THE WESTERN EUROPEAN MARKET

FOR COMPUTER SOFTWARE AND SERVICES

1989 - 1994

INPUT

About INPUT

INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions.

Continuous-information advisory services, proprietary research/consulting, merger/acquisition assistance, and multiclient studies are provided to users and vendors of information systems and services (software, processing services, turnkey systems, systems integration, professional services, communications, systems/software maintenance and support).

Many of INPUT's professional staff members have more than 20 years' experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed as a privately held corporation in 1974, INPUT has become a leading international research and consulting firm. Clients include more than 100 of the world's largest and most technically advanced companies.

INPUT OFFICES

North America

Headquarters
1280 Villa Street
Mountain View, CA 94041-1194
(415) 961-3300
Telex 171407 Fax (415) 961-3966

New York
959 Route 46 East, Suite 201
Parsippany, NJ 07054
(201) 299-6999
Telex 134630 Fax (201) 263-8341

Washington, D.C.
1953 Gallows Road, Suite 560
Vienna, VA 22182
(703) 847-6870 Fax (703) 847-6872

International

Europe
Piccadilly House
33/37 Regent Street
London SW1Y 4NF, England
(01) 493-9335
Telex 27113 Fax (01) 629-0179

Paris
52, boulevard de Sébastopol
75003 Paris, France
(33-1) 42 77 42 77 Fax (33-1) 42 77 85 82

Tokyo
Saida Building
4-6, Kanda Sakuma-cho
Chiyoda-ku, Tokyo 101, Japan
(03) 864-0531 Fax (03) 864-4114

MARCH 1990

THE WESTERN EUROPEAN MARKET FOR COMPUTER SOFTWARE AND SERVICES 1989-1994

INPUT®

Piccadilly House, 33/37 Regent Street, London SW1Y 4NF 01-493-9335

Researched by
INPUT
Piccadilly House
33/37 Regent Street,
London SW1Y 4NF
England

Published by
INPUT
1280 Villa Street
Mountain View, CA 94041-1194
U.S.A.

Market Analysis Programme—Europe

The Western European Market for Computer Software and Services, 1989-1994

SARE • 548 • 1989

Abstract

This report examines the performance, status and growth potential of the computer software and services industry in Western Europe. The report covers the Western European country markets of France, West Germany, the United Kingdom, Italy, Sweden, Norway, Denmark, Finland, the Netherlands, Belgium, Switzerland, Austria and Spain.

The computer software and services industry is defined by INPUT as comprising six major sectors—processing services, network services, software products, professional services, systems integration and turnkey systems.

Each sector is examined with respect to major trends, market dynamics and issues. Estimates of sector and country market growth are given—together with size and growth estimates up to 1994. In addition, the dynamics of each country market are reviewed and an analysis of the market by vertical industry sector is provided.

The report also discusses the economic and strategic position of the computer software and services industry in Western Europe in comparison with the U.S. market.

This report contains 274 pages, including 242 exhibits.

Table of Contents

Table of Contents (Continued)

Table of Contents (Continued)

Table of Contents (Continued)

Table of Contents (Continued)

Exhibits

Exhibits (Continued)

Exhibits (Continued)

Exhibits (Continued)

V

Exhibits (Continued)

Exhibits (Continued)

Exhibits (Continued)

Exhibits (Continued)

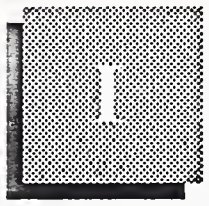
Exhibits (Continued)

Exhibits (Continued)

Exhibits (Continued)

I

Introduction



Introduction

This report is produced as one of a series of reports in INPUT's Software and Services Planning Services for the Computer Software and Services Industry in Western Europe.

A Scope of the Report

This report reviews and analyses the six major sectors that constitute INPUT's definition of the computer software and services market.

- Processing services
- Network services
- Software products
- Professional services
- Systems integration
- Turnkey systems

The six-sector definition is the same as that for INPUT's 1988 programme reports. Appendix E provides a reconciliation between INPUT's current and 1988 assessments of the computer software and services market for Western Europe.

The report is designed to assist vendors in:

- Identifying new markets and product opportunities
- Assessing product and marketing risk exposure
- Allocating research, development and operational resources
- Obtaining insights into market developments

The report describes and reviews the state of the computer software and services market in Western Europe in 1989 and presents a forecast through 1994.

The report discusses the key trends and strategic issues for vendors operating in the computer software and services business.

INPUT has analyzed the Western European country markets of France, West Germany, the United Kingdom, Italy, Sweden, Norway, Denmark, Finland, the Netherlands, Belgium, Switzerland, Austria and Spain—as well as the Rest of Europe (Ireland, Portugal and Greece).

B
Methodology

This report is based principally upon research activities conducted by INPUT during 1989:

- A vendor research programme with interview of more than 500 software and service vendors across Europe
- INPUT's continuous research into the computer software and services industry in Western Europe

For the vendor research programme, interviews were conducted in the Western European countries included in this study. Interviews were conducted on a face-to-face basis and by telephone and mail.

The second element in the research efforts that contributed to this report was INPUT's continuing studies of the computer software and services industry. Previous studies by INPUT of the market, company statements, press releases, news reports, and company financial information were all utilised by INPUT in researching this report.

Individual country markets were assessed in local currency at current rates. For comparative purposes, the assessments of individual country markets have been converted into U.S. dollars and to European Currency Units (ECUs). The exchange rates used are illustrated in Appendix G. Definitions of the terms used in this report are included in Appendix A.

Enquiries and comments regarding this report and any related topics of interest are welcomed by INPUT. INPUT would like to express its thanks to companies and individuals who participated in the research undertaken for this report.

C
Report Structure

The remaining chapters of the report are organised as follows:

- Chapter II is an Executive Overview that provides a summary of the contents of the entire report.
- Chapter III describes INPUT's assessment of the dimensions of the computer software and services market and its main constituent sectors; examines current and predicted growth rates, and makes forecasts

for the medium and longer term. Vendor rankings and market shares of the leading thirty European players are also included. Chapter III also addresses some of the major issues impacting the software and services market environment.

- Chapter IV provides more-detailed analysis of the six main sectors of the software and services industry defined by INPUT—i.e., processing services, network services, software products, professional services, systems integration and turnkey systems.

- Chapter V provides a detailed analysis of the dynamics of each country market covered in this report. Chapter V includes market commentaries, forecasts and vendor rankings.

- Appendix A provides a definition of the terms used, Appendix B a list of related INPUT reports, and Appendixes C-F provide the detailed year-by-year forecast figures from which the exhibits in the report are derived, a reconciliation of INPUT's previous and current assessments of the 1988 market size, and an analysis of the research sample.

There have been a number of changes in terminology in this report from that used in previous INPUT reports. These changes have been made with the aim of more clearly representing the activities within the industry. These changes are:

- The term *equipment vendor* is preferred to *hardware manufacturer*. This change ensures that the phrase describes not only vendors that manufacture computer equipment in their own right, but also those that buy in equipment from some third party, relabel it and sell it on.

- The term *equipment platform* is preferred to *hardware* to be consistent with the use of the term *equipment vendor*.

- Network services delivery mode is now split only into two subsectors, rather than the three subsectors used in previous reports. The subsector *managed network services* has been included with the subsector *network applications*.

- The term *systems operations* is preferred to *facilities management*. This preference reflects the growing trend of vendors' offering a total service to operate client systems, rather than just manage client facilities. If the vendor's computer facilities are used to provide this service, revenues are included under systems operations in the processing services delivery mode. If the clients' computer facilities are used, and all the vendor provides is skilled staff, revenues are included under systems operations in the professional services delivery mode.

The following terminology is used throughout this report:

- CAGR refers to compound annual growth rate.

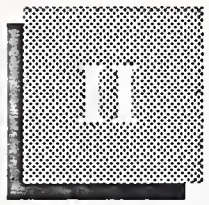
- In exhibits of leading vendors some vendors are owned by another vendor and its revenues are consolidated into the parent vendor's accounts. When INPUT wishes to show the name of the subsidiary vendor, the following terminology is used:

  - Parent vendor name/subsidiary vendor name (e.g., in Italy Concept/ CDS where Concept from France owns CDS in Italy)

During 1989, the INPUT research programme has allowed further refinement and analysis of the structure of the West European software and services market. As a result, changes have been made to the forecast sizes of different delivery modes and to the split of country revenues between different delivery modes. Appendix E discusses these changes and compares the breakdown for 1988 in detail.

III

Executive Overview



Executive Overview

A

The Industry Outlook—A Decade of Opportunity

During the past decade the computer software and services industry has grown at a compound average growth rate of 22% to multiply in size by over seven times. The most striking areas of growth have been in software products and turnkey systems.

As is illustrated by Exhibit II-1, further testimony to the development of the computer software and services sector is that by the end of the 1980s it exceeded the sales of computer equipment. At the beginning of the decade, equipment sales accounted for 57% of the total industry.

EXHIBIT II-1

A Decade of Industry Growth, 1979-1989

- CAGR 22%
- Software and services revenues exceed equipment revenues
- Key vendor challenges
  - Sales opportunities
  - Marketing
  - Support infrastructure

The high rate of growth can be broadly attributed to the fundamental driving force of technological change. Technology change has caused information systems to be applied in new ways to new applications. These changes contribute to a seemingly insatiable demand for new software products and professional services.

However, rapid growth is affecting the traditional industry structure and creating more-competitive markets. Vendors are thus facing key issues relating to identifying and addressing the new opportunities, building sales and marketing organisations and developing service and support infrastructures to meet the increasingly demanding nature of the market.

B

Market Sector Analysis

INPUT estimates that the overall computer software and services market in Western Europe was $50.1 billion in 1989. As Exhibit II-2 illustrates, the overall market is expected to grow to $117.8 billion by 1994.

Over this five-year period from 1989 to 1994, the CAGR forecast by INPUT for the overall market is 19%.

The fastest growing sector will be systems integration, which will have a CAGR of 26% between 1989 and 1994. Network services is forecast to have a CAGR of 24% over this period.

