likes provide a great variety of support activities and services free of charge or at low cost which facilities engineering services in the developing countries either they do not possess or they can obtain only at high costs.
- b. Lack of a special system of business financing and guarantees. This is one of the most critical points. Engineering services as all consulting services face a series of special problems regarding financing and guarantees which traditional banking and insurance business can not satisfy. These problems are the following :
 - i. They need guarantees for participation in tenders, for ensuring good performance of awarded contracts as well as for covering received advances. As their real capital is immaterial (knowledge), they do not possess real property or production facilities which can be mortgaged, they do not handle products which can be pledged and their output (designs, studies) has no commercial value, for all these reasons they are not qualified for the usual guarantees extended by the banking system.
 - ii. As the main item of their expenses consists of salaries which can not be credited or deferred, they need also credit facilities which conventional banking services can not extend.

In developed countries, as well as in some developing ones, these problems have been faced through the specialization of certain banking institutions, state guarantees similar to the ones for export credits or collective guarantees through the professional associations.

- c. The professional updating of the engineering firms and their staff, the need of being regularly informed on the organizational, scientific, technological and financial developments of the profession, keeping contacts with the national, regional and international contract awarding centres and generally being "professionally in" is an enormous effort in terms of time and money investments that only very big engineering firms can afford. For the smaller ones common information and documentation centres as well as common services can cover this vacuum.

The systematic confrontation of all these problems requires the implementation of a special sectoral programme for the development of national engineering services.

Credit facilities and support infrastructures are not the only problems which consulting engineering as a business branch is facing.

Taxation and foreign exchange facilities consist two other big problems. Internal revenue authorities discharging faithfully their statutory task in extracting as many as possible funds for the fiscus, do not recognize often as normal deductible costs a series of expenses which are indispensable to the engineering firms such as participation in conferences and seminars, subscriptions to professional periodicals, procurement of publications, etc. or they apply for their deduction the same rates applicable to ordinary commercial firms. The same problems exist regarding the fiscal treatment of "immaterial", according to the taxation authorities, investments and depreciations being peculiar to Consulting Engineering such as special software programmes, data banks, documentation, etc.

Another serious problem is the one of foreign exchange facilities. As Consulting Engineering is practically a "knowledge transferring" pipeline it needs to have easy and quick communication with the outside world as well as access and "quick and easy buying" possibilities of information and professional inputs such as designs, patents, experts and expertise, models, software programmes, etc. Low limits in foreign exchange approvals coupled with complicated and slowly moving procedures as well as excessive red tape all together raise serious barriers to the normal functioning of Consulting Engineering firms and hamper seriously their competitiveness vis-a-vis the Consulting Engineering firms of the developed countries which do not face any of these problems.

6. The Organizational Development of Engineering firms

Consulting Engineering in developed and developing countries begins from the same basis : qualified individuals educated as engineers in the same or the same level polytechnic universities or similar high level professional schools. On this basis Engineering firms of developing countries are not and could not be inferior compared with the ones of developed countries. The "brain drain" of developing countries proves this fact.

A classical definition of Organization is one according to which: "Organization is the combination of human and material resources into productive relations". When this definition is applied in evaluating levels of development and competence between Consulting Engineering Firms in Developed and in Developing countries differences might be noticed. In

In this respect we would like to underline that a Consulting firm is something more than and different from the sum of its professional staff. It is an institutional entity with its own identity, history, capacities, experience and resources. As a group of good musicians does not make by definition a good orchestra, the same is true concerning consulting firms. A group of good engineers does not make a good by definition Consulting Engineering Firm. The qualifications and experiences of the professional staff of an engineering company is one, very important, but one among the many criteria applied in evaluating its competence in consulting assignments. It should meet many other criteria in order to be pre-qualified or selected for Consulting assignments.

The main organizational problems of consulting engineering firms identified in the Maghreb countries, being more or less the same with the ones recorded in other developing ones, are in the following areas :

- a. Institutional experience
- b. Documentation
- c. Organizational technology
- d. Business Organization

7. Institutional experience.

The assignment of the most important development works to foreign consulting firms or to in-house engineering services of governmental departments and public companies has deprived local engineering firms from the benefit of claiming institutional experience in a vast range of subjects and projects not only in the international scene but also in their own countries. In opened tendering procedures foreign firms can claim and prove more experience in the country than its own engineering firms. In invitations to tender and study assignments for projects financed by the European Development Fund (EEC's Development Assistance Organization), for example, engineering firms from the Maghreb countries, as from all the Lomé and the APC states, can participate in equal terms with the engineering firms of the EEC countries while firms from non EEC states are excluded. Joint ventures between EEC engineering firms and firms from the APC states are receiving preferential treatment. Absence of proved institutional experience of the Maghreb engineering firms inhibits them in using these benefits. This comparative disadvantage is aggravated by the low level of cooperation among local firms as well as the weak organization of the profession.

8. Documentation.

Consulting engineering is an applied art. One of the most important professional secrets in consulting engineering as in many professional activities is to save time and money by not repeating work done already by yourself or others in the past or in relevant subjects and areas but beginning from this work to go further offering the best additions, updating and improvements at the lowest possible costs. To this end documentation resources and infrastructures including technical archives, data bases, technological information, formulas, calculations and drawings, housed in the firm or easily accessible in its environment constitute an important element sharpening the firm's competitive edge.

Engineering firms of the region are weak in own and environmental documentation infrastructures and facilities as well as in access, affiliations and connections with foreign centres, organizations and firms from which they can get this important background work at reasonable costs. The "files" of many important development projects constructed in the Maghreb countries should be somewhere and they can constitute the first input in building up documentation facilities at sectoral or firms' level.

Although local engineering firms have lower personnel costs, operational expenses and margins than their competing foreign firms, in many cases they can not come with lower offers as they have to do from the beginning all or a part of the background work due to lack of or non access to the proper documentation facilities.

9. Organizational Technology.

Engineering as an applied science is undergoing, as all applied disciplines, continuous progress and changes towards two main directions: in its subject matter, i.e. in its pure scientific content, and in the methodology and organization of its application. Methodology and organization of the application constitute that we can define as organizational technology.

Scientific updating is followed up systematically by practising engineers through the literature and periodical follow up education in seminars and special courses as well as through contacts and connections with academic institutions. In spite of limited means for updating, consulting engineers in the Maghreb countries as well as in the majority of the developing ones, do not seem to lag behind their colleagues in the developed countries regarding scientific and professional updating. In the Maghreb countries geographic proximity, economic, political and cultural relations and no

linguistic barriers with the developed industrial countries of Europe have facilitated further the scientific and professional updating of their consulting engineers.

The same as above remarks can not be made, however, regarding organizational technology of consulting engineering firms. It is characteristic that country reports cite as an important comparative advantage of local engineering firms their lower per unit personnel costs while differences in remuneration scales between local and foreign engineers and technicians have been used often as a basis for evaluating competitive positions. All these mean that the profound changes recorded or going on in the area of the organizational technology in Consulting Engineering have not been sized up and properly evaluated as yet.

Consulting engineering as an applied art has undergone the last three decades and is still undergoing rapid and important technological developments which change dramatically the terms and conditions of professional competition. For centuries the organizational configuration of engineering as an applied art had been very simple and uniform dominated by the "Master's Cottage" in which one or more engineers, being the "Masters" of the art and assisted by a number of technicians (draftsmen, land surveyors) were producing the core of the consulting engineering work consisted of calculations and designs, the so called "blue prints", for the construction of buildings and infrastructures, installations of machinery, as well as mechanical, chemical and electrical processes. This work was done at two levels and phases: Basic engineering consisted of general character calculations and drawings and detailed engineering which was breaking down the basic drawings into very detailed ones. The role of assistants, mainly in the detailed engineering phase, was predominant as they were performing the bulk of the work. As the means used were very simple and inexpensive (Logarithmic and trigonometric tables, slide rules, drawing pens, paper, ink and some machines for the multiplication of blue prints) while productivity of the main labour force (calculating assistants and draftsmen) was more or less invariant, per unit labour costs were the main cost differential and the determinant, in the last analysis, of the firm's competitive position. This organizational configuration and methodology had been the same for the big and the small firms and the only difference between them had been in the number of departments, fields of specialization and number of engineers and assistants engaged and, of course, working capital meeting the requirements of a steady and inflexible payroll bill.

In a very few professions the advance of microelectronics has produced so many revolutionary changes as in Consulting Engineering. Engineers and their assistants do not perform and they are not needed anymore for calculations which were occupying a great part of their productive time. They simply

feed the computer. CAD has replaced completely the classical draftsman as basic and detailed designs are made by the computer and they can be checked, changed and revised with amazing speed and accuracy. Parallel to the advance of computers, remote sensing methods, techniques and instruments as well image analysis and processing and field surveying electronic techniques (work stations) have produced profound also changes in the relations of the engineer with the interconnected professions of land surveyors, topographers, geologists, mineralogists and others. In addition to all these advantages, the storing, dragging and interfacing capacities of computers, coupled with computer-to-computer telecommunications, had opened enormous capabilities in documentation, in connecting past experience and works with current ones and in capitalizing the advantages of institutional and environmental documentation mentioned previously (see p. 98).

All the above developments, which offer new work options for the consulting engineer while they have freed him and his assistants from the heavy burden of boring calculations and repetitive designs, have shifted the center of gravity in professional competition from the labour costs to the organization and not to the fixed capital investments as one could think.

In spite of the enormous work capabilities which computers offer, the required investments for the installation and operation of a fully computerized system are moderate and they are offset in a short period of time compensated by savings in ordinary labour costs. In addition, these investments are not required all and at once. They can be spread over a period of years and they can go parallel to the growth of Consulting Engineering firm's business financed through retainments from the revenues of its normal operations. The critical factor is not the cost of the system but the firm's organizational development plan which:

- a. It should choose the proper system from the great variety of hardware options and software applications being available in the market and which system should meet the characteristics and requirements outlined above as well as the ones under the documentation section (p. 98).
- b. It must contain an installation and start-up programme, modular and flexible, connected with the firm's business development plan.

Engineering firms in the Maghreb countries have arrived at a quite good level of computerization but the concept of fully computerized systems and the role which these systems can play in determining competitiveness in consulting engineering seem not to have been fully understood as they still

consider their lower labour unit costs as their main comparative advantage. If they try to face the competition of fully computerized foreign engineering firms on the ground of labour costs that will be equivalent with committing a "competition suicide" trying to halt armoured divisions with conventional cavalry.

Consulting engineering costs in developing countries amount on the average around 10%-12% of the investment, arriving in some cases to 22%-44% (see p. 51). In the European Community and probably in other industrial countries, these costs appear, percentage wise, far lower. As it is indicated in TABLE IV.5 (p. 71) the yearly average turnover of Architects, Consulting Engineers and Construction Economists for the 1988/1990 period, deducting the 1/3 exported, amounted to 7,1% of the average yearly investments of the economy during the 1980/90 decade. This difference is due partly to the fact that imported engineering services in developing countries are overpriced and partly to the fact that the value of the same project upon which engineering costs are calculated, is lower in developing countries than in developed ones as certain cost items (land, local materials, local labour) are lower in the first category of countries than in the second. Even taking into account the causes of these variations, the Maghreb countries as well as all developing countries should take into consideration and should be prepared to face in their development plans competition with lower margins than the ones prevailing today.

10. Business Organization and Promotional practices

In Algeria the exclusive public character of the engineering organizations left the subject of business organization and promotional practices out of discussion while efforts for exporting such services to other Middle East and African countries have not been successful. Business Organization and promotional practices have been quite developed in Morocco and Tunisia but under the limited perspective of local Business.

Under conditions of opened market competition, business organization and promotional practices become important for the survival, market consolidation and growth of local engineering firms. It is well known and it does not appear necessary to be amplified more here that product quality and price, both for goods and services, are not guaranteeing automatically business success without proper marketing. As the methodology, organization and practices of marketing are also well known, we do not feel necessary to repeat them here but to say that this is a subject which should occupy seriously both the consulting engineering firms, their professional associations and the sectoral development plans (see pp. 94-96).

Important elements relevant to the business organization of Consulting engineering in the Maghreb countries and generally in developing ones are :

- a. The business organization of the sector by strengthening its professional associations, preferably one, which should not be limited to the mere role of a trade union (pressure group) but to assume also organizational functions and activities by organizing common Libraries, Documentation and Information Centres, Seminars, promotional activities and also undertaking liaison and perhaps coordination activities between its member firms, Contract assigning national, regional and international Centres as well as important clients.
- b. The recognition by the Taxation authorities, the Banks as well as the Administrators of development funds and programmes that promotional expenses related to the activities enlisted above constitute organizational investments and they should be treated as such.
- c. Provisions in the sectoral development plans and programmes for technical assistance and grants for promotional activities.

VII. R E C O M E N D A T I O N S

1. The formulation of a sectoral development programme

The analysis of the problems and prospects for Engineering Design and Technical Consultancy in the Maghreb countries, presented in the previous chapter, has indicated that :

- Engineering design and technical consultancy services in the Maghreb countries constitute an important market, a very small part of which is covered currently by local firms although local capacities and resources have the qualifications and potential to cover the biggest part, around 60%-80%, of the global demand.
- Liberalization of Trade in Services imposes limits to the governments in introducing restrictive practices for the protection of their local engineering services and leaves no other alternative than to develop these services as they can compete successfully and expand their share in the market.
- As it has been indicated also in the previous chapter, many problems have to be faced and serious efforts are needed in order endogenous capacities and resources to be developed at a level meeting the terms and conditions for such a successful competition.

It is clear that the complex of problems to be solved can not be faced with isolated and fragmental measures no matter how much serious and important can look or can be each of them and a long term special programme is indispensable as a development instrument.

2. The main contents of a sectoral development programme.

A sectoral programme for the development of the Engineering Design and Technical Consultancy services in the Maghreb countries should contain all the essential elements of a complete development programme, i.e. :

- a. The development strategy chosen (Protected or free trade market, capitalization on cheap labour or technological development, priorities and development phases) as the broad lines of this strategy to give a clear picture and to guide the numerous public and private institutions involved in order their activities, measures and interventions to be coordinated and to be converged to the common broad objectives of the development plan. In outlining the development strategy special attention should be paid in clarifying whether the development of the Engineering Services is considered as a target in itself or it is making part of a broader plan for the upgrading of the whole sector of Services (see pp. 49-68).

- b. A detailed as possible policy statement connecting broad strategic objectives with concrete lines of action to be taken. Policy statements of this kind in the form of "White papers" have been proved extremely useful. As many public and private concerns (Development authorities, Banks, Ministries, Taxation Authorities, Customs, Chambers of Commerce, Trade Unions, Foreign exchange controls, etc.) are involved and influencing the operations and the competitiveness of the sector but each of them is seeing the subject from its own optical angle, statutory duties or interests, policy statements help as the activities and interventions of all these concerns to have a common frame of reference and to converge to common objectives.
- c. A detailed programme with concrete and quantified targets, a complete list of actions to be taken articulated in a chronological sequence (Timetable) with concrete financial commitments for each action incorporated in the programme's budget and with allocation of tasks (what, who, when, where, how has to do).