The two largest delivery modes, professional services and software products, are expected to have a CAGR of 20% between 1989 and 1994. Turnkey systems should grow at 19% per annum, whereas processing services are forecast to have the lowest growth rate—only 6% per annum between 1989 and 1994.

Each of the delivery modes is discussed in detail in Chapter IV.

C

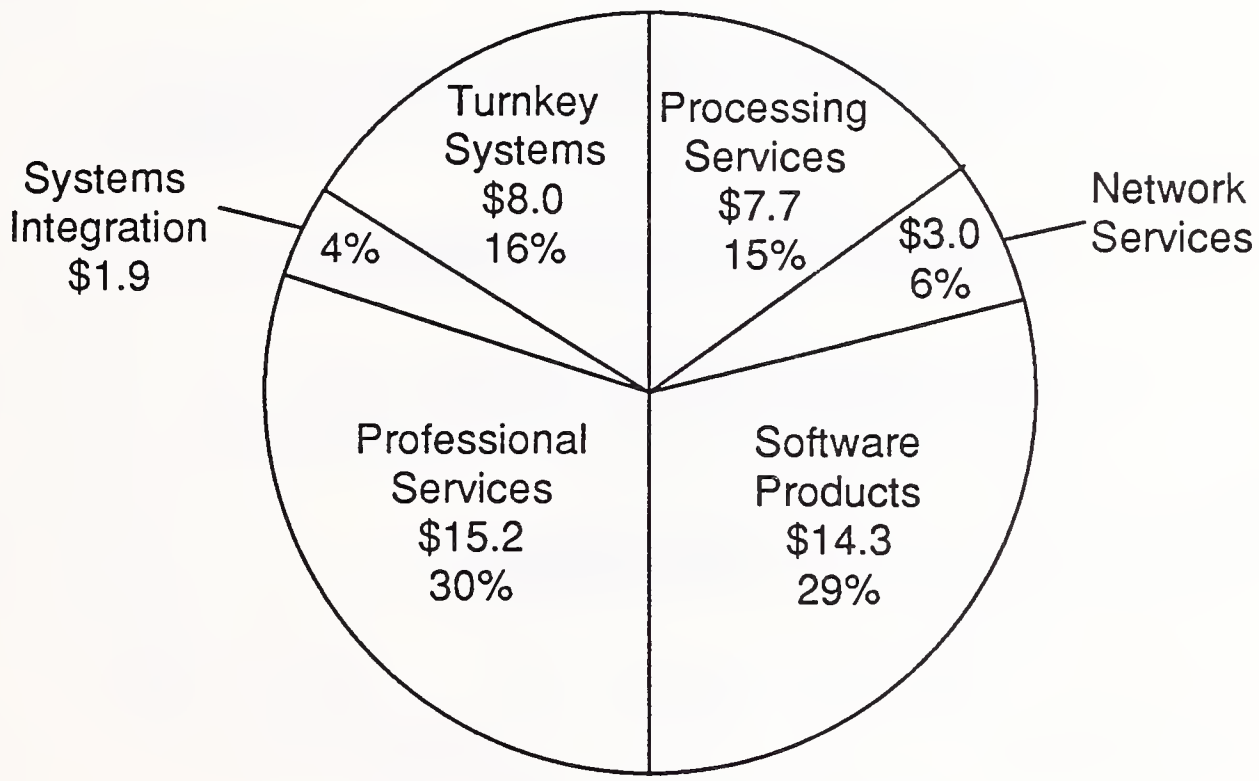
Major Country Markets

France remains the largest country market for software and services in Western Europe. In 1989 it accounted for 24% of the overall West European market for software and services. The leading four country markets illustrated in Exhibit II-3—France, West Germany, the U.K. and Italy—in total accounted for 73% of the overall market in 1989.

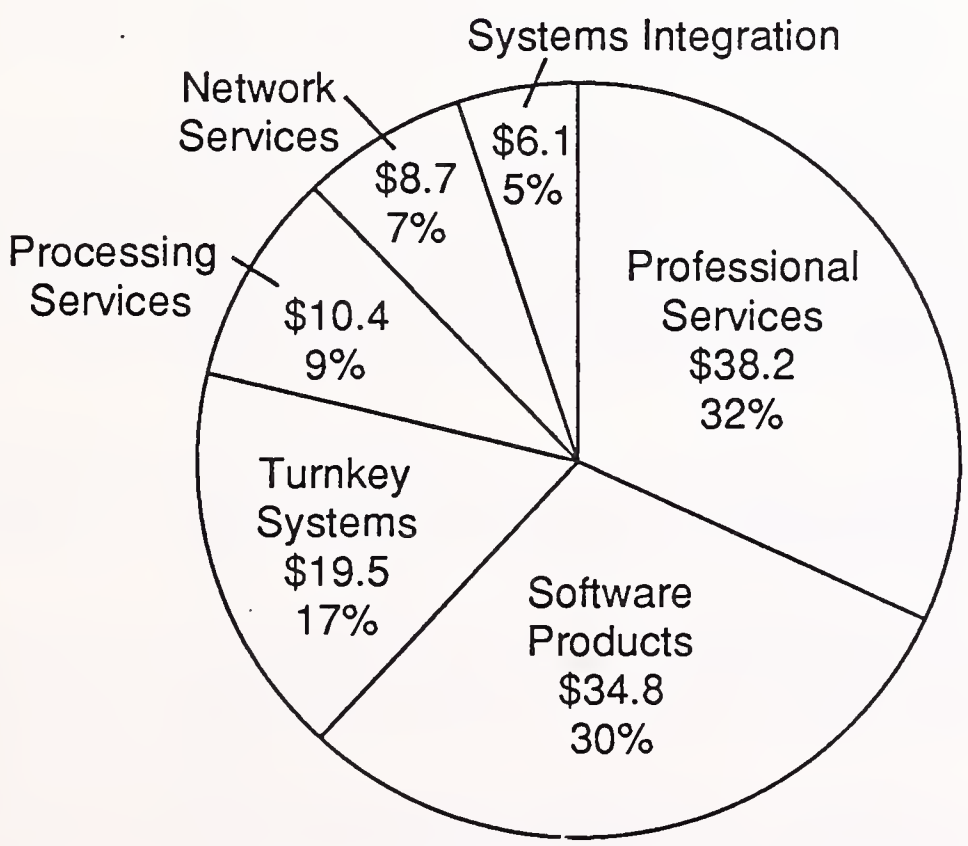
West Germany is forecast to grow at 18% per annum from 1989 to 1994—slightly under the average for the whole West European market. France and the U.K. are expected to grow at 19% per annum—the average for Western Europe—while Italy is forecast to grow at 20% per annum.

EXHIBIT II-2

Delivery Mode Analysis Western European Software and Services Industry, 1989-1994

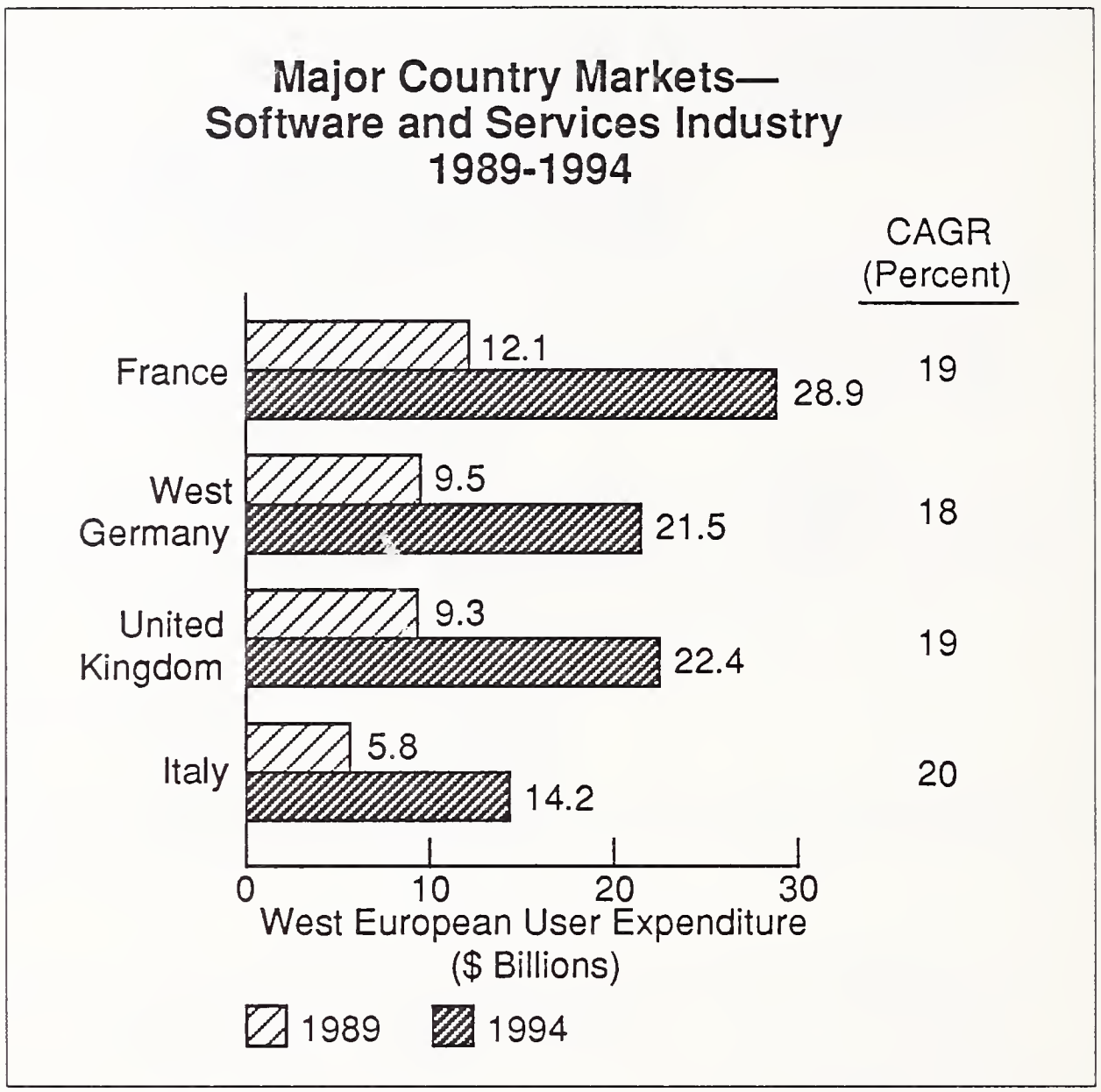


1989 Total Market = $50.1 Billion



1994 Total Market = $117.8 Billion

EXHIBIT II-3



D

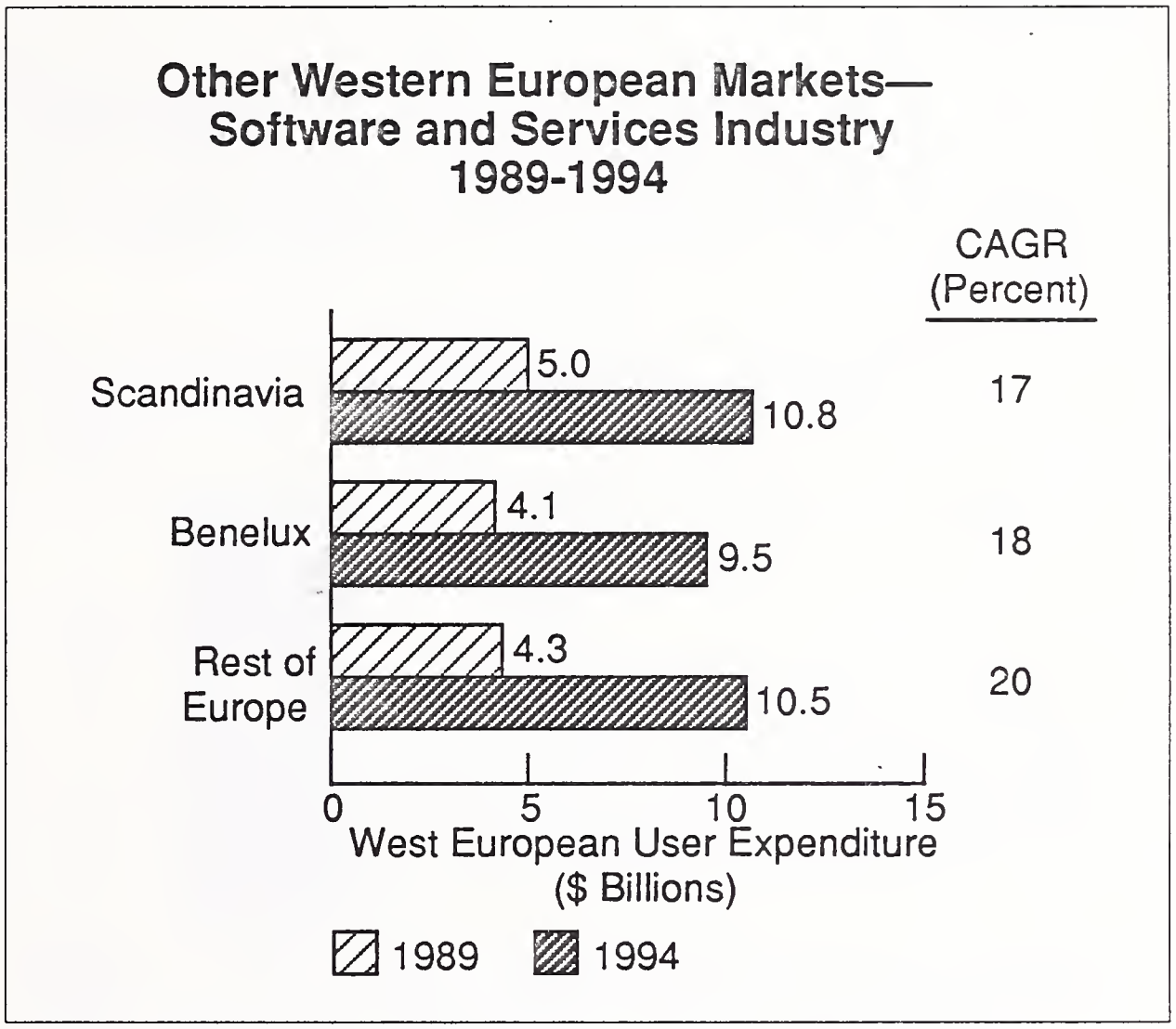
Other European Markets

Of the other West European software and services markets, the four Scandinavian countries accounted for some 10% of the overall market in 1989. They are forecast to show the lowest growth rate—on average 17% per annum—principally due to the high proportion of processing services in these markets, as illustrated by Exhibit II-4.

The three Benelux countries accounted for 8% of the overall West European software and services market in 1989. The overall market for this region is forecast to grow at 18% per annum from 1989 to 1994.

The remaining six countries—Switzerland, Austria, Spain, Ireland, Portugal and Greece—accounted for some 9% of the total West European market in 1989. On average, these countries are expected to grow by some 20% per annum over the period 1989 to 1994. Spain will have the fastest country growth in Europe over this period—22% on average. Switzerland and Austria are forecast to have an average growth rate of 18% per annum.

EXHIBIT II-4



E

Processing Services

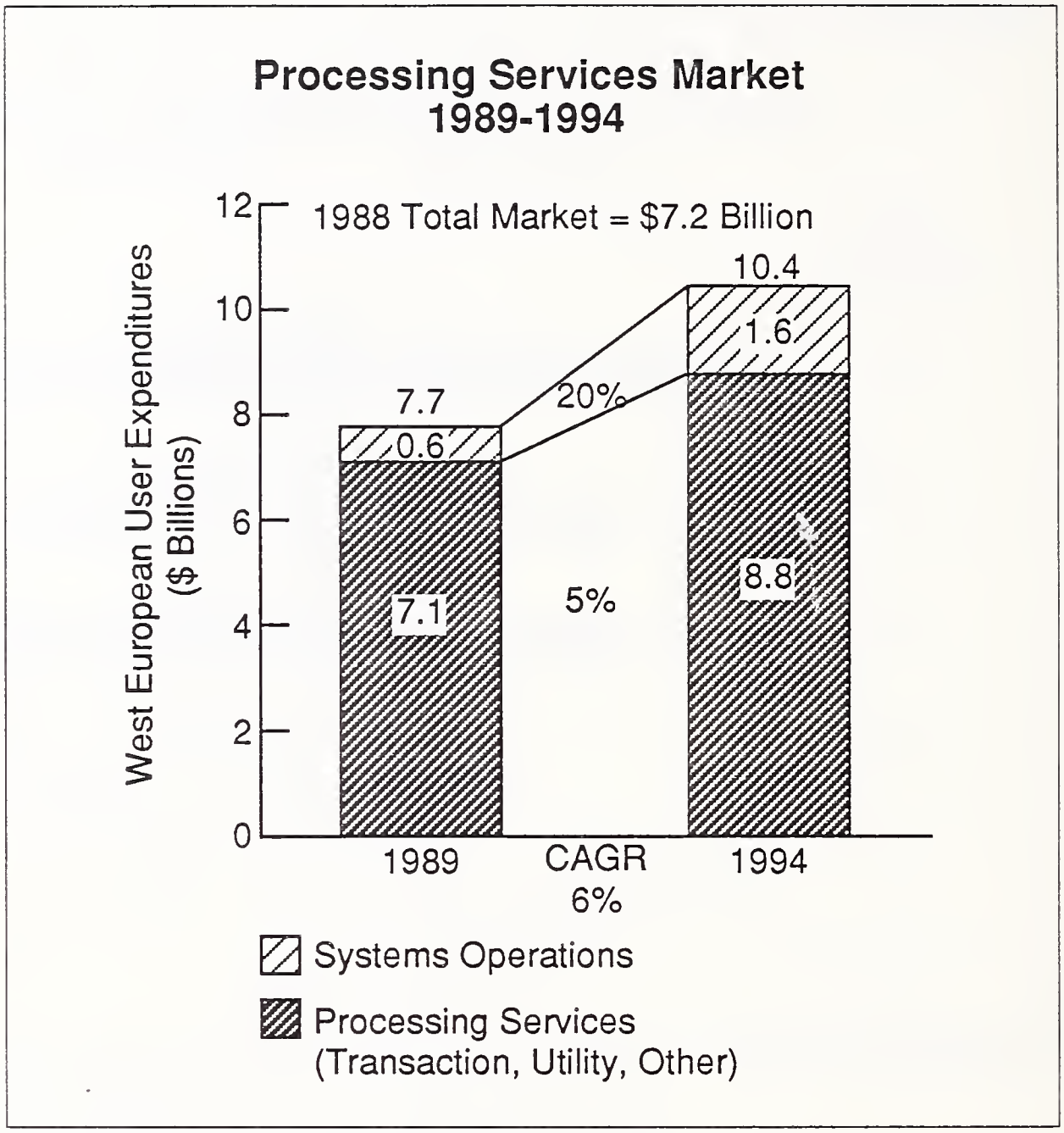
INPUT forecasts that the average growth rate for processing services from 1989 to 1994 will be the slowest of all six INPUT delivery modes, at 6% per annum. Exhibit II-5 shows the forecasts for this period for the overall market and for the two processing services subsectors.

By far the largest proportion of processing services revenues in 1989 came from the transaction and utility processing services subsector (just over 90%). This subsector is forecast to grow at around the average inflation rate for the West European market, some 5% per annum from 1989 to 1994.

In markets such as France, processing services for the financial sector is still important. In Scandinavia, the largest regional market for processing services, there are still market opportunities for transaction services. The Scandinavian market is structured around co-operative socialist principles, making it very suitable for centralised, organised processing services.

The sector of systems operations (facilities management) that is provided on vendor-owned equipment is accounted for by INPUT under

EXHIBIT II-5



processing services. This subsector is seen to have good growth potential, slightly above the average for the total West European software and services market, at 20% per annum for the period 1989 to 1994.