The main problems to be faced by a special development programme have been already presented in the previous chapter which has indicated also the subjects of the programme and which are :

- (1). The creation of a favourable environment with :
- Modernization of incorporation and registration regulations
 - Major revision of public procurement regulations and establishment of a pre-qualification and pre-selection system
 - Objective but favourable attitudes of the authorities versus the engineering firms through analyses of policy statements, circulars but also mixed participations in Conferences, Meetings and Seminars organized and financed by the programme
- (2). Improvement of the sectoral organization by :
- Establishment of a Common Documentation and Information Centre serving the operators of the Sector with technical assistance and grants of the programme extended preferably to the professional association of the Consulting Engineering Firms. This Centre should undertake also the role of liaison and promotion of the relations of the Engineering Firms with National, Regional and International Organizations and contract awarding centres.
 - Establishment of a Credit and Guarantees Fund

- Revision of the Taxation Law regarding Consulting Engineering Firms.
- Revision of the Foreign Exchange Control Regulations and provision of facilities in Foreign Exchange.
- (3). Documentation facilities and documentation methods, techniques and infrastructures at firm's and sectoral level by extending technical assistance with :
 - Studies and Surveys
 - Seminars and Workshops
 - Educational trips to and exchanges with foreign Consulting Engineering Firms.
 - Publications and software programmes.
- (4). Organizational Technology (see pp. 98-101). This must be the main part of the programme in which four target groups should be informed on, trained and assisted in the art of modern applied engineering technologies and organization :
 - Corporate Executives
 - Middle Managers
 - Engineers
 - Technical Assistants (Calculators, Draftsmen, Surveyors, etc.)

The programme can contribute to the development of the human resources with :

- Studies and Surveys
- Seminars and Workshops focused on modern methods and techniques of applied engineering with special emphasis to computer applications in engineering calculus and designing as well as in remote sensing techniques.
- Educational trips to and exchanges with foreign Consulting Engineering Firms especially focused on the above subjects.
- Provision of special Publications and Educational materials.

In addition to the development of the human resources, the modernization and development of the technological infrastructures is equally important and the programme should contribute with :

- Technical assistance for the selection and installation of the proper hardware configurations and software applications for documentation and data banks specialized in the storage and retrieval of engineering data, formulas, calculations, drawings and designs.
- Studies and Surveys as well as Seminars and Workshops especially devoted to the above subjects.
- Educational trips to and exchanges with foreign Consulting Engineering Firms focused especially on these subjects.
- Provision of special Publications and Educational materials.

(5). Business Organization and Promotion. This should be the second in priority activity, after the one of organizational technology, of the development programme providing :

- Technical assistance for the implementation of the promotional activities undertaken by the professional associations as described in a previous part (see p. 102, section a) and mainly in organizing contacts and presentation meetings with international and regional organizations.
- Seminars and Workshops for Executives and upper level Managers in Business Organization and Promotional Methods and techniques including preparation of presentation materials especially focused on Consulting Engineering activities.
- Technical assistance for the implementation of studies and surveys on promotional matters.
- Educational trips to and exchanges with foreign Consulting Engineering Firms especially focused on the above subjects.
- Provision of special Publications and Educational materials.

(6). Programme evaluation and review. The programme should contain finally a built-in evaluation and review component as results achieved to be reviewed on a regular periodical basis and revisions to re-align activities in accordance with objectives set forth.

3. Allocations and Timetable of the Development Programme

One percent of the estimated value of the market (see pp.83-84), or 10% on the yearly investments, amounts to US\$ 80 million which constitutes a serious basis for the implementation of an ambitious five year development programme covering the five countries.

In TABLE VII.1, we present the coefficients for the budgetary and time allocations of the funds which finally could be allocated for financing the implementation of the programme.

T A B L E VII.1 : ALLOCATION COEFFICIENTS OF THE TECHNICAL ASSISTANCE PROGRAMME FOR THE DEVELOPMENT OF THE ENGINEERING DESIGN AND CONSULTANCY SERVICES IN THE MAGHREB UNION COUNTRIES

CODE	SUBJECT / ACTION	TOTAL	T.A. = Technical Assistance		C.C. = Counterpart contributions				
			T.A.	C.C.	1st year	2nd year	3rd year	4th year	5th year
1.0.0.0.	CREATION OF A FAVOURABLE ENVIRONMENT	.1000	.0250	.0750	.1000	0	0	0	0
1.1.0.0.	Modernization of incorporation and registration law and regulations								
1.1.1.0.	Studies	.0100	.0050	.0050	.0100	0	0	0	0
1.1.2.0.	Meetings - Conferences	.0100	0	.0100	.0100	0	0	0	0
1.2.0.0.	Establishment of a pre-qualification and pre-selection system.								
1.2.1.0.	Studies	.0100	.0050	.0050	.0100	0	0	0	0
1.2.2.0.	Meetings - Conferences	.0100	0	.0100	.0100	0	0	0	0
1.3.0.0.	Revision of the Public Procurement System and Regulations								
1.3.1.0.	Studies	.0100	.0050	.0050	.0100	0	0	0	0
1.3.2.0.	Meetings - Conferences	.0100	0	.0100	.0100	0	0	0	0
1.4.0.0.	Externalization of Engineering activities of public departments								
1.4.1.0.	Studies	.0100	.0050	.0050	.0100	0	0	0	0
1.4.2.0.	Meetings - Conferences	.0100	0	.0100	.0100	0	0	0	0
1.5.0.0.	Development of Cooperation between Public Departments and Consulting Engineering Firms								
1.5.1.0.	Meetings - Conferences	.0100	.0050	.0050	.0100	0	0	0	0
1.5.2.0.	Seminars	.0100	0	.0100	.0100	0	0	0	0
2.0.0.0.	SECTORAL ORGANIZATION	.2100	.1450	.0650	.0600	.0700	.0700	.0100	0
2.1.0.0.	Revision of the Taxation System								
2.1.1.0.	Studies	.0050	.0025	.0025	.0050	0	0	0	0
2.1.2.0.	Meetings - Conferences	.0050	0	.0050	.0050	0	0	0	0
2.2.0.0.	Establishment of a Special Credit and Guarantees Fund								
2.2.1.0.	Studies	.0050	.0025	.0025	.0050	0	0	0	0
2.2.2.0.	Meetings - Conferences	.0050	0	.0050	.0050	0	0	0	0
2.3.0.0.	Revision of the system of foreign regulations and facilities								
2.3.1.0.	Studies	.0050	.0050	0	.0050	0	0	0	0
2.3.2.0.	Meetings - Conferences	.0050	0	.0050	.0050	0	0	0	0
2.4.0.0.	Establishment of a Professional Documentation and Information Centre								
2.4.1.0.	Studies	.0500	.0400	.0100	.0100	.0200	.0200	0	0
2.4.2.0.	Organizational Assistance	.0500	.0400	.0100	.0100	.0200	.0200	0	0
2.4.3.0.	Meetings - Conferences	.0500	.0400	.0100	.0100	.0200	.0200	0	0
2.4.4.0.	Educational trips & exchanges	.0300	.0150	.0150	0	.0100	.0100	.0100	0
3.0.0.0.	TECHNICAL ASSISTANCE AND TRAINING IN MODERN APPLIED ENGINEERING METHODS AND TECHNIQUES	.6000	.5500	.0500	.1200	.2000	.1500	.0700	.0600
3.1.0.0.	Corporate Management	.2250	.2000	.0250	.0450	.0550	.0550	.0450	.0250
3.1.1.0.	Seminars and Workshops	.0500	.0500	0	.0200	.0200	.0100	0	0
3.1.2.0.	Educational trips and exchanges	.0500	.0250	.0250	.0100	.0100	.0100	.0100	.0100
3.1.3.0.	Technical Assistance in selecting and installing systems	.1000	.1000	0	.0100	.0200	.0300	.0300	.0100
3.1.4.0.	Literature & Training Aids	.0250	.0250	0	.0050	.0050	.0050	.0050	.0050
3.2.0.0.	Engineers and scientists	.1250	.1000	.0250	.0150	.0350	.0350	.0150	.0250
3.2.1.0.	Seminars and Workshops	.0500	.0500	0	.0100	.0200	.0200	0	0
3.2.2.0.	Educational trips and exchanges	.0500	.0250	.0250	0	.0100	.0100	.0100	.0200
3.2.3.0.	Literature & Training Aids	.0250	.0250	0	.0050	.0050	.0050	.0050	.0050
3.3.0.0.	Technical Assistants	.2500	.2500	0	.0600	.1100	.0600	.0100	.0100
3.3.1.0.	Seminars and Workshops	.2000	.2000	0	.0500	.1000	.0500	0	0
3.3.2.0.	Literature & Training Aids	.0500	.0500	0	.0100	.0100	.0100	.0100	.0100
4.0.0.0.	TECHNICAL ASSISTANCE AND TRAINING IN BUSINESS ORGANIZATION & PROMOTION	.0650	.0350	.0300	0	.0200	.0225	.0175	.0050
4.1.0.0.	Studies	.0050	.0050	0	0	.0050	0	0	0
4.2.0.0.	Meetings - Conferences	.0050	0	.0050	0	0	.0050	0	0
4.3.0.0.	Educational trips & exchanges	.0050	.0050	0	0	0	.0025	.0025	0
4.4.0.0.	Technical Assistance for :								
4.4.1.0.	- Promotional Publications	.0050	.0050	0	0	.0050	0	0	0
4.4.2.0.	- Promotional Conferences and meetings	.0050	0	.0050	0	0	.0050	0	0
4.4.3.0.	- Establishment of an Information and Liaison promotional Office	.0100	.0100	0	0	0	0	.0050	.0050
4.4.4.0.	- Marketing surveys	.0300	.0100	.0200	0	.0100	.0100	.0100	0
5.0.0.0.	PROGRAMME REVIEW AND EVALUATION	.0250	.0250	0	.0050	.0050	.0050	.0050	.0050
ALL PROGRAMME ACTIVITIES		1	.7800	.2200	.2850	.2950	.2475	.1025	.0700

APPENDIX A

INDUSTRIAL SERVICES

- TABLE A.1 : DETAILED LIST OF SPECIALIZED SERVICES
- TABLE A.2 : SERVICES IN THE E. E. C. - BASIC DATA
- TABLE A.2 : E. E. C. - LABOUR PRODUCTIVITY AND INVESTMENTS PER EMPLOYED IN SERVICES

T A B L E A. 1. : A DETAILED LIST OF SPECIALIZED SERVICES

ADVERTISEMENT - PUBLIC RELATIONS

Audiovisual advertising
Corporate image promotion
Integrated promotion
Media monitoring and research
Mural Advertising services
Press Advertising services

CONFERENCES AND LINGUISTIC SERVICES

Distant linguistic education
Hostess services
Interpretation and Translation
Language courses
Language data banks
Language Electronic programmes
Meeting Management Services
Press releases & Conferences
Public speaking training
Recording and duplicating services
Simultaneous translation services

DESIGN SERVICES

Automobile design
Brochures & Reports design
CAD/CAM services
Corporate identity design
Design consultancy
Graphic design
Industrial Design
Interior design
Package design
Product design
Three-dimensional video imaging

DISTRIBUTIVE SERVICES

Barter trade
Trade of scrap, waste
and recycling materials
Wholesale Trade
Agents & representatives
Trading Houses
Ordinary Wholesale Trade
Cash + Carry
Wholesale discount houses
Retail Trade
Agents & representatives
Ordinary retail shops
Hypermarkets & Superstores
Supermarkets

DISTRIBUTIVE SERVICES (continuing)

Department & variety stores
Discount stores
Second hand stores
Catalogue sales houses
Mail order services
Telemarketing Services
Teleshopping services
Marketing services
Marketing information
Market research/fax polls
Public relations
Market advertising services
Trade fairs & exhibitions
Product presentation
Trade Fairs and Exhibitions
Organization- presentation- advise
Linguistic & organizational services
Interpretation and Translation
Press releases & Conferences
Hostess services

ELECTRONIC INFORMATION SERVICES

CD Rom and data storage services
Data banks & Banks networks
Information brokerage
Maps and Designs Data Banks
On-line data banks services
Remote sensing services
Satellite telecom services
Special Data Banks & Data bases
Technological and Technical Banks
Text and data retrieval services

FINANCIAL SERVICES

banking
Conventional teller banking
Export/import banking
Cross- boarder banking
Investment banking
Leasing
Mortgages & pledges credit
Retail financial services
CC & traveller's banking
Stock dealing
Telebanking services
Venture capital
Wholesale banking

(continued)

T A B L E A. 1. : A DETAILED LIST OF SPECIALIZED SERVICES
(continuing)

FINANCIAL SERVICES (continued)

Insurance
 life-insurance
 re-insurance
 risk insurance

INDUSTRIAL SERVICES

Cleaning Services
 Laundry services
 Custodial Services
 Maintenance Services
 Repair services
 Car leasing
 Car renting
 Transport fleet management
 Security Services
 Goods transport services
 Personnel transport services
 Catering Services
 Health & sanitation services
 Personnel care & leisure services

PERSONAL SERVICES

Audiovisual Services
 Catering Services
 Restaurants
 Drive-ins
 Cafeterias
 Fast food services
 Ibis & Snac services
 Cultural Services
 Theatre ticketing
 Art work services
 Art gallery services
 Lodging Services
 Hotels
 Motels
 Inns
 Boarding houses
 Camping
 Youth hostels
 Recreation Services
 Fitness & sport centres
 Theme parks
 Repair services
 Ordinary
 Fast repair
 Fast Services
 Fast repair
 Photo & Copying
 Photo development
 Printing

PERSONNEL RELATED SERVICES

Carrier development services
 Executive development
 Executive search
 In-Service personnel training
 Management motivation training
 On-the-job personnel training
 Personnel Management
 Personnel outplacement
 Personnel selection and recruitment
 Temporary Work Services

PROFESSIONAL SERVICES

Accountancy Services
 Accounting
 Auditing
 Tax advice
 Insolvency
 Trustee & Administration
 Inventory analysis & Management
 Architectural Services
 Architectural concept development
 Architectural design
 Architecture for Special Buildings and installations
 Landscape & gardening architecture
 Construction Economists Services
 Construction cost estimates
 Expert evidence in Arbitrations and Disputes
 Assessment of replacement values
 Consulting Engineering Services
 Agricultural infrastructures & installa Buildings
 Environmental studies & protection
 Industrial infrastructures & equipment
 Mining and natural resources
 Public Utilities
 Transport Infrastructures
 Legal Services
 Legal advice
 Legal defense
 Licensing & patent services
 Soliciting
 Trustee Services
 Management Consultancy Services
 Administrative information
 Carrier development services
 Crisis management services
 Executive development
 Executive search
 Facilities and Custodial services
 Financial consultancy