There is considerable interest in systems operations throughout Europe. However, as the EEC edges towards a more open market in the 1990s, the market for systems operations is being split between domestic offerings in specific countries and pan-European services.

The larger clients of systems operations services are looking to vendors who can cover as wide a proportion of their international operations as possible. This puts U.S. vendors, such as EDS and Andersen Consulting, in a very strong position compared to traditional West European vendors, such as Hoskyns of the U.K.

F

Network Services

The network services sector of the computer software and services business is expected to have one of the highest growth rates of all the delivery modes analysed by INPUT, averaging 24% per annum over the forecast period. Network services is currently a high-growth, profitable and competitive sector with a plethora of new business opportunities.

Networks, as vehicles for carrying information, are a vital component in the growth of the Western European economy, where economic development is linked to the free flow and sharing of information.

INPUT defines this sector as comprised of the following subsectors:

- Network applications
- Electronic information services

The market size and forecast for these subsectors is included in Exhibit II-6. The network applications subsector, consisting primarily of electronic mail (E-mail), Electronic Data Interchange (EDI) and Electronic Funds Transfer (EFT), has experienced high rates of growth over the past year, from $560 million in 1988 to $780 million 1989.

The electronic information services (EIS) subsector has also continued to expand. Whilst not fulfilling the more bullish projections made by some industry analysts, the continued demand for information in the financial sector has resulted in vendors developing analytical tools and alternative delivery mechanisms (such as CD ROM) to increase volume usage by their current customer base and to attract new customers. This market subsector has grown from a $1.6 billion market in 1988 to a $2.2 billion market in 1989.

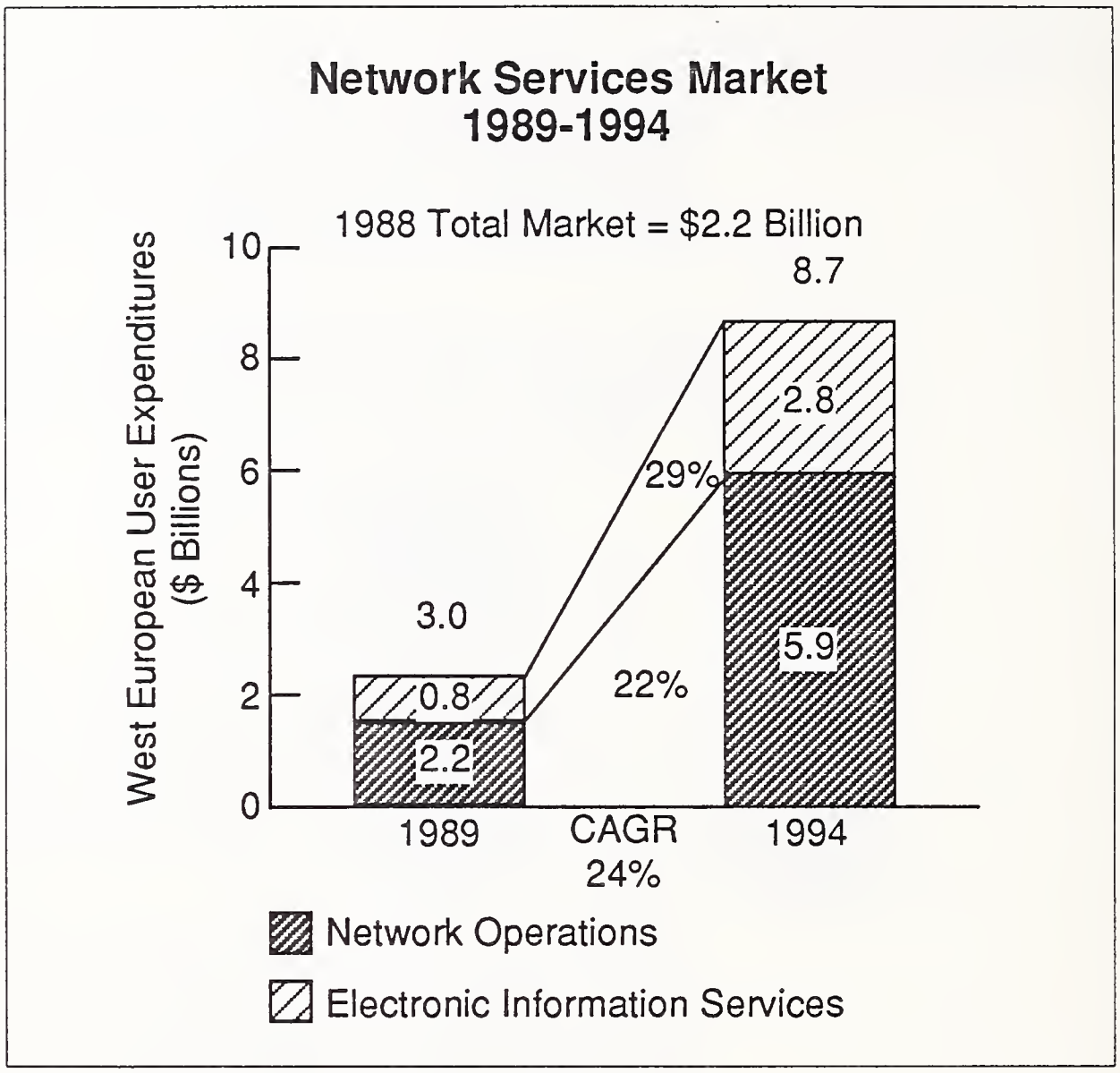
High-capacity networks will be an essential, dynamic element of Western Europe's productive capacity. The activities of many of the leading national and international vendors are providing stimulus to the market. Telecommunications links are vital if Europe is to achieve a real single market by 1992. Vendors have been addressing this challenge through merger and acquisition activity and strategic alliances in order to develop or increase their presence in both national and international markets.

The following is a summary of the key developments that have occurred over the past twelve months:

- British Telecom acquired Tymnet from McDonnell Douglas.

- France Telecom and the Deutsche Bundespost acquired a 30% stake in GSI's Travel and Tourism division and set up a joint venture company, Eucom.

EXHIBIT II-6



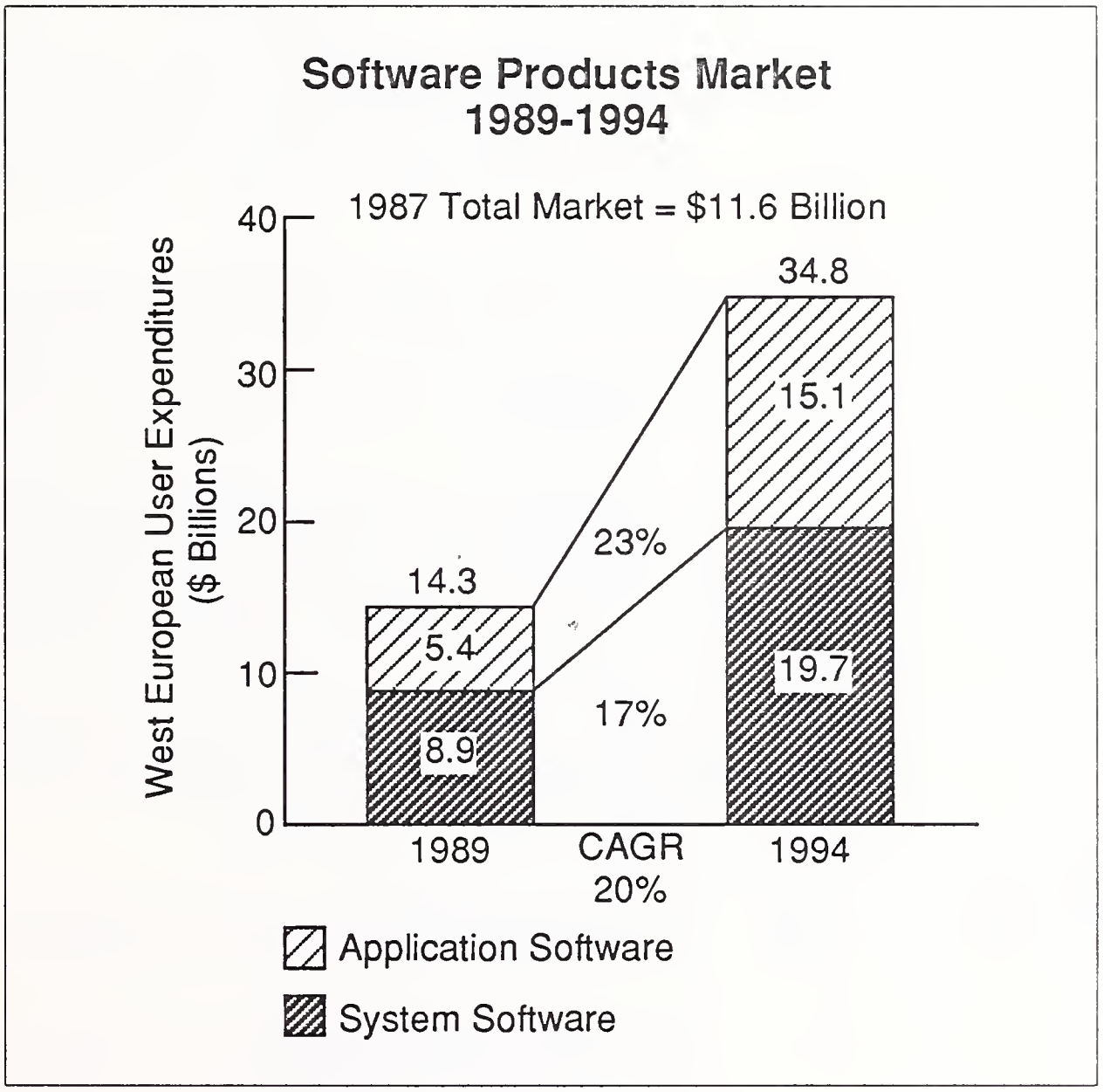
- IBM and Fiat finally obtained agreement from the Italian government for their joint venture, Intesa, to offer network services.
- GEIS responded by concluding a deal with Stet in Italy.
- AT&T acquired Istel of the U.K.
- INS and GEIS developed their "European" bridge between the U.S., the U.K. and Europe.
- Transpac and BT announced that they would be offering EDI services.
- INS and the National Westminster Bank will be trialling an EDI/EFT link.

G

Software Products

Software products are expected to grow at slightly above the average rate forecast for the overall West European software and services market for the period 1989 to 1994, at 20% per annum, as illustrated by Exhibit II-7.

EXHIBIT II-7



This delivery mode is the second largest within the overall software and services industry, accounting for some 29% of the total for Western Europe in 1989. This importance will marginally increase by 1994 to 30%.

In 1989, the systems software market accounted for some 62% of the overall software products sector. This is principally due to the importance of mainframes and, to a lesser degree, minicomputers in the West European market. However, the larger equipment platforms are forecast by INPUT to have considerably slower growths over the next few years, and PCs and workstations will become increasingly important.

Many software products on PCs and workstations are defined as applications, whereas on larger equipment they would be classified as systems software—database and spreadsheet packages. The far higher growth of PC/workstations is therefore expected to drive the growth rate of application software at some 23% per annum from 1989 to 1994. Systems software is only forecast to grow at 17% per annum over this period.

The growth in systems software is being significantly assisted by the demand within Western Europe for UNIX. The European Commission has taken the lead in pushing for internationally accepted open standards, and this has now been taken up by the major national governments in the EEC.

The need for flexible network systems software continues as the market moves more towards decentralised computing. Interest in CASE and other systems tools is growing, as a way to offset shortages in skilled programmers. The problem of skill shortages is pan-European.

IBM retains a dominant position in the overall West European software products market, controlling some 20% of total revenues. The John Akers statement in 1989, that IBM plans for software and services to account for 35% of IBM revenues by 1995, implies a major move by IBM into all sectors of the software and services industry.

In 1989, IBM moved further into the area of software products by taking minority shares in a number of software products vendors in both the U.S. and Western Europe.

H

Professional Services

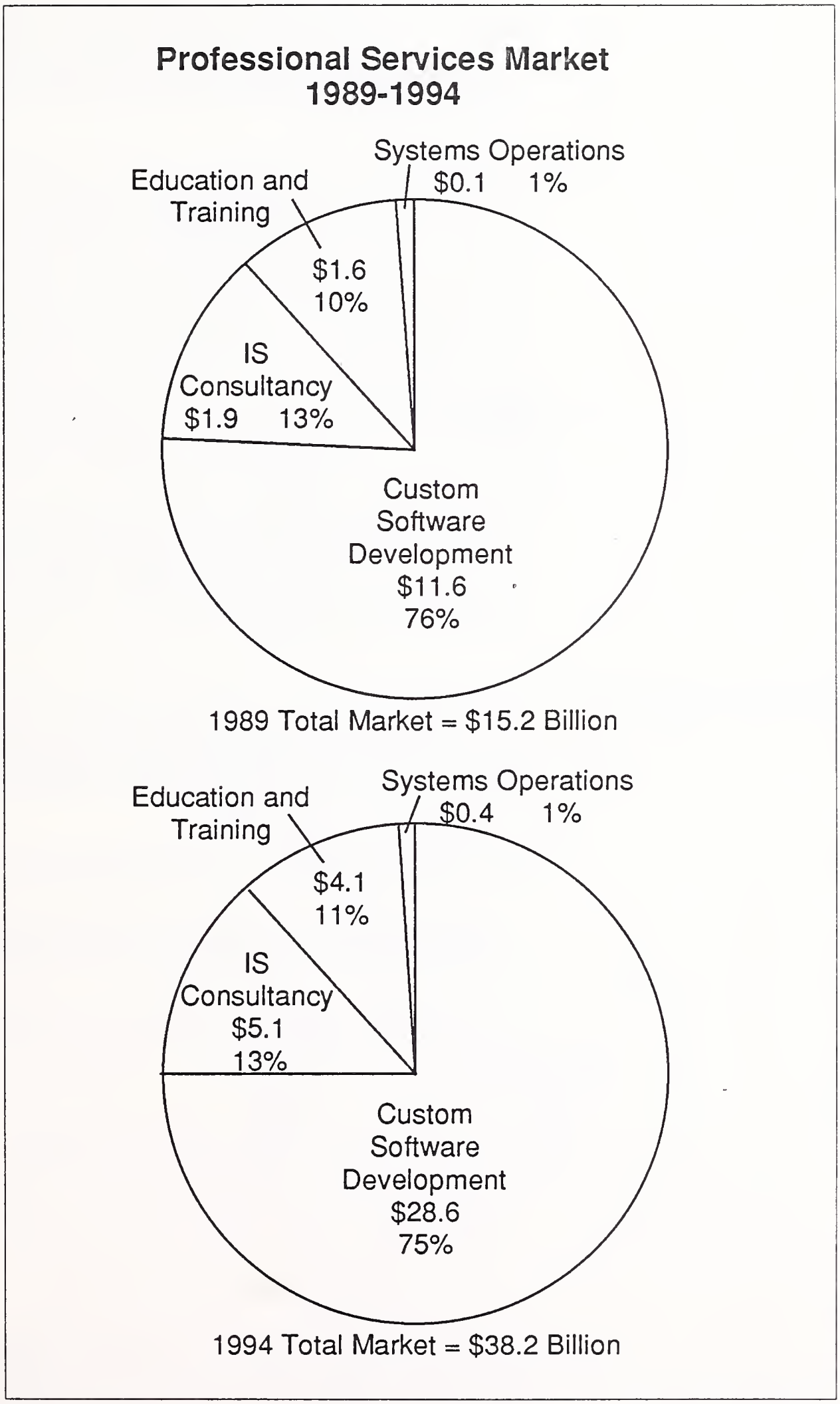
Improving quality and developing management skills are the two key challenges facing professional services vendors.

The forces driving the market, such as the decentralisation and externalisation of in-house corporate services, and the anticipated restructuring process of Western European industrial markets, means continued high growth in the professional services market over the next five years. INPUT expects the Western European professional services sector to reach over $38.2 billion by 1994 from $15.2 billion in 1989, a compound annual growth rate of 20%.

Professional services is the largest of INPUT's six delivery modes, accounting for 30% of total Western European software and services revenues in 1989. As Exhibit II-8 illustrates, custom software development accounts for some 75% of the overall professional services market.

However, the demands of the client will be for more comprehensive service, both in range and geographical location. As Exhibit II-8 shows, the existing offering of services for developing a system, from the

EXHIBIT II-8



business inception to the physical implementation, is very fragmented. It will therefore be necessary for vendors to expand services for two reasons: to meet the needs of the client, and to defend against competitors who are diversifying.

The market is expected to become increasingly competitive, as healthy growth will attract new entrants, and there will be greater competition from companies already present. International equipment and software products vendors will continue to move into this market more aggressively. Also, other professional services vendors who have traditionally operated outside the IS segment, such as management consultants and consultants in other specialist fields, will wish to add IS consultancy as part of a more complete service. Management consultants that already offer IS consultancy, such as the consultancy departments of auditing firms, will continue to extend into software development.

Recent vendor and user research has identified a serious quality problem within professional services, and there is clear evidence that services are falling short of clients' expectations. The number of new entrants into the market and the restructuring that is taking place is expected to exacerbate this problem.

I

Systems Integration

Many services vendors recognise systems integration as a major opportunity. Companies in related sectors, such as equipment and software products vendors, are using systems integration as part of an overall strategic move into services.

The INPUT definition of systems integration is given below.

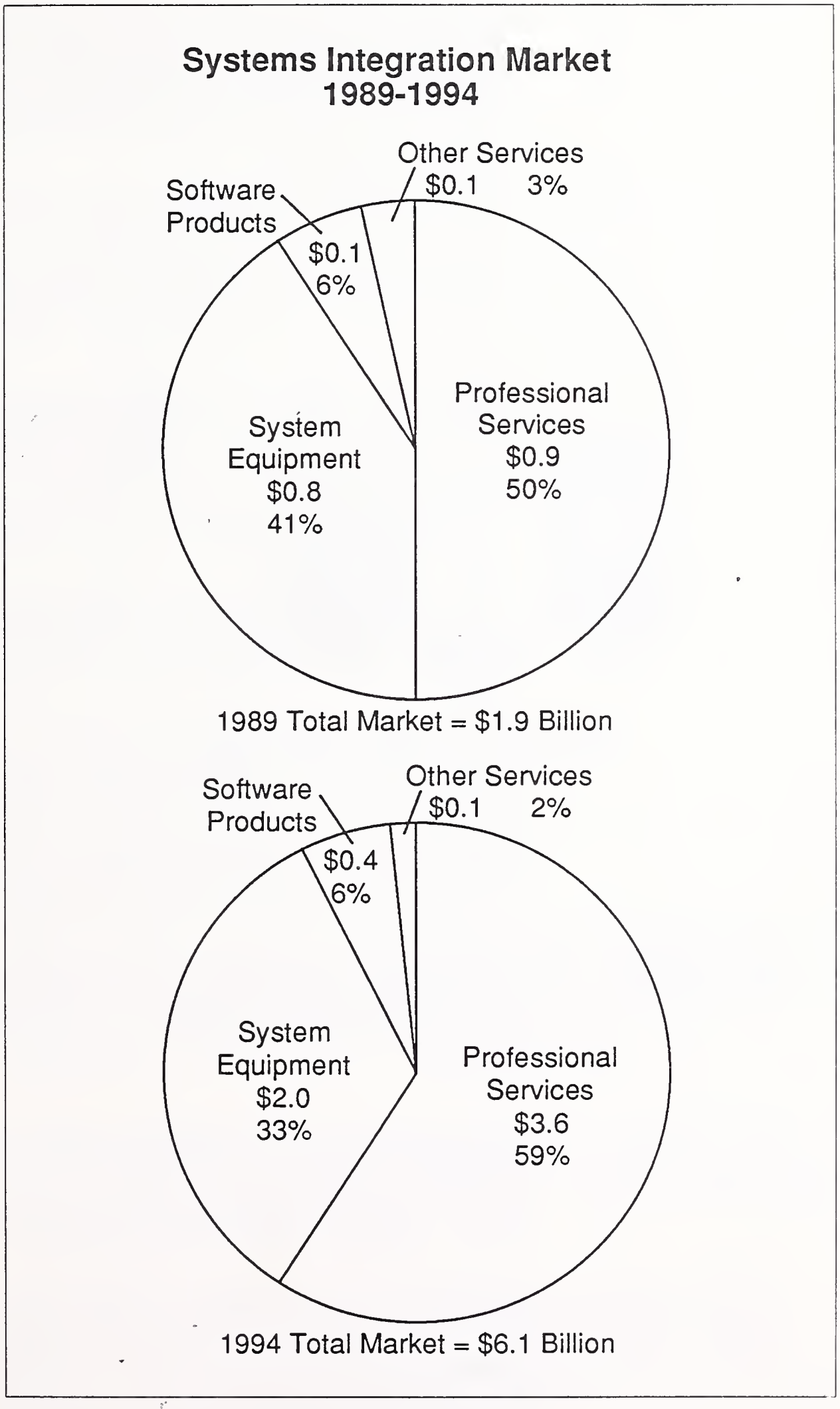
- Systems integration is the provision of an integrated solution to a multidisciplinary information systems requirement