(continued)

**T A B L E A. 1. : A DETAILED LIST OF SPECIALIZED SERVICES
(continuing)**

**Management Consultancy Services
(continuing)**

Government Administration
Human resources development
Information Systems
Information Systems Management
Intelligent-building management
On-the-job personnel training
In-Service personnel training
Management (General)
Management audit
Management motivation training
Manufacturing processes
Personnel outplacement
Personnel selection and recruitment
Procurement
Research and development
Systems and Methods

Notarial Services

Quality Control Services

Calibration
Certification
Damage expert advise
Environmental pollution measurement
Laboratory analysis/testing
Metrology Laboratory Services
Pre- and post shipment inspection
Quality assurance/quality control
Safety audit

Statutory inspection

Real Estate Services

Real Estate Dealings
Property management

SECURITY SERVICES

Household/Residential Security
Public/Institutional Security
Industries and Services Security
Electronic security & Alarm systems
Transport of valuables
Teleguarding
Data security equipment & services
Security Systems & installations

TELECOMMUNICATION SERVICES

Electronic mail
Voice transmission services
Conventional telephones
Mobile telephones
Wireless telephones
Text transmission services
Telex
Fax
Image transmission
Integrated communication systems
Digital data transmission
VAN, LAN
HIMS
Line leasing
Network services

SOFTWARE AND COMPUTING SERVICES

Package software
Custom software and Consultancy
Data processing services
Turnkey systems
Network systems
Network services
Systems integration
Training

STORAGE SERVICES

Warehousing ordinary services
Cold storage services
Liquid & Gas storage services
Special storage services

TRANSPORT SERVICES

Road transport services

Goods
Passengers
Special loads & materials
Rail transport services

Goods

Passengers
Special loads & materials

Air transport services

Cargo
Passengers
Special loads & materials
Airport Control & Land services

Inland Waters transport

Goods
Passengers
Special loads & materials
Special transport services

Courier express services
Remailing services
Express forwarding services
Document and valuables forwarding services
Door-to-door transportation
Domestic relocation services
International removal services

TRAVEL SERVICES

Booking and reservation
Business travel
Integrated travel services
Tourist services
Tour operating
Travel insurance and credit

(E n d)

TABLE A.2 : SERVICES WITHIN THE ECONOMY OF THE EUROPEAN COMMUNITIES 1988/90

SECTORS AND ACTIVITIES	MARKET SIZE (Million US \$ of 1985)	VALUE ADDED (\$ of 1985)	EMPLOYM. (1000)	Yearly Growth
PRIMARY SECTOR	130,000	91,000	9,858	1.9 %
SECONDARY SECTOR	3,025,000	1,020,000	37,851	3.3 %
TERTIARY SECTOR	2,402,900	1,554,300	75,967	5.5 %
<u>Market Services</u>	2,002,900	1,264,300	50,835	
<u>Distributive Services</u>	910,000	545,000	21,687	
Transport & Storage	310,000	125,000	1,267	3.2 %
Conv. Communications	120,000	60,000	1,036	3.5 %
Wholesale Trade	180,000	140,000	7,386	6.5 %
Retail Trade	300,000	220,000	11,998	
<u>Producer Services</u>	1,092,900	719,300	29,148	
Money and Banking	235,000	100,000	2,236	7.6 %
Insurance	125,000	50,000	1,229	
<u>Professional and Business Services</u>	530,900	412,300	14,363	5.4 %
Real Estate	19,000	15,000	239	...
Legal Services	75,000	60,000	1,387	...
Notarial Services	30,000	24,000	461	...
Consulting Engineers	22,000	16,000	358	...
Architects	7,000	5,000	420	...
Construction Economists	12,000	9,000	234	...
Management Consultants	22,000	20,000	124	10 %
Quality Control	12,000	10,000	250	12 %
Accountancy Services	60,000	50,000	549	...
Software & Computing Services	30,000	60,000	591	...
Data Banks and On-line Information	30,000	20,000	393	19 %
Temporary Work Services	85,000	60,000	8,921	30 %
Market Research	1,500	1,000	245	...
Public Relations	400	300	62	...
Advertising	30,000	30,000	124	...
Direct Marketing and Telemarketing	6,000	5,000	78	20-30
Sales Promotion	10,000	8,000	118	...
Languages-Translations-Interpretations	6,000	7,000	105	15-20
Conferences-Exhibitions	1,000	800	25	8-10
Executive Search	700	600	15	10-15
Design Services	2,000	1,400	25	...
Fast Customer Services	1,600	1,300	47	12 %
Internl. Moving Services	700	400	12	13 %
Telecommunication Services	15,000	6,000	156	7 %
Express Couriers	2,000	1,500	24	18 %
<u>Industrial Services</u>	23,000	18,000	3,566	
Cleaning & Maintenance	15,000	12,000	2,975	...
Security Services	8,000	6,000	591	10 %
<u>Personal Services</u>	179,000	139,000	7,155	
Hotels and Catering	100,000	77,000	4,902	7.2 %
Audiovisual Services	9,000	7,000	263	...
Repairs	70,000	55,000	1,990	...
<u>Non Market Services</u>	400,000	390,000	25,131	9.5 %
E C O N O M Y	5,557,900	2,765,300	123,676	4.6 %

Notes :

The above data represent more estimates than measurements and they have been elaborated and adjusted from the 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, 1992)
3. OECD, Labour Force Statistics 1969-1989 (OECD, Paris, 1992)
4. Pauli, Gunter, DOUBLE-DIGIT GROWTH: How to Achieve it with Services (Berlaar, ESIF 3, 1991)

() Data non available

T A B L E A.3: EUROPEAN ECONOMIC COMMUNITY - LABOUR PRODUCTIVITY & INVESTMENTS PER WORKER

S E C T O R S	LABOUR PRODUCTIVITY (US \$ at 1985 prices)			FIXED CAPITAL PER WORKER (US \$ at 1985 prices)			EMPLOYMENT	
	1980 (1)	1990 (1)	%	1980 (2)	1990 (3)	%	1980 (1000)	1990 (1000)
PRIMARY SECTOR	7.830	9.322	19.1	18,581	19,119	2.9	11,887	9,762
SECONDARY SECTOR	20.078	26.836	33.7	25,254	33,621	33.1	45,849	37,755
Fuel and Power	55.777	68.996	23.7	125,107	228,917	83.0	1,942	1,677
Manufacturing	18.995	25.972	36.7	23,876	28,501	19.4	34,112	27,896
Building and Construction	16.771	21.142	26.1	10,258	11,047	7.7	9,795	8,182
TERTIARY SECTOR	18.191	21.532	18.4	25,100	27,938	11.3	66,751	77,025
<u>Distributive Services</u>	20.944	24.803	18.4	28,287	34,493	21.9	20,630	21,967
Transport and Storage	82.557	96.582	17.0	180,176	212,318	17.8	1,211	1,283
Communications	48.937	56.828	16.9	71,115	154,408	117.1	932	1,049
Trade	15.494	18.402	18.8	16,179	16,467	1.8	18,487	19,635
<u>Producer Services</u>	19.184	24.411	27.2	23,231	26,652	14.7	23,812	29,626
Financial & Insurance	32.998	41.578	26.0	67,690	95,474	41.0	3,144	3,610
Professional and Business Services	18.319	23.545	28.5	17,155	17,656	2.9	16,459	21,052
Hotels & Catering	12.249	15.603	27.4	13,783	14,754	7.0	4,209	4,964
<u>Non Market Services</u>	14.586	15.353	5.3	24,149	23,774	-1.6	22,309	25,432
owner occupied Dwellings								
E C O N O M Y	18.918	23.651	25.0	34,826	39,793	14.3	124,487	124,542

N o t e s: The above data have been elaborated and adjusted from the following sources:

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

(1) Value added per employed

(2) Cumulative investments during the 1970-79 decade per employed at the end of 1980

(3) Cumulative investments during the 1980-89 decade per employed at the end of 1990

APPENDIX B

STATISTICAL DATA

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TABLE B.1: ALGERIA - BASIC SOCIO-ECONOMIC AGGREGATES, 1975-1989

	1975		1980		1985		1989	
Population (000)	16020		18670		21850		24600	
Per capita GNP								
Current US Dollars	974		2268		2616		1919	
Index	100.0		232.9		266.6		197.0	
Constant 1980 US Dollars	1957		2268		2410		2159	
Index	100.0		115.9		123.1		110.3	
SOCIAL INDICATORS								
Fertility rate (total)	7.3		6.7		5.8		5.3	
Infant mortality	120.0		97.6		79.6		69.8	
Life expectancy at birth	56.3		59.3		62.6		64.8	
Food Prod.per capita (1987=100)	116.7		101.4		103.8		87.4	
Primary school enrolment	93.0		95.0		93.0		96.0	
Primary sch. enrolm.-Female	75.0		31.0		82.0		87.0	
Secondary school enrolment	20.0		33.0		51.0		54.0	
	(000)	x	(000)	x	(000)	x	(000)	x
Labour Force (**)	5615	100.0	6647	100.0	7855	100.0	8918	100.0
Male	5046	89.9	5881	88.5	6863	87.6	7749	86.9
Female	569	10.1	765	11.5	972	12.4	1169	13.1
Labour Force (**)								
Agriculture	2364	42.1	2067	31.1	1720	21.9	1373	15.4
Industry	1297	23.1	1788	26.9	2341	29.8	2764	31.0
Services	1354	34.8	2792	42.0	3794	48.3	4780	53.6
Employment in Manufacturing			312		400		467	
	(A)	x	(A)	x	(A)	x	(A)	x
Gross Domestic Product	29567		42342		53959		56895	
Fixed Capital Formation	11700	39.6	14305	33.8	17406	32.3	17523	30.8
Code Sectors/Branches	Value	Added	Value	Added	Value	Added	Value	Added
	A	x	A	x	A	x	A	x
Gross Domestic Product	29567	100.0	42342	100.0	53959	100.0	56895	100.0
Agriculture	2731	9.2	3368	8.0	4105	7.6	4927	8.7
Mining & Quarrying	103	.3	196	.5	192	.4	180	.3
Manufacturing	1814	6.1	3286	7.8	5028	9.3	6090	10.7
Electricity, Gas, Water	11587	39.2	13664	32.3	13882	25.7	8396	14.8
Construction	2916	9.9	5263	12.4	7584	14.1	7442	13.1
Trade, Hotels, Restaur.	3100	10.5	4945	11.7	6245	11.6	9649	17.0
Transport, Storage and Communications	1463	4.9	2004	4.7	2555	4.7	3083	5.4
Other Services (*)	5853	19.8	9616	22.7	14368	26.6	17148	30.1
MANUFACTURING			3286	100.0	5028	100.0	6090	100.0
311 Food Products			592	18.0	697	13.9	861	14.1
313 Beverages			122	3.7	144	2.9	188	3.1
314 Tobacco Products			159	4.8	187	3.7	214	3.5
321 Textiles			262	8.0	367	7.3	406	6.7
322 Wearing apparel			211	6.4	296	5.9	324	5.3
323 Leather & Fur products			47	1.4	65	1.3	85	1.4
324 Footwear			81	2.5	114	2.3	148	2.4
331 Wood and Wood Products			108	3.3	167	3.3	219	3.6
332 Furniture & Fixtures			51	1.6	79	1.6	103	1.7
341 Paper & Paper products			129	3.9	198	3.9	270	4.4
342 Printing & Publishing			14	.4	22	.4	30	.5
351 Industrial chemicals			13	.4	20	.4	26	.4
352 Other chemical products			84	2.6	136	2.7	175	2.9
353 Petroleum Refineries			75	2.3	122	2.4	151	2.5
354 Misc. Petroleum & coal			4	.1	6	.1	8	.1
355 Rubber products			15	.5	24	.5	30	.5
356 Plastic products			31	.9	50	1.0	67	1.1
361 Pottery, China & Ear.			9	.3	11	.2	15	.2
362 Glass & Glass products			32	1.0	42	.8	56	.9
369 Non metal minerals			320	9.7	406	8.1	551	9.0
371 Iron & steel			291	8.9	594	11.8	808	13.3
372 Non-ferrous metals			17	.5	34	.7	48	.8
381 Metal products			239	7.3	488	9.7	504	8.3
382 Non-electrical machinery			41	1.2	86	1.7	88	1.4
383 Electrical machinery			111	3.4	227	4.5	235	3.9
384 Transport equipment			163	5.0	332	6.6	343	5.6
385 Prof. & Scient. Equip.			27	.8	55	1.1	57	.9
390 Other Man. Industries			38	1.2	59	1.2	80	1.3

(*) including indirect taxes and statistical discrepancies (**) Estimates
(A) millions constant 1980 US Dollars

Sources :

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

1. WORLD BANK, World Tables 1991
2. UNIDO, Industry and Development - Global Report 1991/92 (Vienna, 1991)
3. UI, Monthly Bulletin of Statistics, Various issues
4. UNIDO database of Industrial Statistics