The principal subsectors of the systems integration market are:

- The provision of computer and communications equipment
- Systems and applications software products
- Professional services for management, design, development and integration
- Other miscellaneous services and supplies

Exhibit II-9 shows the growth of systems integration in Western Europe from a $1.9 billion market in 1989, to $6.1 billion in 1994. It also illustrates the importance and growth of professional services as a subsector of that market. As equipment prices decrease, and despite the

EXHIBIT II-9



standardisation of software into kernels and enabling products, the importance of integration and management skills will increase the professional services element as a proportion. Professional services is expected to increase from 50% to 59% as a proportion of total expenditure in systems integration, and is the key growth subsector.

Efforts by the United Kingdom Government to externalise services in government are a contributory driving force to systems integration in that country. It is possible that the EEC's emphasis on the liberalisation of public procurement as a result of the Single European Act will duplicate this driving force in other countries of Western Europe.

Although potentially attractive, it must be recognised that systems integration is also high-risk. It has been suggested by some vendors that companies are moving into the systems integration market that do not have the requisite skills. These skills will have to be acquired, and although it is possible to buy into a market in order to gain a presence, with large, complex projects, this is a very dangerous strategy.

It is believed that systems integration will accelerate the restructuring process taking place in the West European software and services industry. This will be a result of company failures, and of the need of large companies to absorb smaller, specialist companies.

The systems integration market has further implications for the skills shortage: bigger, more complex projects imply a premium for project management skills, but in Europe, more international projects would also imply the need for a new breed of project manager who can manage multidisciplinary, multicultural projects, and a new breed of line manager who can negotiate and assimilate these projects.

J

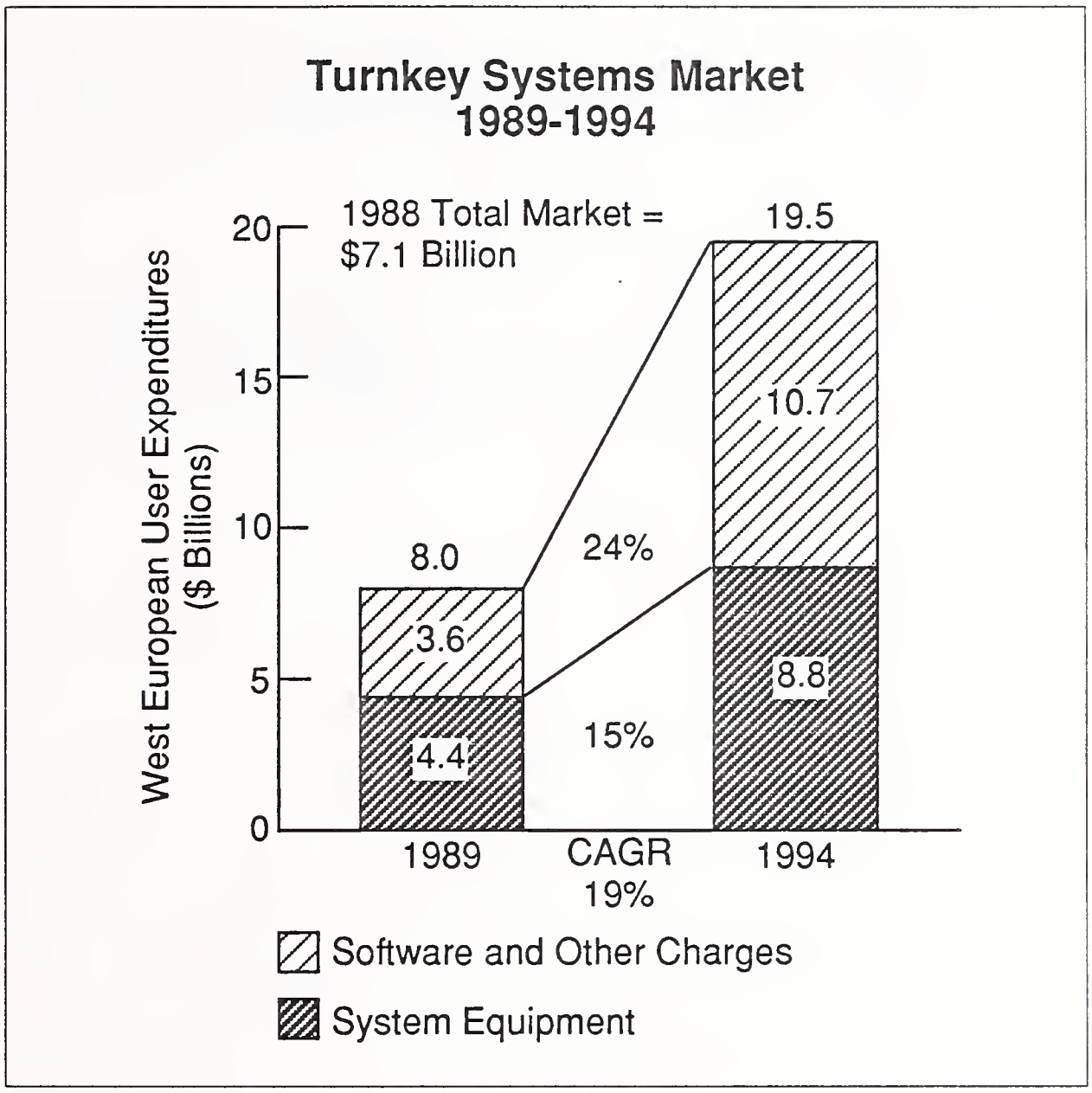
Turnkey Systems

Turnkey systems are forecast to grow 19% on average over the next five years, as illustrated in Exhibit II-10. During 1989, INPUT undertook major research into this market sector and significantly revised its forecasts.

Equipment vendors accounted for some 55% of the overall West European turnkey systems market in 1989. U.S. equipment vendors dominate CAD/CAM sectors, whilst West German equipment vendors such as Nixdorf and Mannesmann Kienzle offer wide portfolios of turnkey systems throughout Western Europe.

Equipment vendors reported poor growth rates in turnkey systems during 1988. The West European CAD/CAM market is maturing and so not showing the same high growth rates of other sectors. Added to this, West European equipment vendors have been faced with the costly decision to move their application portfolios to UNIX.

EXHIBIT II-10



They have been reluctant to do this. However, end-user demand for seamless development paths from proprietary operating systems has forced them to make the move to UNIX. The delay in making these decisions cost some vendors market share in 1988. The cost of this expensive development has seriously affected their short-term profitability.

All major equipment vendors are involved in turnkey systems to some degree. Nixdorf, Mannesmann Kienzle, Nokia Data and Norsk Data use turnkey as their principle delivery mode. Many independent vendors sell turnkey systems, especially on PCs.