T A B L E B.2 : ALGERIA - FOREIGN TRADE AND BALANCE OF PAYMENTS, 1975-1989

	1 9 7 5		1 9 8 0		1 9 8 5		1 9 8 9	
FOREIGN TRADE	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
Merchandise	5452	4501	3596	13652	8811	13034	8188	9476
Primary products	1387	244	2478	191	2738	105	2239	375
Fuels	93	4158	236	13413	165	12626	263	8840
Manufactures	3972	99	6882	48	5908	103	5686	261
Services	1436	354	4956	848	4309	722	3706	645
Non factor Services	1009	281	2715	476	2573	531	1748	592
Factor Services	427	73	2241	372	1736	191	1958	53
Long term interest	217		1436		1409		1851	
Other fact. services	210	73	805	372	327	191	107	53
Trade in Manufactures	3,972	99	6,882	48	5,908	103	5,686	261
Food Industries	628		1,014		1,105		1,263	
Textiles and Clothing	87	3	291	1	227		228	
Wood products-Furniture	43		103		36		21	
Paper, Printing, Publish.	60	1	101		122	1	188	1
Chemical Industry	443	72	967	43	740	98	1129	247
Non metallic products	132	2	147	1	352	1	150	
Basic Metals, Iron, Steel	444	10	697	2	504	1	524	8
Machinery & Equipment	2123	10	3535	1	2782	1	2157	5
Miscellaneous products	12	1	27		40	1	26	
Percentage distribution								
Merchandise	79.2	92.7	65.9	94.2	67.2	94.8	68.8	93.6
Primary products	20.1	5.0	17.0	1.3	20.9	.8	18.8	3.7
Fuels	1.4	85.6	1.6	92.5	1.3	93.2	2.2	87.3
Manufactures	57.7	2.0	47.3	.3	45.0	.7	47.8	2.6
Services	20.8	7.3	34.1	5.8	32.8	5.2	31.2	6.4
Non factor Services	14.6	5.8	18.7	3.3	19.6	3.9	14.7	5.8
Factor Services	6.2	1.5	15.4	2.6	13.2	1.4	16.5	.5
	(A)	%	(A)	%	(A)	%	(A)	%
Trade Balance (net)	-2033	(100.0)	-52	(100.0)	636	100.0	-1773	(100.0)
Merchandise	-951	(46.8)	4056	7,800.0	4223	664.0	1288	72.6
Primary products	-1143		-2287		-2633		-1864	
Fuels	4065		13177		12661		8577	
Manufactures	-3873		-8834		-5805		-5425	
Services	-1082	(53.2)	-4108	(7,900.0)	-3587	(564.0)	-3061	(172.6)
Non factor Services	-728		-2239		-2042		-1156	
Factor Services	-354		-1869		-1545		-1905	
BALANCE OF PAYMENTS	-334	(100.0)	1341	(100.0)	1020	(100.0)	-647	(100.0)
Trade Balance	-2033	(608.7)	-52	3.9	636	(62.4)	-1773	(274.0)
Worker's Remittances	412	123.4	406	(30.3)	313	(30.7)	355	54.9
Private current transfers	-57	(17.1)	-129	9.6	54	(5.3)	164	25.3
Official transfers	20	6.0	24	(1.8)	11	(1.1)		.0
Current balance	-1658	(498.4)	249	(18.8)	1014	(99.4)	-1254	(193.8)
Long term capital	1373	411.1	897	(66.9)	-36	3.5	357	55.2
Direct investment	85	25.4	315	(23.5)	-2	.2	-59	(9.1)
Long term loans								
- Disbursements	1560	467.1	3398	(253.4)	3988	(391.0)	5024	776.5
- Repayments	-253	(75.7)	-2482	185.1	-3504	343.5	-5221	(807.0)
Other capital	-19	(5.7)	-334	24.9	-518	50.8	613	94.7
Other capital	-49	(14.7)	195	(14.5)	42	(4.1)	250	38.6

Sources :

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

1. WORLD BANK, World Tables 1991
2. UNIDO database of Industrial Statistics

TABLE B.3: LIBYA - BASIC SOCIO-ECONOMIC AGGREGATES, 1975-1989

	1975		1980		1985		1989	
Population (000)	2446		3043		3786		4395	
Per capita GNP								
Current US Dollars	4640		9740		6560		5410	
Index	100.0		209.9		141.4		116.6	
Constant 1980 US Dollars	9240		11679		6399		4927	
Index	100.0		126.4		69.3		53.3	
SOCIAL INDICATORS								
Fertility rate (total)	7.3		7.3		7.0		6.7	
Infant mortality	109.0		101.0		88.0		77.5	
Life expectancy at birth	54.6		57.3		59.8		61.7	
Food Prod.per capita (1987=100)	99.1		92.9		107.1		100.1	
Primary school enrollment								
Primary sch. enrollm.-Female								
Secondary school enrollment								
Labour Force (**)	852		1060		1319		1532	
Male	770		959		1193		1384	
Female	82		102		127		147	
Labour Force (**)								
Agriculture	200		249		310		360	
Industry	260		260		260		260	
Services	392		392		392		392	
Employment in Manufacturing			18		21		24	
	(A)	%	(A)	%	(A)	%	(A)	%
Gross Domestic Product	12766		35592		28585		25127	
Fixed Capital Formation	5057	39.6	12025	33.8	9220	32.3	9021	35.90
Code Sectors/Branches								
	Value	Added	Value	Added	Value	Added	Value	Added
	A	%	A	%	A	%	A	%
Gross Domestic Product	22901	100.0	35592	100.0	28585	100.0	25127	100.0
Agriculture	476	2.1	557	1.6	959	3.4	963	3.8
Mining & Quarrying	16886	73.7	21854	61.4	15117	52.9	16488	65.6
Manufacturing	297	1.3	705	2.0	1112	3.9	1462	5.8
Electricity, Gas, Water	71	.3	169	.5	297	1.0	304	1.2
Construction	2324	10.1	3161	8.9	2280	8.0	1707	6.8
Trade, Hotels, Restaur.	1152	5.0	1628	4.6	871	3.0	503	2.0
Transport, Storage and								
Communications	760	3.3	1131	3.2	1027	3.6	806	3.2
Other Services (*)	935	4.1	6387	17.9	6922	24.2	2894	11.5
MANUFACTURING								
			723	100.0	1136	100.0	1486	100.0
311 Food Products			72	11.0	97	8.5	110	7.4
313 Beverages			34	4.7	42	3.7	48	3.2
314 Tobacco Products			111	16.4	131	12.2	120	8.6
321 Textiles			28	3.9	38	3.3	48	3.2
322 Wearing apparel			10	1.4	10	.9	8	.5
323 Leather & Fur products			14	1.9	26	2.3	41	2.8
324 Footwear			28	3.9	54	4.8	64	4.3
331 Wood and Wood Products			6	.8	8	.7	6	.4
332 Furniture & Fixtures			4	.6	6	.5	8	.5
341 Paper & Paper products			6	.8	8	.7	10	.7
342 Printing & Publishing				.0	12	1.1	10	.7
351 Industrial chemicals			71	9.8	108	9.9	163	11.9
352 Other chemical products			42	5.8	38	3.3	30	2.0
353 Petroleum Refineries			164	23.7	315	28.7	459	31.4
354 Misc. Petroleum & coal				.0		.0		.0
355 Rubber products				.0		.0		.0
356 Plastic products			4	.6	6	.5	8	.5
361 Pottery, China & Ear.			2	.3	2	.2	2	.1
362 Glass & Glass products				.0		.0		.0
369 Non metal minerals			103	13.7	205	18.5	322	21.7
371 Iron & steel				.0		.0		.0
372 Non-ferrous metals				.0		.0		.0
381 Metal products			6	.8	6	.1	5	.2
382 Non-electrical machinery				.0		.0		.0
383 Electrical machinery				.0		.0		.0
384 Transport equipment				.0		.0		.0
385 Prof. & Scient. Equip.				.0		.0		.0
390 Other Man. Industries			18	.3	24	.0	24	.0

(*) including indirect taxes and statistical discrepancies (***) Estimates
 (A) millions constant 1980 US Dollars

Sources :

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

1. WORLD BANK, World Tables 1991
2. UNIDO, Industry and Development - Global Report 1991/92 (Vienna, 1991)
3. UN, Monthly Bulletin of Statistics, Various issues
4. UNIDO Database of Industrial Statistics

T A B L E B.4 : LIBYA - FOREIGN TRADE AND BALANCE OF PAYMENTS, 1975-1989

FOREIGN TRADE	Millions current US dollars							
	1 9 7 5		1 9 8 0		1 9 8 5		1 9 8 9	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
Merchandise	4424	8412	10368	21919	5754	10353	5753	5844
Primary products	723	1	1467	3	963	5	962	2
Fuels	69	8411	44	21837	43	10170	44	5512
Manufactures	3632	6	8857	79	4748	178	4747	130
Services	1553	375	3850	1446	2315	526	2071	889
Non factor Services	1343	160	2303	164	1775	63	1634	128
Factor Services	210	215	1347	1282	540	463	437	761
Long term interest								
Other fact. services	210	215	1347	1282	540	463	437	761
Trade in Manufactures	3,632	6	8,857	79	4,748	178	4,747	130
Food Industries	506		1209		462		564	
Textiles and Clothing	413		657		228	1	316	
Wood products-Furniture	70		276		81		189	
Paper, Printing, Publish-	40		71		56		117	
Chemical Industry	307	5	787	77	910	169	830	127
Non metallic products	229		293		61		94	1
Basic Metals, Iron, Steel	350		736		22		471	
Machinery & Equipment	1671		4728	2	2531	8	2090	2
Miscellaneous p. oducts	46	1	100		127		76	
Percentage distribution								
Merchandise	74.0	94.5	74.0	93.8	71.3	95.2	73.5	86.4
Primary products	12.1	.0	10.5	.0	11.9	.0	12.3	.0
Fuels	1.2	94.4	.3	93.5	.5	93.5	.6	84.4
Manufactures	60.8	.1	63.2	.3	58.8	1.6	60.7	2.0
Services	26.0	5.5	26.0	6.2	28.7	4.8	26.5	13.6
Non factor Services	22.5	2.4	18.4	.7	22.0	.6	20.9	2.0
Factor Services	3.5	3.2	9.6	5.5	6.7	4.3	5.6	11.6
	(A)	X	(A)	X	(A)	X	(A)	X
Trade Balance (net)	813	100.0	9347	100.0	2810	100.0	-1291	(100.0)
Merchandise	1594	244.4	11551	123.8	4599	163.7	-109	(8.4)
Primary products	-722		-1464		-958		-960	
Fuels	6342		21793		10127		5468	
Manufactures	-3826		-8778		-4570		-4617	
Services	-1178	(144.4)	-2204	(23.6)	-1789	(63.7)	-1182	(91.6)
Non factor Services	-1183		-2139		-1712		-1506	
Factor Services	5		-85		-77		324	
BALANCE OF PAYMENTS	-1897	(100.0)	6407	(100.0)	2362	(100.0)	-1390	(100.0)
Trade Balance	816	43.0	9349	(145.9)	2810	(119.0)	-1291	(92.9)
Worker's Remittances								
Private current transfers	-260	(13.7)	-1089	17.0	-859	36.4	-496	(35.7)
Official transfers	-164	(8.6)	-48	.7	-45	1.9	-36	(2.6)
Current balance	392	20.7	8214	(128.2)	1906	(80.7)	-1823	(131.2)
Long term capital	-1524	(80.3)	-1372	21.4	-19	.8	-430	(30.9)
Direct investment	-516	(32.5)	-1136	17.7	119	(5.0)	42	3.0
Long term loans								
- Disbursements								
- Repayments								
Other capital	-908	(47.8)	-236	3.7	-138	5.8	-472	(34.0)
Other capital	-765	(40.3)	-435	6.8	475	(20.1)	863	62.1

Sources :

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

1. WORLD BANK, World Tables 1991
2. UNIDO database of Industrial Statistics

T A B L E B.5 : MAURITANIA - BASIC SOCIO-ECONOMIC AGGREGATES, 1975-1989

	1 9 7 5		1 9 8 0		1 9 8 5		1 9 8 9	
Population (000)	1420		1550		1770		1970	
Per capita GNP								
Current US Dollars	300		457		400		490	
Index	100.0		152.3		133.3		163.3	
Constant 1980 US Dollars	433		457		422		440	
Index	100.0		105.5		97.5		101.6	
SOCIAL INDICATORS								
Fertility rate (total)	6.5		6.5		6.5		6.5	
Infant mortality	153.8		141.8		131.0		123.8	
Life expectancy at birth	41.2		43.2		45.2		46.4	
Food Prod. per capita (1987=100)	99.2		113.7		99.9		99.2	
Primary school enrollment	19.0		37.0		49.0		53.0	
Primary sch. enrollm.-Female	13.0		26.0		39.0		43.0	
Secondary school enrollment	4.0		11.0		15.0		17.0	
Labour Force (**)								
Male	595		643		744		837	
Female	447		488		558		621	
Total	148		155		187		217	
Labour Force (**)								
Agriculture	476		446		418		392	
Industry	35		57		93		126	
Services	84		140		233		319	
Employment in Manufacturing								
Gross Domestic Product	(A)	x	(A)	x	(A)	x	(A)	x
Fixed Capital Formation	614	34.2	709	24.0	746	163	867	16.7
Code Sectors/Branches	Value Added	Value Added	Value Added	Value Added	Value Added	Value Added	Value Added	Value Added
	A	x	A	x	A	x	A	x
Gross Domestic Product	614	100.0	709	100.0	746	100.0	867	100.0
Agriculture	169	27.5	202	28.5	224	30.0	252	29.1
Mining & Quarrying	81	13.2	77	10.9	105	14.1	111	12.8
Manufacturing	37	6.0	46	6.5	47	6.3	66	7.6
Electricity, Gas, Water								
Construction	41	6.7	50	7.1	53	7.1	70	8.1
Trade, Hotels, Restaur.	58	9.4	75	10.6	55	7.4	64	7.4
Transport, Storage and								
Communications	38	6.2	57	8.0	61	8.2	71	8.2
Other Services (*)	190	30.9	202	28.5	201	26.9	233	26.9
MANUFACTURING (data non available)								
311 Food Products								
313 Beverages								
314 Tobacco Products								
321 Textiles								
322 Wearing apparel								
323 Leather & Fur products								
324 Footwear								
331 Wood and Wood Products								
332 Furniture & Fixtures								
341 Paper & Paper products								
342 Printing & Publishing								
351 Industrial chemicals								
352 Other chemical products								
353 Petroleum Refineries								
354 Misc. Petroleum & coal								
355 Rubber products								
356 Plastic products								
361 Pottery, China & Ear.								
362 Glass & Glass products								
369 Non metal minerals								
371 Iron & steel								
372 Non-ferrous metals								
381 Metal products								
382 Non-electrical machinery								
383 Electrical machinery								
384 Transport equipment								
385 Prof. & Scient. Equip.								
390 Other Man. Industries								

(*) including indirect taxes and statistical discrepancies
 (A) millions constant 1980 US Dollars

Sources :

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

1. WORLD BANK, World Tables 1991
2. UNIDO, Industry and Development - Global Report 1991/92 (Vienna, 1991)
3. UN, Monthly Bulletin of Statistics, Various issues
4. UNIDO database of Industrial Statistics

TABLE B.6 : MAURITANIA - FOREIGN TRADE AND BALANCE OF PAYMENTS, 1975-1989
Millions current US dollars

	1 9 7 5		1 9 8 0		1 9 8 5		1 9 8 9	
FOREIGN TRADE	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
Merchandise	209	167	321	196	334	372	355	449
Primary products	68	164	100	190	79	361	80	436
Fuels	17	1	28	2	40	3	18	2
Manufactures	124	2	193	4	215	8	257	11
Services	104	23	172	73	298	31	280	57
Non factor Services	69	18	128	56	202	27	212	52
Factor Services	35	5	44	17	96	4	68	5
Long term interest	5		13		27		25	
Other fact. services	30	5	31	17	69	4	43	5
Trade in Manufactures	124		193		215		257	
Food Industries	29		46		73		61	
Textiles and Clothing	5		11		23		35	
Wood products-Furniture	2		1		2		1	
Paper, Printing, Publishing	2		3		3		5	
Chemical Industry	20		47		29		39	
Non metallic products	3		4		5		9	
Basic Metals, Iron, Steel	9		9		6		9	
Machinery & Equipment	53		71		73		96	
Miscellaneous products	1		1		1		2	
Percentage distribution								
Merchandise	86.8	87.9	85.1	72.9	52.8	92.3	55.9	88.7
Primary products	21.7	86.3	20.3	70.6	12.5	89.6	12.6	86.2
Fuels	5.4	.5	5.7	.7	6.3	.7	2.8	.4
Manufactures	39.6	1.1	39.1	1.5	34.0	2.0	40.5	2.2
Services	33.2	12.1	34.9	27.1	47.2	7.7	44.1	11.3
Non factor Services	22.0	9.5	26.0	20.8	32.0	6.7	33.4	10.3
Factor Services	11.2	2.6	8.9	6.3	15.2	1.0	10.7	1.0
	(A)	%	(A)	%	(A)	%	(A)	%
Trade Balance (net)	-123	(100.0)	-224	(100.0)	-229	(100.0)	-129	(100.0)
Merchandise	-42	(34.1)	-125	(55.8)	38	16.6	94	72.9
Primary products	96		90		262		356	
Fuels	-16		-26		-37		-16	
Manufactures	-122		-189		-207		-246	
Services	-81	(85.9)	-99	(44.2)	-267	(116.6)	-223	(172.9)
Non factor Services	-51		-72		-175		-160	
Factor Services	-30		-27		-92		-63	
BALANCE OF PAYMENTS	-55	(100.0)	-38	(100.0)	-25	(100.0)	19	
Trade Balance	-123	(223.6)	-224	(589.5)	-229	(916.0)	-129	
Worker's Remittances			6		1		4	
Private current transfers	-23	(41.8)	-35	(92.1)	-22	(88.0)	-34	
Official transfers	83	150.9	119	313.2	134	536.0	270	
Current balance	-63	(114.5)	-134	(352.6)	-116	(464.0)	111	
Long term capital	10	18.2	129	339.5	98	392.0	180	
Direct investment	-123	(223.6)	27	71.1	7	28.0	3	
Long term loans	22	40.0	113	297.4	56	224.0	41	
- Disbursements	56	101.8	130	342.1	105	420.0	96	
- Repayments	-34	(81.8)	-17	(44.7)	-49	(196.0)	-55	
Other capital	111	201.8	-11	(28.9)	35	140.0	136	
Other capital	-2	(3.6)	-33	(86.8)	-7	(28.0)	-272	

Sources :

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

1. WORLD BANK, *World Tables 1991*
2. UNIDO database of Industrial Statistics

T A B L E B.7 : MOROCCO - BASIC SOCIO-ECONOMIC AGGREGATES, 1975-1989

	1975	1980	1985	1989				
Population (000)	17310	20050	22120	24520				
Per capita GNP								
Current US Dollars	500	980	610	880				
Index	100.0	196.0	122.0	176.0				
Constant 1980 US Dollars	833	980	979	1046				
Index	100.0	117.6	117.5	125.6				
SOCIAL INDICATORS								
Fertility rate (total)	6.3	5.6	5.1	4.7				
Infant mortality	114.8	99.2	80.6	69.8				
Life expectancy at birth	54.6	57.3	59.8	61.3				
Food Prod. per capita (1987=100)	91.1	103.6	106.1	120.9				
Primary school enrollment	62.0	78.0	78.0	72.0				
Primary sch. enrollm.-female	45.0	59.0	60.0	54.0				
Secondary school enrollment	16.0	25.0	34.0	27.0				
Labour Force (**)								
Labour Force (**)	6881	8160	9147	10237				
Male	5453	6316	6968	7724				
Female	1428	1845	2179	2513				
Labour Force (**)								
Agriculture	3702	3721	2997	2400				
Industry	1342	2040	3060	4100				
Services	1837	2399	3090	3737				
Employment in Manufacturing		191	252	330				
	(A)	X	(A)	X				
Gross Domestic Product	14417	18997	21562	25545				
Fixed Capital Formation	3575	24.8 4217	22.2 4981	23.1 5186 20.3				
Code Sectors/Branches								
	Value	Added	Value	Added	Value	Added	Value	Added
	A	X	A	X	A	X	A	X
Gross Domestic Product	14417	100.0	18997	100.0	21562	100.0	25545	100.0
Agriculture	2595	18.0	3467	18.3	3678	17.1	4199	16.4
Mining & Quarrying	670	4.6	866	4.6	920	4.3	658	2.6
Manufacturing	2483	17.2	3197	16.8	3974	18.4	4193	16.4
Electricity, Gas, Water	408	2.8	610	3.2	699	3.2	1861	7.3
Construction	1285	8.9	1181	6.2	1118	5.2	1393	5.5
Trade, Hotels, Restaur.	2022	14.0	2695	14.2	3107	14.4	3274	12.8
Transport, Storage and								
Communications	689	4.8	986	5.2	1235	5.7	1707	6.7
Other Services (*)	4265	29.6	5995	31.6	6831	31.7	8260	32.3
MANUFACTURING								
			3197	100.0	3974	100.0	4193	100.0
311 Food Products			629	19.7	862	21.7	806	19.2
313 Beverages			128	4.0	145	3.6	162	3.9
314 Tobacco Products			79	2.5	125	3.1	118	2.8
321 Textiles			419	13.1	515	13.0	584	13.9
322 Wearing apparel			66	2.1	121	3.0	115	2.7
323 Leather & Fur products			31	1.0	40	1.0	45	1.1
324 Footwear			50	1.6	80	2.0	76	1.8
331 Wood and Wood Products			62	1.9	97	2.4	92	2.2
332 Furniture & Fixtures			39	1.2	20	.5	13	.3
341 Paper & Paper products			132	4.1	129	3.2	152	3.6
342 Printing & Publishing			54	1.7	84	2.1	89	2.1
351 Industrial chemicals			283	8.2	346	8.7	406	9.7
352 Other chemical products			201	6.3	241	6.1	262	6.2
353 Petroleum Refineries								
354 Misc. Petroleum & coal								
355 Rubber products			70	2.2	78	1.9	65	1.6
356 Plastic products			41	1.3	28	.7	37	.9
361 Pottery, China & Ear.			12	.4	8	.2	8	.2
362 Glass & Glass products			21	.7	8	.2	8	.2
369 Non metal minerals			319	10.0	434	10.9	466	11.1
371 Iron & steel			14	.4	24	.6	24	.6
372 Non-ferrous metals			17	.5	12	.3	13	.3
381 Metal products			228	7.1	286	7.2	314	7.5
382 Non-electrical machinery			62	1.9	60	1.5	63	1.5
383 Electrical machinery			126	3.9	137	3.4	162	3.9
384 Transport equipment			128	4.0	88	2.2	107	2.6
385 Prof. & Scient. Equip.			2	.1	4	.1	3	.1
390 Other Man. Industries			4	.1	4	.1	3	.1

(*) including indirect taxes and statistical discrepancies
 (A) millions constant 1980 US Dollars

Sources :

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

1. WORLD BANK, World Tables 1991
2. UNIDO, Industry and Development - Global Report 1991/92 (Vienna, 1991)
3. IUI, Monthly Bulletin of Statistics, Various issues
4. UNIDO database of Industrial Statistics

T A B L E B.8 : MOROCCO - FOREIGN TRADE AND BALANCE OF PAYMENTS, 1975-1989

	Millions current US dollars							
	1 9 7 5		1 9 8 0		1 9 8 5		1 9 8 9	
FOREIGN TRADE	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
Merchandise	2266	1529	3770	2415	3513	2145	4991	3313
Primary products	814	1324	1125	1728	1052	1194	1419	1592
Fuels	246	14	890	118	983	83	657	69
Manufactures	1206	191	1755	569	1478	868	2915	1652
Services	805	497	2038	856	1612	1015	2431	1700
Non factor Services	688	468	1401	817	819	993	1190	1659
Factor Services	117	29	637	39	793	22	1241	41
Long term interest	57		619		491		1066	
Other fact. services	60	29	18	39	302	22	175	41
Trade in Manufactures	1206	191	1756	569	1478	868	2915	1652
Food Industries	157		232		226		260	
Textiles and Clothing	68	104	123	221	123	312	240	603
Wool products-Furniture	2	2	5	4	4	5	16	9
Paper, Printing, Publish.	32	3	68	1	50	3	82	5
Chemical Industry	200	52	344	262	273	469	750	778
Non metallic products	22	3	27	3	22	3	45	12
Basic Metals, Iron, Steel	124	4	210	39	189	31	310	55
Machinery & Equipment	595	18	733	32	581	42	1190	182
Miscellaneous products	6	5	14	7	10	3	22	8
Percentage distribution								
Merchandise	73.8	75.5	64.9	73.8	68.5	67.9	67.2	66.1
Primary products	26.5	65.4	19.4	52.8	20.5	37.8	19.1	31.8
Fuels	8.0	.7	15.3	3.6	19.2	2.6	8.9	1.4
Manufactures	39.3	9.4	30.2	17.4	28.8	27.5	39.3	33.0
Services	26.2	24.5	35.1	26.2	31.5	32.1	32.8	33.9
Non factor Services	22.4	23.1	24.1	25.0	16.0	31.4	16.0	33.1
Factor Services	3.8	1.4	11.0	1.2	15.5	.7	16.7	.8
	(A)	%	(A)	%	(A)	%	(A)	%
Trade Balance (net)	-1045	(100.0)	-2537	(100.0)	-1965	(100.0)	-2409	(100.0)
Merchandise	-737	(70.5)	-1355	(53.4)	-1368	(69.6)	-1678	(69.7)
Primary products	510		603		142		173	
Fuels	-232		-772		-900		-588	
Manufactures	-1015		-1186		-610		-1263	
Services	-308	(29.5)	-1182	(46.6)	-597	(30.4)	-731	(30.3)
Non factor Services	-220		-584		174		469	
Factor Services	-88		-598		-771		-1200	
BALANCE OF PAYMENTS	-29	(2.8)	-249	(9.8)	-88	(4.5)	-2	(.1)
Trade Balance	-1045	(100.0)	-2537	(100.0)	-1965	(100.0)	-2409	(100.0)
Worker's Remittances	533	51.0	1054	41.5	967	49.2	1337	55.5
Private current transfers	-51	(4.9)	-50	(2.0)	-2	(.1)	20	.8
Official transfers	34	3.3	114	4.5	111	5.6	265	11.0
Current balance	-529	(50.6)	-1419	(55.9)	-889	(45.2)	-787	(32.7)
Long term capital	709	67.8	1359	53.6	621	31.6	600	24.9
Direct investment			89		20		167	
Long term loans	514	49.2	1167	46.0	695	35.4	444	18.4
- Disbursements	620	59.3	1757	69.3	1209	61.5	1061	44.0
- Repayments	-106	(10.1)	-590	(23.3)	-514	(26.2)	-617	(25.6)
Other capital	195	18.7	103	4.1	-94	(4.8)	-11	(.5)
Other capital	-209	(20.0)	-189	(7.4)	180	9.2	185	7.7

Sources :

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

1. WORLD BANK, World Tables 1991
2. UNIDO database of Industrial Statistics

T A B L E B.9 : TUNISIA - BASIC SOCIO-ECONOMIC AGGREGATES, 1975-1989

	1 9 7 5		1 9 8 0		1 9 8 5		1 9 8 9	
Population (000)	5610		6390		7260		7990	
Per capita GNP	760		1369		1170		1260	
Current US Dollars	100.0		180.1		153.9		165.8	
Index	100.0		119.8		129.3		128.0	
Constant 1980 US Dollars	1143		1369		1478		1463	
Index	100.0		119.8		129.3		128.0	
SOCIAL INDICATORS								
Fertility rate (total)	5.9		5.2		4.5		4.0	
Infant mortality	100.8		72.4		54.8		46.9	
Life expectancy at birth	58.3		61.9		64.6		66.2	
Food Prod.per capita (1987=100)	102.5		91.5		102.5		76.8	
Primary school enrollment	97.0		103.0		116.0		117.0	
Primary sch. enrollm.-Female	78.0		88.0		106.0		108.0	
Secondary school enrollment	21.0		27.0		39.0		41.0	
Labour Force (**)								
Male	2216		2684		3122		3484	
Female	1767		2013		2287		2517	
Female	449		671		835		967	
Labour Force (**)								
Agriculture	844		939		869		790	
Industry	695		859		1063		1150	
Services	677		886		1190		1544	
Employment in Manufacturing			125		162		195	
Gross Domestic Product	(A)	X	(A)	X	(A)	X	(A)	X
Fixed Capital Formation	5676		8742		10733		11699	
	1459	25.7	2474	28.3	2876	26.8	2468	21.1
Code Sectors/Branches								
	Value	Added	Value	Added	Value	Added	Value	Added
	A	X	A	X	A	X	A	X
Gross Domestic Product	5676	100.0	8742	100.0	10733	100.0	11699	100.0
Agriculture	1185	20.9	1235	14.1	1602	14.9	1420	12.1
Mining & Quarrying	879	15.5	1044	11.9	1010	9.4	934	8.0
Manufacturing	587	10.3	1030	11.8	1443	13.4	1744	14.9
Electricity,Gas,Water	74	1.3	133	1.5	190	1.8	187	1.6
Construction	398	7.0	514	5.9	637	5.9	549	4.7
Trade,Hotels,Restaur.	1106	19.5	1536	17.6	1943	18.1	2385	20.4
Transport,Storage and								
Communications	274	4.8	420	4.8	511	4.8	771	6.6
Other Services (*)	1173	20.7	2829	32.4	3397	31.7	3709	31.7
MANUFACTURING								
			1030	100.0	1443	100.0	1744	100.0
311 Food Products			107	10.4	117	8.1	133	7.6
313 Beverages			54	5.2	83	5.8	103	5.9
314 Tobacco Products			24	2.3	35	2.4	44	2.5
321 Textiles			60	5.8	104	7.2	124	7.1
322 Wearing apparel			101	9.8	155	10.7	203	11.6
323 Leather & Fur products			7	.7	9	.6	10	.6
324 Footwear			23	2.2	31	2.1	39	2.2
331 Wood and Wood Products			13	1.3	18	1.2	18	1.0
332 Furniture & Fixtures			14	1.4	20	1.4	24	1.4
341 Paper & Paper products			26	2.5	28	1.9	36	2.1
342 Printing & Publishing			19	1.8	25	1.7	24	1.4
351 Industrial chemicals			46	4.5	34	2.4	34	1.9
352 Other chemical products			106	10.3	116	8.0	145	8.3
353 Petroleum Refineries			14	1.4	16	1.1	15	.9
354 Misc.Petroleum & coal				0		0		0
355 Rubber products			9	.9	12	.8	12	.7
356 Plastic products			20	1.9	31	2.1	36	2.1
361 Pottery, China & Ear.			12	1.2	12	.8	14	.8
362 Glass & Glass products			8	.8	9	.6	11	.6
369 Non metal minerals			172	16.7	265	15.4	332	19.0
371 Iron & steel			49	4.8	103	7.1	132	7.6
372 Non-ferrous metals			9	.9	9	.6	7	.4
381 Metal products			58	5.6	109	7.6	143	8.2
382 Non-electrical machinery			2	.2	3	.2	2	.1
383 Electrical machinery			38	3.7	50	3.5	62	3.6
384 Transport equipment			33	3.2	41	2.8	31	1.1
385 Prof. & Scient. Equip.			1	.1	1	.1	2	.1
390 Other Man. Industries			5	.5	7	.5	8	.5