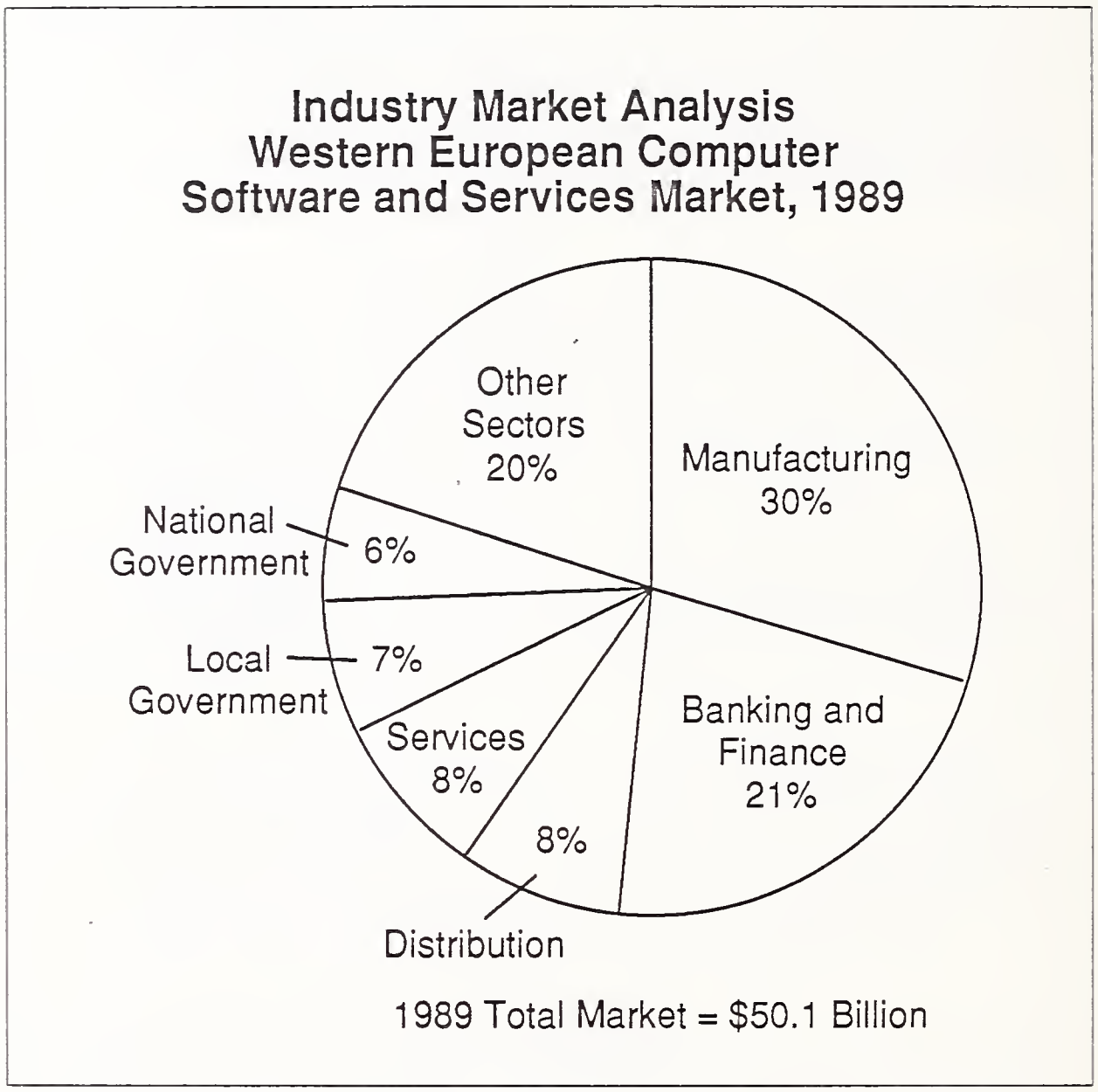
INPUT sees that there are a number of forces that are likely to drive equipment vendors further towards owning or controlling turnkey systems in the 1990s. This will likely be done via acquisition. However, such a recent strategy by Prime caused it major financial problems and left it open to be attacked by a hostile bid from MAI.

K

Industry Market Opportunities

Exhibit II-11 illustrates INPUT's breakdown of the 1989 West European software and services market by industrial sector.

EXHIBIT II-11



INPUT estimates that manufacturing is by far the most important sector, accounting for some 30% of the overall market in 1989. The second largest sector is banking and finance. Together, these two leading sectors accounted for over 50% of the total 1989 market.

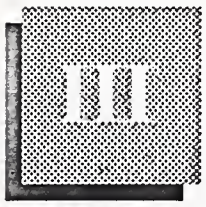
In INPUT's report *The Challenge of the Single European Market—1992 and Beyond*, INPUT researches how the 1990s will see the gradual evolution of new pan-European markets. As the Single European Act legislation breaks down old nationalist barriers, specific vertical domestic markets will be free to expand and become pan-European. This has already started to happen in banking in the international sector, and major changes are expected in the retail sector during the 1990s. Similar changes can be expected in many other vertical markets—specific manufacturing sectors, transportation, distribution and government.

The 1990s offer vendors opportunities to not only exploit existing domestic niche markets, but also to look to the new pan-European sectors. However, INPUT sees that there will be considerable competition for control of these new pan-European software and services markets, by both the large international independents and equipment vendors.

In many of these new expanding markets, it is the U.S. vendors who are better placed to take advantage of them in the 1990s. These include network services, systems software, certain applications software and systems integration. The large European vendors are strong in sectors of the market which require greater understanding of cultural differences, in particular professional services.

III

Market Overview and Forecasts



Market Overview and Forecasts

A

The Western European Opportunity

This report provides an assessment of the computer software and services business at the end of the 1980s, an appropriate time to briefly review the enormous development that INPUT has tracked through the past decade, and to assess the wealth of opportunities which INPUT presages for the next decade. This subsection includes:

- A comparison of the industry in 1979 with that of 1989
- A summary of the key issues and challenges facing vendors for the 1990s

1. Computer Software and Services Markets—1979/1989 Comparison

During the past decade the computer software and services industry has grown at a compound annual growth rate of 25% and has increased in size by over nine times. A comparison of the market sizes in 1979 and 1989 respectively, and an analysis of the major sectors, is shown in Exhibit III-1. It is important to note that this comparison is made in real currencies using the then-current exchange rates. These exchange rates are listed in Exhibit III-2.

It is also important to bear in mind that there have been changes in industry definitions, notably the two separately defined sectors of network services and systems integration. Despite these differences, and the difficulty in making precise comparisons, there nevertheless can be seen in Exhibit III-1 the basic evidence of the vast expansion that has taken place in the computer software and services industry.

Most striking is the rate of growth that has been experienced in the software products and turnkey systems sectors, with average compound annual growth of slightly over 35% over this ten-year period. Naturally,

EXHIBIT III-1

Western European Computer Software and Services Market, 1979-1989

Market Sector	Market Forecast ($ Millions) 1979	1989	1979-1989 CAGR (Percent)
Processing Services	2,780	7,690	11
Network Services	-	2,960	-
Software Products	660	14,260	36
Professional Services	1,780	15,230	24
Systems Integration	-	1,920	-
Turnkey Systems	340	8,030	37
Total	5,560	50,090	25

this analysis needs to take account of the inclusion of inflation in these growth rates, which is estimated to average around 4% over this period. A comparison of the relative country market shares between INPUT's 1979 and 1989 analyses is shown as Exhibit III-3. It is clear that the rate of growth in the four largest country economies in Europe have significantly increased their market share from around 65% in 1979 to 75% of the total Western European software and service market in 1989.

Another interesting comparison is that between the list of leading vendors in 1979, shown in Exhibit III-4 and those in 1988 as listed in Exhibit III-16. Two key observations can be made:

Firstly, regarding vendors, IBM's leading position in both tables can be noted with a slightly increased market share in 1988. In 1979, IBM accounted for 6.5% of total West European software and services revenues; in 1989, it had increased its share to 6.8%.

EXHIBIT III-2

U.S. Dollar Exchange Rates, 1979-1989

Country	Currency	U.S. Dollar Exchange Rate	
		1979	1989
France	FF	4.31	6.55
West Germany	DM	2.0	1.93
United Kingdom	£	0.5	0.61
Italy	Lira	824	1,409.00
Sweden	SK	4.36	6.55
Denmark	DK	5.25	7.53
Norway	NK	5.11	7.00
Finland	FM	4.0	4.32
Netherlands	Dfl	2.03	2.18
Belgium	BF	30.35	40.50
Switzerland	SF	1.71	1.70
Austria	Sch	13.74	13.60
Spain	Pta	67.38	121.00

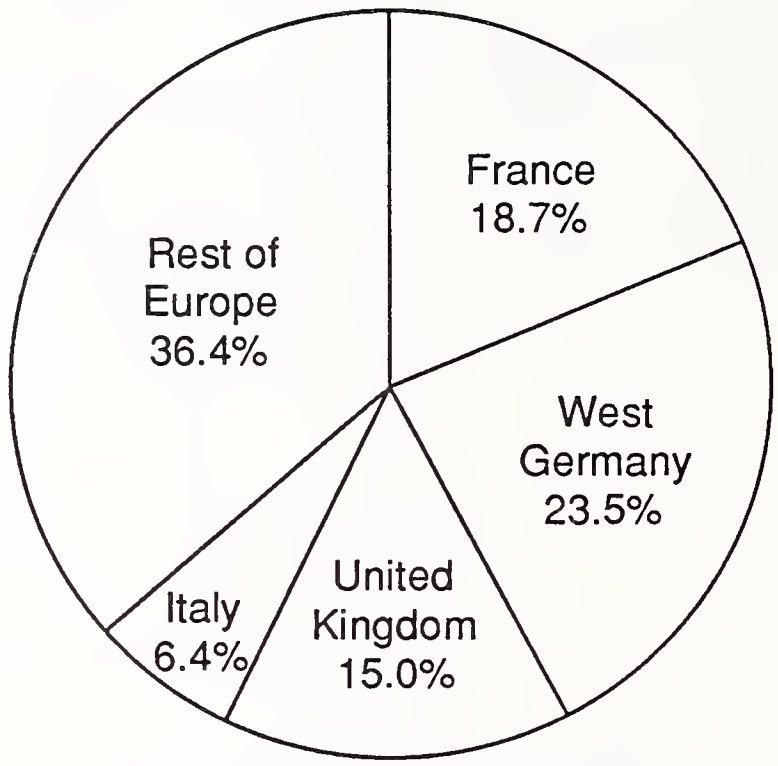
Secondly, with regard to the relative market share held by the leading group of vendors, the following comparison can be made:

	Top Ten	Top Twenty
• 1979	19.3%	26.9%
• 1988	19.0%	26.0%

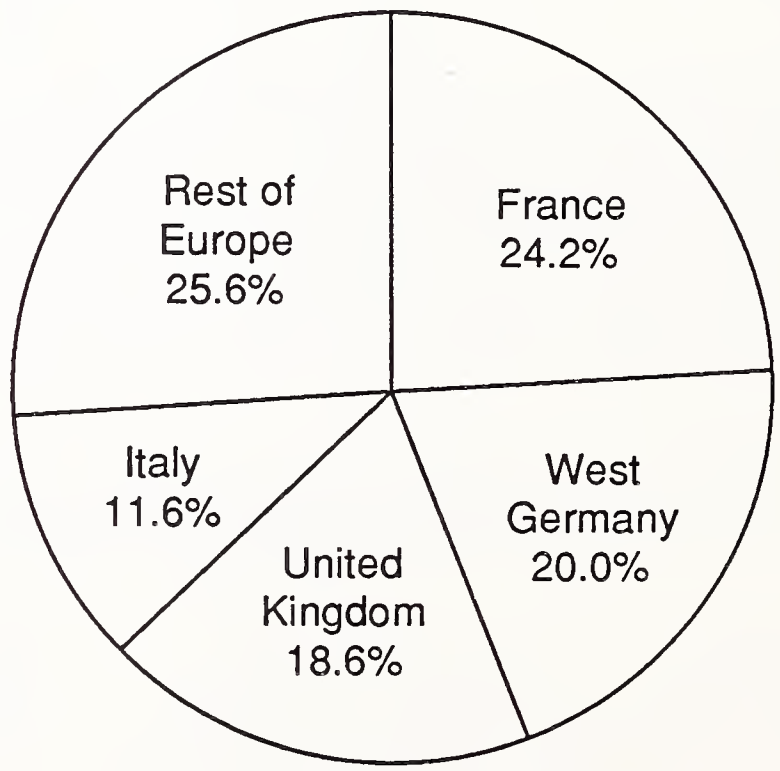
Over this ten-year period, although there have been major changes in the types of products and services sold by vendors, the importance of leading vendors within the overall market has remained remarkably constant.