(*) including indirect taxes and statistical discrepancies

(A) millions constant 1980 US Dollars

Sources :

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

1. WORLD BANK, World Tables 1991
2. UNIDO, Industry and Development - Global Report 1991/92 (Vienna,1991)
3. UN, Monthly Bulletin of Statistics, Various issues
4. UNIDO database of Industrial Statistics

T A B L E B.10 : TUNISIA - FOREIGN TRADE AND BALANCE OF PAYMENTS, 1975-1989
(Millions current US dollars)

	1 9 7 5		1 9 8 0		1 9 8 5		1 9 8 9	
FOREIGN TRADE	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
Merchandise	1238	789	3139	2158	2567	1700	4137	2931
Primary products	302	290	877	252	591	223	1339	579
Fuels	129	344	851	1133	302	707	285	475
Manufactures	807	155	1811	773	1674	770	2513	1877
Services	431	527	980	1198	1039	1012	980	1629
Non factor Services	273	487	627	1104	839	972	627	1552
Factor Services	158	40	353	94	400	40	353	77
Long term interest	35		228		251		228	
Other fact. services	123	40	125	94	149	40	125	77
Trade in Manufactures	807	155	1811	773	1674	770	2513	1877
Food products	121	86	190	115	181	118	214	182
Textiles and Clothing	69	29	227	326	230	292	467	855
Wood products-furniture	4	1	11	1	7	1	11	8
Paper, Printing, Publishing	21	3	32	8	39	7	57	14
Chemical Industry	135	44	471	258	422	271	715	734
Non metallic products	29	1	57	1	33	3	40	69
Basic Metals, Iron, Steel	57	5	159	15	112	8	175	25
Machinery & Equipment	364	5	653	46	639	65	809	183
Miscellaneous products	7	1	11	3	11	5	25	7
Percentage distribution								
Merchandise	74.2	60.0	76.2	64.3	71.2	62.7	80.8	64.3
Primary products	18.1	22.0	16.4	7.5	16.4	8.2	26.2	12.7
Fuels	7.7	26.1	15.8	33.8	8.4	26.1	5.6	10.4
Manufactures	48.4	11.8	44.0	23.0	46.4	28.4	49.1	41.2
Services	25.8	40.0	23.8	35.7	28.8	37.3	19.2	35.7
Non factor Services	16.4	37.0	15.2	32.9	17.7	35.8	12.3	34.0
Factor Services	9.5	3.0	8.6	2.8	11.1	1.5	6.9	1.7
	(A)	%	(A)	%	(A)	%	(A)	%
Trade Balance (net)	-344	(100.0)	-763	(100.0)	-894	(100.0)	-858	(100.0)
Merchandise	-440	(127.9)	-981	(128.6)	-867	(97.0)	-1206	(140.6)
Primary products	-9	(2.6)	-425	(55.7)	-368	(41.2)	-750	(88.6)
Fuels	219	63.7	482	63.2	405	45.3	190	22.1
Manufactures	-650	(189.0)	-1038	(136.0)	-904	(101.1)	-636	(74.1)
Services	98	27.9	218	28.8	-27	(3.0)	348	40.6
Non factor Services	214	62.2	477	62.5	333	37.2	826	96.3
Factor Services	-118	(34.3)	-259	(33.9)	-360	(40.3)	-478	(55.7)
BALANCE OF PAYMENTS	-17	(4.9)	78	10.0	-225	(25.2)	65	7.6
Trade Balance	-344	(100.0)	-763	(100.0)	-894	(100.0)	-858	(100.0)
Worker's Remittances	145	42.2	319	41.8	271	30.3	488	56.9
Private current transfers	-14	(4.1)	-18	(2.4)	-12	(1.3)	-4	(.5)
Official transfers	43	12.5	101	13.2	48	5.4	215	25.1
Current balance	-170	(49.4)	-381	(47.3)	-587	(65.7)	-159	(18.5)
Long term capital	127	36.9	509	66.7	392	43.8	186	19.3
Direct investment	45	13.1	235	30.8	102	11.4	74	8.6
Long term loans	124	36.0	353	46.3	315	35.2	233	27.2
- Disbursements	192	55.8	611	80.1	791	88.5	940	109.6
- Repayments	-68	(19.8)	-258	(33.8)	-476	(53.2)	-707	(82.4)
Other capital	-42	(12.2)	-79	(10.4)	-25	(2.8)	-141	(16.4)
Other capital	28	7.6	-72	(9.4)	-30	(3.4)	58	6.8

Sources :

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

1. WORLD BANK, World Tables 1991

T A B L E B.11: MAGHREB UNION - BAS C SOCIO-ECONOMIC AGGREGATES, 1975-1989

	1 9 7 5		1 9 8 0		1 9 8 5		1 9 8 9	
Population (000)	42806		49703		56786		63475	
Per capita GNP	1709		2140		2035		1893	
Constant 1980 US Dollars	100.0		125.2		119.1		110.7	
Index								
SOCIAL INDICATORS								
Fertility rate (total)	6.7		6.1		5.5		5.0	
Infant mortality	115.9		96.6		79.0		69.1	
Life expectancy at birth	55.3		58.2		61.0		62.8	
Food Prod.per capita (1987=100)	102.9		100.9		104.6		100.3	
Primary school enrollment	73.2		81.5		82.5		81.4	
Primary sch. enrollm.-Female	56.9		66.4		69.7		69.5	
Secondary school enrollment	16.8		26.3		38.3		37.0	
	(000)	%	(000)	%	(000)	%	(000)	%
Labour Force (**)	16159	100.0	19204	100.0	22214	100.0	25055	100.0
Male	13484	83.4	15656	81.5	17888	80.5	19995	79.8
Female	2675	16.6	3547	18.5	4326	19.5	5061	20.2
Labour Force (**)								
Agriculture	7586	46.9	7368	38.4	6194	27.9	5140	20.5
Industry	3628	22.5	5066	26.5	7072	31.8	8654	34.5
Services	4945	30.6	6749	35.1	9138	41.1	11261	44.9
Employment in Manufacturing			646	3.4	835	3.8	1016	4.1
Gross Domestic Product	73175		106382		115585		120133	
Fixed Capital Formation	26024		35.6 33191		31.2 34646		30.0 34365	
Code Sectors/Branches	Value	Added	Value	Added	Value	Added	Value	Added
	A	%	A	%	A	%	A	%
Gross Domestic Product	73175	100.0	106382	100.0	115585	100.0	120133	100.0
Agriculture	7156	9.8	8829	8.3	10568	9.1	11761	9.8
Mining & Quarrying	18619	25.4	24037	22.6	17344	15.0	18371	15.3
Manufacturing	5218	7.1	8282	7.8	11628	10.1	13579	11.3
Electricity, Gas, Water	12140	16.6	14576	13.7	15068	13.0	10748	8.9
Construction	6964	9.5	10169	9.6	11672	10.1	11161	9.3
Trade, Hotels, Restaur.	7438	10.2	10879	10.2	12221	10.6	15875	13.2
Transport, Storage and								
Communications	3224	4.4	4598	4.3	5389	4.7	6418	5.3
Other Services (*)	12416	17.0	25011	23.5	31695	27.4	32220	26.8
MANUFACTURING			8238	100.0	11431	100.0	13399	100.0
311 Food Products			1400	17.0	1763	15.4	1894	14.1
313 Beverages			338	4.1	385	3.4	481	3.6
314 Tobacco Products			373	4.5	467	4.1	487	3.6
321 Textiles			769	9.3	980	8.6	1142	8.5
322 Wearing apparel			388	4.7	528	4.6	602	4.5
323 Leather & Fur products			99	1.2	138	1.2	180	1.3
324 Footwear			182	2.2	279	2.4	327	2.4
331 Wood and Wood Products			189	2.3	290	2.5	335	2.5
332 Furniture & Fixtures			108	1.3	125	1.1	148	1.1
341 Paper & Paper products			293	3.6	363	3.2	468	3.5
342 Printing & Publishing			87	1.1	143	1.3	153	1.1
351 Industrial chemicals			393	4.8	508	4.4	629	4.7
352 Other chemical products			433	5.3	531	4.6	612	4.6
353 Petroleum Refineries			253	3.1	453	4.0	625	4.7
354 Misc. Petroleum & coal			4	.0	6	.1	8	.1
355 Rubber products			94	1.1	112	1.0	107	.8
356 Plastic products			96	1.2	115	1.0	148	1.1
361 Pottery, China & Ear.			35	.4	33	.3	39	.3
362 Glass & Glass products			61	.7	59	.5	75	.6
369 Non metal minerals			914	11.1	1310	11.5	1671	12.5
371 Iron & steel			354	4.3	721	6.3	964	7.2
372 Non-ferrous metals			43	.5	55	.5	68	.5
381 Metal products			531	6.4	889	7.8	966	7.2
382 Non-electrical machinery			105	1.3	149	1.3	153	1.1
383 Electrical machinery			275	3.3	414	3.6	459	3.4
384 Transport equipment			324	3.9	461	4.0	481	3.6
385 Prof. & Scient. Equip.			30	.4	60	.5	62	.5
390 Other Man. Industries			65	.8	94	.8	115	.9

(*) including indirect taxes and statistical discrepancies

(A) millions constant 1980 US Dollars

Sources :

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

1. WORLD BANK, World Tables 1991
2. UNIDO, Industry and Development - Global Report 1991/92 (Vienna, 1991)
3. UN, Monthly Bulletin of Statistics, Various issues
4. UNIDO database of Industrial Statistics

TABLE B.12 : MAGHREB UNION - FOREIGN TRADE AND BALANCE OF PAYMENTS, 1975-1989
(Millions current US dollars)

	1975		1980		1985		1989	
FOREIGN TRADE	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
Merchandise	13589	13413	27194	40340	20979	27804	23424	21813
Primary products	3294	2026	5847	2364	5423	1888	6039	2984
Fuels	554	10932	1849	36503	1533	23789	1267	14898
Manufactures	9741	455	19498	1473	14023	1527	16118	3931
Services	4329	1776	11798	4421	9573	3306	9769	4920
Non factor Services	3382	1414	7174	2617	6008	2586	5510	3983
Factor Services	947	362	4622	1804	3565	720	4259	937
Long term interest	314	0	2296	0	2178	0	3329	0
Other fact. services	633	362	2326	1804	1387	720	930	937
Trade in Manufactures	9741	453	19499	1469	14023	1919	16118	3920
Food products	1441	67	2691	115	2047	118	2362	182
Textiles and Clothing	642	136	1309	548	831	605	1286	1258
Wood products-furniture	121	3	396	5	130	6	238	17
Paper, Printing, Publish.	155	7	275	9	270	11	449	20
Chemical Industry	1105	174	2516	640	2374	1007	3463	1866
Non metallic products	415	6	528	5	473	7	338	82
Basic Metals, Iron, Steel	984	19	1811	56	1103	40	1489	88
Machinery & Equipment	4806	33	9720	81	6606	116	6342	372
Miscellaneous products	72	8	153	10	189	9	151	15
Percentage distribution								
Merchandise	75.8	88.3	69.7	90.1	68.7	89.3	70.6	81.6
Primary products	18.4	13.3	15.0	5.3	17.8	6.1	18.2	11.2
Fuels	3.1	72.0	4.7	81.6	5.0	77.0	3.8	55.7
Manufactures	54.4	3.0	50.0	3.3	45.9	6.2	48.6	14.7
Services	24.2	11.7	30.3	9.9	31.3	10.7	29.4	18.4
Non factor Services	18.9	9.3	18.4	5.8	19.7	8.4	16.6	14.9
Factor Services	5.3	2.4	11.9	4.0	11.7	2.3	12.8	3.5
	(A)	%	(A)	%	(A)	%	(A)	%
Trade Balance (net)	-1551	(100.0)	5771	(100.0)	358	(100.0)	-8460	(100.0)
Merchandise	-176	(11.3)	13146	(227.8)	6625	(1,850.6)	-1811	(24.9)
Primary products	-1268	(81.8)	-3483	60.4	-3535	987.4	-3055	(47.3)
Fuels	10378	689.1	34654	(600.5)	22256	(6,216.8)	13631	21.0
Manufactures	-9286	(598.7)	-18025	312.3	-12096	3,378.8	-12187	(188.7)
Services	-2553	(164.6)	-7375	127.8	-6267	1,750.6	-4649	(75.1)
Non factor Services	-1968	(126.9)	-4557	79.0	-3422	955.9	-1527	(23.6)
Factor Services	-585	(37.7)	-2818	48.8	-2845	794.7	-3322	(51.4)
BALANCE OF PAYMENTS	-2332	(85.5)	7537	(130.8)	3044	(850.3)	-1955	(30.3)
Trade Balance	-2729	(100.0)	5773	(100.0)	358	(100.0)	-8460	(100.0)
Worker's Remittances	1090	39.9	1785	(30.9)	1552	(433.5)	2184	33.8
Private current transfers	-405	(14.8)	-1321	22.9	-841	234.9	-350	(5.4)
Official transfers	16	.6	312	(5.4)	259	(72.3)	714	11.1
Current balance	-2028	(74.3)	6549	(113.4)	1328	(370.9)	-3912	(60.6)
Long term capital	695	25.5	1522	(26.4)	1058	(295.0)	873	13.5
Direct investment	-609	(22.3)	-470	8.1	248	(68.7)	227	3.5
Long term loans	1967	72.1	2549	(44.2)	1550	(433.0)	521	8.1
- Disbursements	2428	89.0	5898	(102.1)	6093	(1,702.0)	7121	110.2
- Repayments	-461	(16.9)	-3347	58.0	-4543	1,269.0	-6600	(102.2)
Other capital	-663	(24.3)	-557	9.8	-740	206.7	125	1.9
Other capital	-999	(36.6)	-534	9.2	660	(184.4)	1084	16.8

Sources :

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

1. WORLD BANK, World Tables 1991
2. UNIDO database of Industrial Statistics

TABLE B.13: ENDOGENOUS DEVELOPMENT RESOURCES IN THE MAGHREB UNION COUNTRIES, 1975-1989

I. EARNINGS IN FOREIGN EXCHANGE (million current US Dollars)

					Percentage distribution			
	1975	1980	1985	1989	1975	1980	1985	1989
Algeria								
Primary Products	244	191	105	375	4.6	1.3	.7	3.6
Oil	4,153	13,413	12,826	8,840	78.9	90.0	91.2	84.4
Manufactures	99	48	103	261	1.9	.3	.7	2.5
Tourism	281	476	531	592	5.3	3.2	3.3	5.7
Workers' remittances	412	406	313	355	7.0	2.7	2.2	3.4
Various services	73	372	191	53	1.4	2.5	1.4	.5
Total	5,267	14,906	14,069	10,476	100.0	100.0	100.0	100.0
Libya								
Primary Products	1	3	5	2	.0	.0	.0	.0
Oil	6,411	21,837	10,170	5,512	94.4	93.5	93.5	84.4
Manufactures	6	79	178	130	.1	.3	1.6	2.0
Tourism	160	164	63	128	2.4	.7	.6	2.0
Workers' remittances					.0	.0	.0	.0
Various services	215	1,282	463	761	3.2	5.5	4.3	11.6
Total	6,793	23,365	10,879	6,533	100.0	100.0	100.0	100.0
Mauritania								
Primary Products	164	190	361	436	26.3	69.1	89.4	65.5
Oil	1	2	3	2	.5	.7	.7	.4
Manufactures	2	4	8	11	1.1	1.5	2.0	2.2
Tourism	18	56	27	52	9.5	20.4	6.7	10.2
Workers' remittances		6	1	4	.0	2.2	.2	.8
Various services	5	17	4	5	2.6	6.2	1.0	1.0
Total	190	275	404	510	100.0	100.0	100.0	100.0
Morocco								
Primary Products	1,324	1,728	1,194	1,592	51.7	40.0	28.9	25.1
Oil	14	118	83	69	.5	2.7	2.0	1.1
Manufactures	191	569	868	1,652	7.5	13.2	21.0	26.0
Tourism	468	817	993	1,659	18.3	18.9	24.1	26.1
Workers' remittances	533	1,054	967	1,337	20.8	24.4	23.4	21.1
Various services	29	39	22	41	1.1	.9	.5	.6
Total	2,559	4,325	4,127	6,350	100.0	100.0	100.0	100.0
Tunisia								
Primary Products	290	252	273	579	19.8	6.9	7.5	11.5
Oil	344	1,133	707	475	23.5	30.8	23.7	9.4
Manufactures	155	773	770	1,077	10.6	21.0	25.8	37.2
Tourism	487	1,104	972	1,552	33.3	30.0	32.6	30.7
Workers' remittances	145	319	271	482	9.9	8.7	9.1	9.7
Various services	40	94	40	77	2.7	2.6	1.3	1.5
Total	1,461	3,675	2,983	5,048	100.0	100.0	100.0	100.0
MAGHREB UNION								
Primary Products	2023	2364	1888	2984	12.4	5.1	5.8	10.3
Oil	10928	36503	23789	14898	67.2	78.4	73.3	51.5
Manufactures	453	1473	1927	3931	2.8	3.2	5.9	13.6
Tourism	1414	2617	2586	3983	8.7	5.6	8.0	13.8
Workers' remittances	1090	1785	1552	2184	6.7	3.8	4.8	7.6
Various services	362	1804	720	937	2.2	3.9	2.2	3.2
Total	16270	46546	32462	28917	100.0	100.0	100.0	100.0

TABLE B.13: ENDOGENOUS DEVELOPMENT RESOURCES IN THE MAGHREB UNION COUNTRIES, 1975-1989
(Continuing)

					Percentage distribution			
	1975	1980	1985	1989	1975	1980	1985	1989
II. PAYMENTS IN FOREIGN EXCHANGE (millions current US dollars)								
Algeria								
Production inputs	1480	2714	2903	2502	20.7	15.9	17.5	14.6
Manufactures	3972	6882	5908	5686	55.6	40.4	35.5	33.2
Services	1219	3520	2900	1855	17.1	20.7	17.4	10.8
Long term interest	217	1436	1409	1851	3.0	8.4	8.5	10.6
Loans' repayments	253	2482	3504	5221	3.5	14.6	21.1	30.5
T o t a l	7141	17034	16624	17115	100.0	100.0	100.0	100.0
Libya								
Production inputs	792	1511	1006	1006	13.3	10.8	12.5	12.9
Manufactures	3632	8857	4748	4747	60.8	63.2	58.8	60.7
Services	1553	3650	2315	2071	26.0	26.0	28.7	26.5
Long term interest								
Loans' repayments								
T o t a l	5977	14018	8069	7824	100.0	100.0	100.0	100.0
Mauritania								
Production inputs	85	128	119	98	24.5	25.1	17.5	14.2
Manufactures	124	193	215	257	35.7	37.8	31.6	37.2
Services	99	159	271	255	28.5	31.2	39.6	37.0
Long term interest	5	13	27	25	1.4	2.5	4.0	3.6
Loans' repayments	34	17	49	55	9.8	3.3	7.2	8.0
T o t a l	347	510	681	690	100.0	100.0	100.0	100.0
Morocco								
Production inputs	1060	2015	2035	2076	33.4	31.5	36.1	25.8
Manufactures	1206	1755	1478	2915	38.0	27.4	26.2	36.3
Services	748	1419	1121	1365	23.5	22.2	19.9	17.0
Long term interest	57	619	491	1066	1.8	9.7	8.7	13.3
Loans' repayments	106	590	514	617	3.3	9.2	9.1	7.7
T o t a l	3177	6398	5639	8039	100.0	100.0	100.0	100.0
Tunisia								
Production inputs	431	1328	893	1624	24.8	30.3	21.9	27.9
Manufactures	807	1811	1674	2513	46.5	41.4	41.0	43.1
Services	396	752	788	752	22.8	17.2	19.3	12.9
Long term interest	35	228	251	228	2.0	5.2	6.1	3.9
Loans' repayments	68	258	476	707	3.9	5.9	11.7	12.1
T o t a l	1737	4377	4082	5824	100.0	100.0	100.0	100.0
MAGHREB UNION								
Production inputs	3848	7696	6956	7306	20.9	18.2	19.8	10.5
Manufactures	9741	19498	14023	16118	53.0	46.1	40.0	40.8
Services	4015	9500	7395	6298	21.8	22.4	21.1	15.9
Long term interest	314	2296	2178	3170	1.7	5.4	6.2	8.0
Loans' repayments	461	3347	4543	6600	2.5	7.9	12.9	16.7
T o t a l	18379	42337	35095	39497	100.0	100.0	100.0	100.0

Source : TABLES B.1 - B.10

T A B L E B.14 : ALGERIA - ESTIMATES ON THE GLOBAL DEMAND FOR AND EMPLOYMENT IN TECHNICAL SERVICES

A. T U R N O V E R	N E W I N V E S T M E N T S			O P E R A T I N G U N I T S			T O T A L		
	(millions of 1980 US Dollars)			(millions of 1980 US Dollars)			(millions of 1980 US Dollars)		
	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.
Architectural Works	52.6	78.9	105.1	11.1	16.6	22.2	63.7	95.5	127.3
Architectural Design	35.0	52.6	70.1	7.4	11.1	14.8	42.4	63.7	84.9
Contract administration	17.5	26.3	35.0	3.7	5.5	7.4	21.2	31.8	42.4
Buildings and									
Infrastructures	372.4	536.6	700.9	78.6	113.2	147.9	450.9	649.9	848.8
Feasibility studies	21.9	54.8	87.6	4.6	11.5	18.5	26.5	66.3	106.1
Detailed design	131.4	197.1	262.8	27.8	41.6	55.5	159.2	238.8	318.3
Construction Supervision	219.0	284.7	350.5	46.3	171.1	295.9	265.3	455.8	646.3
Process and Industrial									
Engineering	1051.4	1419.4	1787.3	221.9	763.8	1305.7	1273.3	2183.2	3093.1
Feasibility studies	105.1	157.7	210.3	22.2	19.6	17.1	127.3	177.3	227.3
Design and processing									
engineering	105.1	210.3	315.4	22.2	28.2	34.1	127.3	238.4	349.6
Detailed engineering	736.0	893.7	1051.4	155.3	319.5	483.6	891.3	1213.1	1535.0
Procurement & construction									
supervision	105.1	157.7	210.3	22.2	19.6	17.1	127.3	177.3	227.3
Procurement	8.8	26.3	43.8	1.9	43.6	85.3	10.6	69.9	129.2
T O T A L	1485.1	2061.1	2637.2	313.4	937.3	1561.2	1798.5	2998.5	4198.4
B. E M P L O Y M E N T (Units)									
Architectural Works	3.638	5.457	7.276	.768	1.152	1.535	4.406	6.608	8.811
Architectural Design	2.425	3.638	4.850	.512	.788	1.024	2.937	4.406	5.874
Contract administration	1.213	1.819	2.425	.256	.384	.512	1.469	2.203	2.937
Buildings and									
Infrastructures	25.768	37.136	48.504	5.437	7.837	10.237	31.205	44.972	58.740
Feasibility studies	1.516	3.789	6.063	.319	.799	1.280	1.835	4.589	7.343
Detailed design	9.094	13.642	18.189	1.921	2.880	3.839	11.016	16.522	22.028
Construction Supervision	15.157	19.705	24.252	3.201	11.837	20.473	18.358	31.542	44.725
Process and Industrial									
Engineering	72.755	98.220	123.684	15.355	52.855	90.357	88.110	151.076	214.042
Feasibility studies	7.276	10.913	14.551	1.535	1.358	1.181	8.811	12.272	15.732
Design and processing									
engineering	7.276	14.551	21.827	1.535	1.949	2.362	8.811	16.500	24.189
Detailed engineering	50.929	61.842	72.755	10.748	22.107	33.466	61.677	83.949	106.221
Procurement & construction									
supervision	7.276	10.913	14.551	1.535	1.358	1.181	8.811	12.272	15.732
Procurement	.606	1.819	3.031	.130	3.018	5.906	.736	4.837	8.937
T O T A L	102.767	142.831	182.495	21.690	64.862	108.035	124.457	207.493	290.530
Professionals	30.830	42.789	54.749	6.507	19.459	32.410	37.337	62.248	87.159
M E M O I T E M S	G D P	56895	Investments	17523					

Note : The estimates of this Table are based on the Data provided in Table B.1 and the coefficients given in Table B.19. These are rough estimates. The details of the above figures are the products of calculations by employing these coefficients and do not mean corresponding accuracy

T A B L E B.15 : LIBYA - ESTIMATES ON THE GLOBAL DEMAND FOR AND EMPLOYMENT IN TECHNICAL SERVICES

A. T U R N O V E R	NEW INVESTMENTS			OPERATING UNITS			T O T A L		
	(	)		millions of 1980 US Dollars)		
	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.
Architectural Works	27.1	40.6	34.1	4.9	7.3	9.8	32.0	47.9	63.9
Architectural Design	18.0	27.1	36.1	3.3	4.9	6.5	21.3	32.0	42.6
Contract administration	9.0	13.5	18.0	1.6	2.4	3.3	10.7	16.0	21.3
Buildings and									
Infrastructures	191.6	276.2	360.7	34.7	50.0	65.3	226.3	326.2	426.1
Feasibility studies	11.3	28.2	45.1	2.0	5.1	8.2	13.3	33.3	53.3
Detailed design	67.6	101.5	135.3	12.3	18.4	24.5	79.9	119.8	159.8
Construction Supervision	112.7	146.5	180.4	20.4	75.5	130.7	133.2	222.1	311.0
Process and Industrial									
Engineering	541.1	730.5	919.8	98.0	337.3	576.7	639.1	1067.8	1496.5
Feasibility studies	54.1	81.2	108.2	9.8	8.7	7.5	63.9	89.8	115.8
Design and processing									
engineering	54.1	108.2	162.3	9.8	12.4	15.1	63.9	120.7	177.4
Detailed engineering	378.8	459.9	541.1	68.6	141.1	213.6	447.4	601.0	754.7
Procurement & construction									
supervision	54.1	81.2	108.2	9.8	8.7	7.5	63.9	89.8	115.8
Procurement	4.5	13.5	22.5	.8	19.3	37.7	5.3	32.8	60.2
T O T A L	764.3	1060.7	1357.2	138.4	414.0	689.5	902.7	1474.7	2046.7
B. E M P L O Y M E N T (Units)									
Architectural Works	1.872	2.808	3.744	.339	.509	.678	2.211	3.317	4.422
Architectural Design	1.248	1.872	2.496	.226	.339	.452	1.474	2.211	2.948
Contract administration	.624	.936	1.248	.113	.170	.226	.737	1.106	1.474
Buildings and									
Infrastructures	13.261	19.111	24.962	2.401	3.461	4.521	15.662	22.572	29.483
Feasibility studies	.780	1.950	3.120	.141	.353	.565	.921	2.303	3.685
Detailed design	4.680	7.021	9.361	.849	1.272	1.695	5.529	8.292	11.056
Construction Supervision	7.801	10.141	12.481	1.414	5.228	9.042	9.214	15.368	21.523
Process and Industrial									
Engineering	37.443	50.548	63.553	6.781	23.343	39.905	44.224	73.891	103.558
Feasibility studies	3.744	5.616	7.489	.678	.600	.522	4.422	6.216	8.010
Design and processing									
engineering	3.744	7.489	11.233	.678	.861	1.043	4.422	8.349	12.276
Detailed engineering	26.210	31.826	37.443	4.747	9.763	14.780	30.937	41.590	52.222
Procurement & construction									
supervision	3.744	5.616	7.489	.678	.600	.522	4.422	6.216	8.010
Procurement	.312	.936	1.560	.057	1.333	2.608	.369	2.269	4.168
T O T A L	52.888	73.403	93.919	9.579	28.646	47.712	62.467	102.049	141.631
Professionals	15.866	22.021	28.176	2.874	8.594	14.314	18.740	30.615	42.489

MEMO ITEMS G D P 25127 Investments 9018

Note : The estimates of this Table are based on the Data provided in Table B.3 and the coefficients given in Table B.19. These are rough estimates. The details of the above figures are the products of calculations by employing these coefficients and do not mean corresponding accuracy

T A B L E B.16 : MAURITANIA-ESTIMATES ON THE GLOBAL DEMAND FOR AND EMPLOYMENT IN TECHNICAL SERVICES

A. T U R N O V E R	NEW INVESTMENTS			OPERATING UNITS			T O T A L		
	(millions of 1980 US Dollars)					
	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.
Architectural Works	.4	.6	.9	.2	.3	.3	.6	.9	1.2
Architectural Design	.3	.4	.6	.1	.2	.2	.4	.6	.8
Contract administration	.1	.2	.3	.1	.1	.1	.2	.3	.4
Buildings and									
Infrastructures	3.1	4.4	5.8	1.2	1.7	2.3	4.3	6.1	8.0
Feasibility studies	.2	.5	.7	.1	.2	.3	.3	.6	1.0
Detailed design	1.1	1.6	2.2	.4	.6	.8	1.5	2.3	3.0
Construction Supervision	1.8	2.3	2.9	.7	2.6	4.5	2.5	4.9	7.4
Process and Industrial									
Engineering	8.6	11.7	14.7	3.4	11.6	19.9	12.0	23.3	34.6
Feasibility studies	.9	1.3	1.7	.3	.3	.3	1.2	1.6	2.0
Design and processing									
engineering	.9	1.7	2.6	.3	.4	.5	1.2	2.2	3.1
Detailed engineering	6.0	7.3	8.6	2.4	4.9	7.4	8.4	12.2	16.0
Procurement & construction									
supervision	.9	1.3	1.7	.3	.3	.3	1.2	1.6	2.0
Procurement	.1	.2	.4	.0	.7	1.3	.1	.9	1.7
T O T A L	12.2	16.9	21.7	4.8	14.3	23.8	17.0	31.2	45.5
B. E M P L O Y M E N T (Units)									
Architectural Works	30	45	60	12	18	23	42	.062	.083
Architectural Design	20	30	40	8	12	16	28	.042	.055
Contract administration	10	15	20	4	6	8	14	.021	.028
Buildings and									
Infrastructures	212	305	399	83	119	156	295	.425	.555
Feasibility studies	12	31	50	5	12	19	17	.043	.069
Detailed design	75	112	149	29	44	58	104	.156	.208
Construction Supervision	125	162	199	49	180	312	173	.342	.511
Process and Industrial									
Engineering	598	807	1016	234	805	1377	832	1.613	2.393
Feasibility studies	60	90	120	23	21	18	83	.110	.138
Design and processing									
engineering	60	120	179	23	30	36	83	.149	.215
Detailed engineering	419	508	598	164	337	510	582	.845	1.108
Procurement & construction									
supervision	60	90	120	23	21	18	83	.110	.138
Procurement	5	15	25	2	46	90	7	.061	.115
T O T A L	845	1172	1500	331	988	1646	1175	2161	3146
Professionals	253	352	450	99	297	494	353	648	944
MEMO ITEMS	G D P	867	Investaents	144					

Note : The estimates of this Table are based on the Data provided in Table B.5 and the coefficients given in Table B.19. These are rough estimates. The details of the above figures are the products of calculations by employing these coefficients and do not mean corresponding accuracy

T A B L E B.17 : MOROCCO - ESTIMATES ON THE GLOBAL DEMAND FOR AND EMPLOYMENT IN TECHNICAL SERVICES

A. T U R N O V E R	NEW INVESTMENTS			OPERATING UNITS			T O T A L		
	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.
Architectural Works	15.6	23.3	31.1	5.0	7.5	10.0	20.5	30.8	41.1
Architectural Design	10.4	15.6	20.7	3.3	5.0	6.6	13.7	20.5	27.4
Contract administration	5.2	7.8	10.4	1.7	2.5	3.3	6.8	10.3	13.7
Buildings and Infrastructures	110.2	158.8	207.4	35.3	50.8	66.4	145.5	209.7	273.9
Feasibility studies	6.5	16.2	25.9	2.1	5.2	8.3	8.6	21.4	34.2
Detailed design	38.9	58.3	77.8	12.5	18.7	24.9	51.4	77.0	102.7
Construction Supervision	64.8	84.3	103.7	20.8	26.8	32.8	85.6	111.1	136.6
Process and Industrial Engineering	311.2	420.1	529.0	99.6	142.9	186.3	410.8	583.0	775.2
Feasibility studies	31.1	46.7	62.2	10.0	14.8	20.7	41.1	55.5	69.9
Design and processing engineering	31.1	62.2	93.3	10.0	20.6	30.6	41.1	81.8	121.7
Detailed engineering	217.8	264.5	311.2	69.7	103.4	135.0	207.5	256.7	323.3
Procurement & construction supervision	31.1	46.7	62.2	10.0	14.8	20.7	41.1	55.5	69.9
Procurement	2.6	7.8	13.0	.8	2.6	4.3	3.4	10.6	17.9
T O T A L	439.5	610.0	780.5	140.7	202.8	271.0	580.2	830.8	1101.4
B. E M P L O Y M E N T (Units)									
Architectural Works	1.077	1.615	2.153	.345	.517	.689	1.421	2.132	2.843
Architectural Design	.718	1.077	1.435	.230	.345	.460	.948	1.421	1.895
Contract administration	.359	.538	.717	.115	.172	.230	.474	.711	.948
Buildings and Infrastructures	7.626	10.990	14.355	2.441	3.519	4.596	10.067	14.509	18.951
Feasibility studies	.449	1.121	1.794	.143	.359	.575	.592	1.480	2.369
Detailed design	2.892	4.037	5.383	.863	1.293	1.724	3.554	5.330	7.107
Construction Supervision	4.486	5.832	7.177	1.437	2.015	2.746	5.923	7.699	10.537
Process and Industrial Engineering	21.532	29.069	36.605	6.894	9.732	12.569	28.426	38.800	50.174
Feasibility studies	2.153	3.230	4.306	.689	1.010	1.330	2.843	3.840	4.837
Design and processing engineering	2.153	4.306	6.460	.689	1.375	2.061	2.843	5.181	7.520
Detailed engineering	15.073	18.302	21.532	4.826	5.926	7.278	19.898	23.828	28.817
Procurement & construction supervision	2.153	3.230	4.306	.689	1.010	1.330	2.843	3.840	4.837
Procurement	.179	.538	.897	.058	1.355	2.652	.238	1.893	3.549
T O T A L	30.414	42.212	54.010	9.738	13.122	16.506	40.153	51.334	62.516
Professionals	9.124	12.664	16.203	2.922	4.037	5.152	12.046	16.400	21.755
MEMO ITEMS	G D P	25545	Investments	5186					

Note : The estimates of this Table are based on the Data provided in Table B.7 and the coefficients given in Table B.19. These are rough estimates. The details of the above figures are the products of calculations by employing these coefficients and do not mean corresponding accuracy

T A B L E B.18 : TUNISIA - ESTIMATES ON THE GLOBAL DEMAND FOR AND EMPLOYMENT IN TECHNICAL SERVICES

A. T U R N O V E R	NEW INVESTMENTS			OPERATING UNITS			T O T A L		
	(	)		millions of 1980 US Dollars)		
	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.
Architectural Works	7.4	11.1	14.8	2.3	3.4	4.6	9.7	14.5	19.4
Architectural Design	4.9	7.4	9.9	1.5	2.3	3.0	6.5	9.7	12.9
Contract administration	2.5	3.7	4.9	.8	1.1	1.5	3.2	4.8	6.5
Buildings and Infrastructures	52.4	75.6	98.7	16.2	23.3	30.4	68.6	98.9	129.1
Feasibility studies	3.1	7.7	12.3	.9	2.4	3.8	4.0	10.1	16.1
Detailed design	18.5	27.8	37.0	5.7	8.6	11.4	24.2	36.3	48.4
Construction Supervision	30.9	40.1	49.4	9.5	35.2	60.8	40.4	75.3	110.2
Process and Industrial Engineering	148.1	199.9	251.7	45.6	157.1	268.5	193.7	357.0	520.2
Feasibility studies	14.8	22.2	29.6	4.6	4.0	3.5	19.4	26.2	33.1
Design and processing engineering	14.8	29.6	44.4	4.6	5.8	7.0	19.4	35.4	51.4
Detailed engineering	103.7	125.9	148.1	31.9	65.7	99.4	135.6	191.6	247.5
Procurement & construction supervision	14.8	22.2	29.6	4.6	4.0	3.5	19.4	26.2	33.1
Procurement	1.2	3.7	6.2	.4	9.0	17.5	1.6	12.7	23.7
T O T A L	209.2	290.3	371.4	64.4	192.7	321.0	273.8	483.0	692.5
B. E M P L O Y M E N T (Units)									
Architectural Works	.512	.769	1.025	.158	.237	.316	.670	1.005	1.340
Architectural Design	.342	.512	.683	.105	.158	.210	.447	.670	.894
Contract administration	.171	.256	.342	.053	.079	.105	.223	.335	.447
Buildings and Infrastructures	3.629	5.230	6.831	1.118	1.611	2.105	4.747	6.842	8.936
Feasibility studies	.213	.534	.854	.066	.164	.263	.279	.698	1.117
Detailed design	1.281	1.921	2.562	.395	.592	.789	1.676	2.514	3.351
Construction Supervision	2.135	2.775	3.416	.658	2.434	4.210	2.793	5.209	7.625
Process and Industrial Engineering	10.247	13.834	17.420	3.157	10.868	18.580	13.404	24.702	36.000
Feasibility studies	1.025	1.537	2.049	.316	.279	.243	1.340	1.816	2.292
Design and processing engineering	1.025	2.049	3.074	.316	.401	.486	1.340	2.450	3.560
Detailed engineering	7.173	8.710	10.247	2.210	4.546	6.881	9.383	13.256	17.128
Procurement & construction supervision	1.025	1.537	2.049	.316	.279	.243	1.340	1.816	2.292
Procurement	.085	.256	.427	.027	.821	1.214	.112	.877	1.641
T O T A L	14.474	20.089	25.703	4.460	13.337	22.215	18.934	33.426	47.918
Professionals	4.342	6.027	7.711	1.338	4.001	6.664	5.680	10.028	14.375
MEMO ITEMS	G D P	11699	Investments	2468					

Note : The estimates of this Table are based on the Data provided in Table B.9 and the coefficients given in Table B.19. These are rough estimates. The details of the above figures are the products of calculations by employing these coefficients and do not mean corresponding accuracy

TABLE B.19: COEFFICIENTS FOR ROUGH ESTIMATES ON THE GLOBAL DEMAND FOR ENGINEERING DESIGN AND CONSULTANCY TECHNICAL SERVICES

CATEGORIES OF WORKS	ON NEW FIXED CAPITAL INVESTMENTS			ON GDP (VALUE ADDED OF OPERATING ECONOMIC UNITS)		
	Minimum	Average	Maximum	Minimum	Average	Maximum
Architectural Works	.00300	.00450	.00600	.000195	.000293	.000390
Architectural Design	.00200	.00300	.00400	.000130	.000195	.000260
Contract administration	.00100	.00150	.00200	.000065	.000098	.000130
Buildings and Infrastructures	.02125	.03063	.04000	.001381	.001991	.002600
Feasibility studies	.00125	.00313	.00500	.000081	.000203	.000325
Detailed design	.00750	.01125	.01500	.000488	.000731	.000975
Construction Supervision	.01250	.01625	.02000	.000813	.004000	.005200
Process and Industrial Engineering	.06000	.08100	.10200	.003900	.017000	.022950
Feasibility studies	.00600	.00900	.01200	.000390	.000200	.000300
Design and processing engineering	.00600	.01200	.01800	.000390	.000300	.000600
Detailed engineering	.04200	.05100	.06000	.002730	.007000	.008500
Procurement & construction supervision	.00600	.00900	.01200	.000390	.000200	.000300
Procurement	.00050	.00150	.00250	.000033	.000500	.001500

Note: The above coefficients have been calculated on the basis of the data provided in TABLE IV.2 (p.51) and a number of input/output Tables for developing countries with per capita GDP ranging between US \$ 1000-2000

TABLE B.20 : MACRERB - ESTIMATES ON THE GLOBAL DEMAND FOR AND EMPLOYMENT IN TECHNICAL SERVICES

A. TURNOVER	NEW INVESTMENTS			OPERATING UNITS			TOTAL		
	(			millions of 1980 US Dollars)		
	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.
Architectural Works	183.1	154.6	206.2	23.4	35.1	46.9	126.5	189.8	253.0
Architectural Design	68.7	103.1	137.5	15.6	23.4	31.2	84.3	126.5	168.7
Contract administration	34.4	51.5	68.7	7.8	11.7	15.6	42.2	63.3	84.3
Buildings and									
Infrastructures	730.3	1052.4	1374.6	165.9	239.1	312.3	896.2	1291.6	1686.9
Feasibility studies	43.0	107.4	171.8	9.7	24.4	39.0	52.7	131.8	210.9
Detailed design	257.7	386.6	515.5	58.6	87.9	117.1	316.4	474.5	632.6
Construction Supervision	429.6	558.4	687.3	97.7	361.2	624.7	527.2	919.6	1312.0
Process and Industrial									
Engineering	2061.9	2783.6	3505.2	468.5	1612.8	2757.1	2530.4	4396.4	6262.3
Feasibility studies	206.2	309.3	412.4	46.9	41.4	36.0	253.0	350.7	448.4
Design and processing									
engineering	206.2	412.4	618.6	46.9	59.5	72.1	253.0	471.8	690.6
Detailed engineering	1443.3	1752.6	2061.9	328.0	674.5	1021.1	1771.3	2427.2	3083.0
Procurement & construction									
supervision	206.2	309.3	412.4	46.9	41.4	36.0	253.0	350.7	448.4
Procurement	17.2	51.5	85.9	4.0	92.1	180.2	21.1	143.6	266.1
TOTAL	2912.4	4042.2	5171.9	661.8	1979.1	3296.4	3574.2	6021.3	8468.4
B. EMPLOYMENT (Units)									
Architectural Works	7.134	10.701	14.268	1.621	2.432	3.242	8.755	13.133	17.510
Architectural Design	4.756	7.134	9.512	1.081	1.621	2.161	5.837	8.755	11.674
Contract administration	2.378	3.567	4.756	.540	.811	1.081	2.918	4.378	5.837
Buildings and									
Infrastructures	50.534	72.828	95.122	11.481	16.547	21.614	62.014	89.375	116.737
Feasibility studies	2.973	7.431	11.890	.673	1.688	2.702	3.646	9.119	14.592
Detailed design	17.835	26.753	35.671	4.057	6.081	8.105	21.892	32.834	43.776
Construction Supervision	29.726	38.643	47.561	6.759	24.994	43.229	36.484	63.637	90.790
Process and Industrial									
Engineering	142.683	192.623	242.562	32.421	111.605	190.788	175.105	304.227	433.350
Feasibility studies	14.268	21.403	28.537	3.242	2.868	2.494	17.510	24.271	31.031
Design and processing									
engineering	14.268	28.537	42.805	3.242	4.115	4.988	17.510	32.652	47.793
Detailed engineering	99.878	121.281	142.683	22.695	46.679	70.662	122.573	167.960	213.346
Procurement & construction									
supervision	14.268	21.403	28.537	3.242	2.868	2.494	17.510	24.271	31.031
Procurement	1.189	3.567	5.945	.274	6.372	12.470	1.463	9.939	18.415
TOTAL	201.540	279.719	357.898	45.797	136.956	228.114	247.338	416.675	586.012
Professionals	60.462	83.916	107.369	13.739	41.087	68.434	74.201	125.002	175.804
MEMO ITEMS	G D P	120133	Investments	34365					

Note : The estimates of this Table are based on the Data provided in Table B.11 and the coefficients given in Table B.19. These are rough estimates. The details of the above figures are the products of calculations by employing these coefficients and do not mean corresponding accuracy