EXHIBIT III-3

Country Market Comparison 1979-1989



1979 Total Market = $6 Billion



1989 Total Market = $50 Billion

EXHIBIT III-4

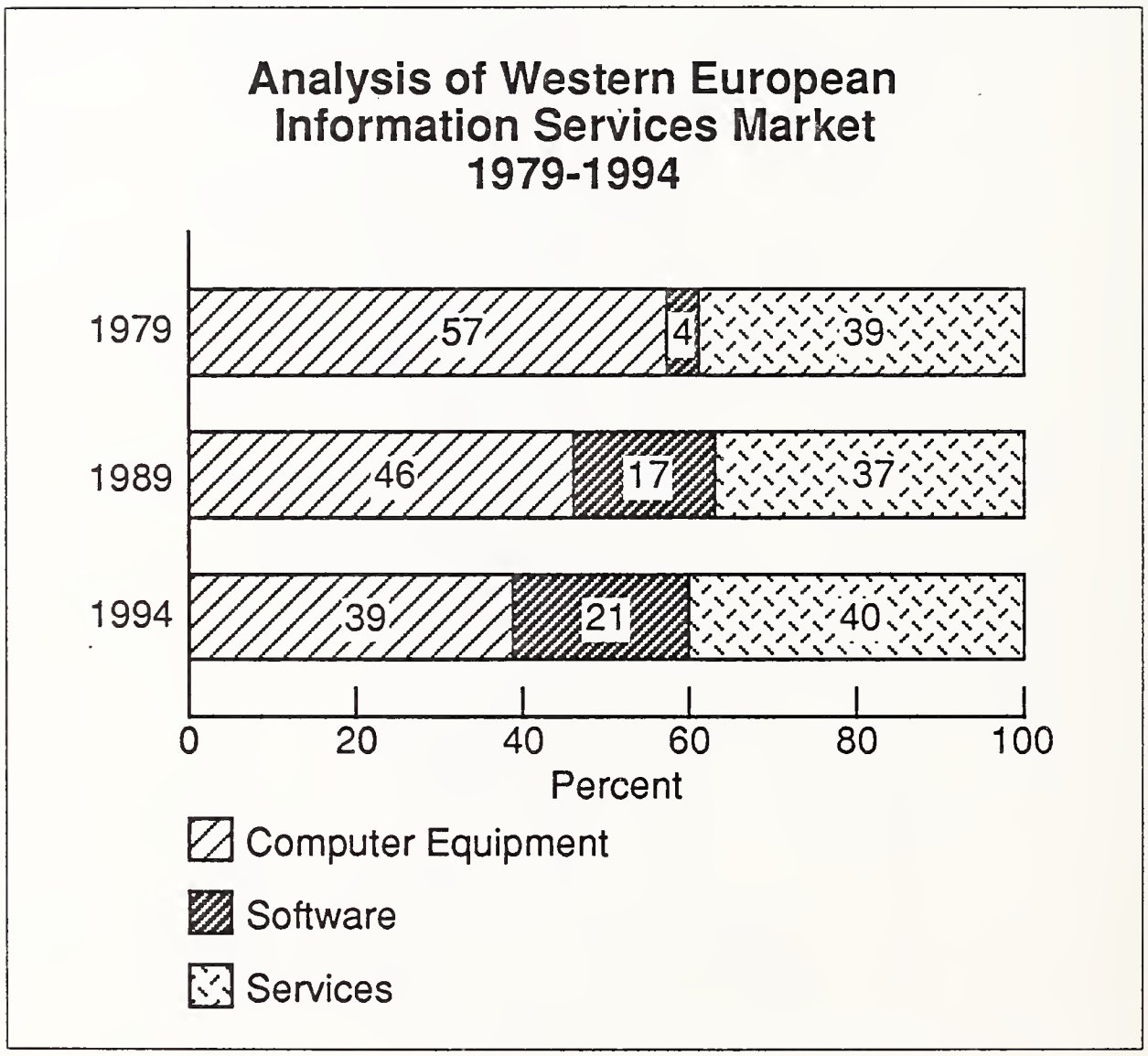
Leading Vendors—1979 Western European Software and Services Market

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	IBM	6.5	360
2	GSI	2.1	115
3	ICL	1.9	105
4	GEISCO	1.4	80
5	Cap Gemini Sogeti	1.3	75
6	Scicon/SCS/GFI	1.3	70
7 =	CISI	1.2	65
7 =	Sema Informatique	1.2	65
7 =	CDC	1.2	65
7 =	Datema	1.2	65
11	SG2	1.0	55
12 =	Sligos	0.9	50
12 =	BOC	0.9	50
12 =	Datev	0.9	50
15	Datacentralen	0.8	45
16 =	Kommunedata	0.7	40
16 =	CCMC	0.7	40
18 =	TSIL	0.6	35
18 =	A-C (UCC)	0.6	35
20	Sesa	0.5	30
	Others	73.1	4,065
	Total	100.0	5,560

The clearest illustration of the dramatic change in the significance of the computer software and services industry can be found in a further and different comparison of the overall market for information systems and services between the years 1979 and 1994. This is shown in Exhibit III-5. In this analysis, all computer service delivery modes are re-assessed into the 'pure' categories of:

- Equipment
- Software products
- Services (All professional services, processing services and customer (field maintenance) services)

EXHIBIT III-5



A direct comparison with INPUT's full service sector analysis is not possible because of the inclusion of equipment elements in the systems integration and turnkey system sectors. This analysis illustrates the dramatic change that has taken place over the last ten years in the basic constituents of the computer industry. Of most significance is the use of software and services in general, and software products in particular as the key component, the key facilitator, of the computer industry.

Clearly, this basic trend in industry structure—lower emphasis on equipment, and higher emphasis on the software and services that create systems—is going to continue into the next decade. Exhibit III-5 shows the effect of the assumption that the growth in equipment sales will average 9% for the next five years. By 1994, the equipment category will have fallen to just under 40% of total industry expenditure, in comparison to 57% at the beginning of the last decade.

This high rate of growth experienced in the computer software and services area has caused ever-increasing participation of equipment supplies and telecommunications companies in the industry, in addition to the traditional independent software and services vendors. In addition, the high rate of growth has from time to time caused organisations from other areas to attempt to develop businesses in this sector, for example Saatchi and Saatchi.

2. Key Vendor Issues

The computer software and services business is now generating end-user revenues that exceed those for computer equipment. Within that environment, vendors are facing a number of issues, the most important being:

- Identifying and addressing rapidly growing opportunities
- Building sales and marketing organisations appropriate to the increasingly competitive market conditions
- Developing the appropriate infrastructure to support increasingly demanding user needs

This report forecasts continued high growth in the computer software and services industry over the next five years; the fundamental reasons for this are described in subsection 3 below. The industry driving forces are anticipated to propel growth for at least another ten years, but it must be recognized that some slackening will occur within this time frame. The sheer size of the industry in proportion to the overall economy will itself become a governing force in its growth. However, that growth presents challenges to vendors, in terms of identifying and exploiting the opportunities presented. This is clearly an extremely complex issue, but at its most fundamental level it can be summed up as the need to track and respond quickly to newly emerging and changing user needs. As indicated in the following subsection, perhaps the most important of these is the trend towards outsourcing, evident in the rapidly growing systems integration and systems operations sectors.

A major part of the need to track changing and developing user needs can be met by establishing a full marketing and sales system. Increasing

resources will be applied to this function as the competitive environment for service firms continues to evolve.

The most obvious change in the competitive environment of the computer industry, compared to 10 years ago, has been the blurring of the boundaries between different sectors of the industry. Thus it can be observed that we have:

- Traditional service companies adding products as the basis of developing further service business

- Traditional product companies adding services to support the further penetration of their products in the market-place

This change is particularly noticeable amongst larger companies, where increasingly their revenues are generated by activities across a number of sectors such as systems integration and turnkey systems, software products, and professional services and facilities management.

In order to meet these needs and respond to changes more quickly than would be possible internally, the market has witnessed rapid expansion in the areas of:

- mergers and acquisitions
- cooperative agreements

Clearly motivated by the need for critical market size in some sectors, and geographical coverage in others, a key factor has been the need to acquire or gain access to skill sets and management experience. These are required in order to hold a viable position in these new and different market sectors.

The continuing high rate of merger and acquisition activity within the Western European industry (for example, AT&T's takeover of Istel), and the range of cooperative actions, notably those of IBM, are testimony to the need for new types of organisations for the 1990s.

One of the most interesting trends in the world economy at large is the movement towards globalisation and the emergence of larger trading blocs. The EEC initiative to create a single European Market during the 1990s is one important manifestation of that trend. The "1992" effect has led to a realisation on the part of service vendor executives that their market position must be reassessed. Increasingly, companies holding strong 'national' positions only, have sought to establish a 'European' position or, as the Istel example shows, identified a means by which they can achieve a wider position than that just within their own national market.

The third major area of key issues facing information services vendors relates to the infrastructure or skill sets that enable the company to fully service the needs of its users. Key issues here include the quest for productivity, quality, and management skills—all discussed elsewhere in this report. Additionally, the increasing level of client responsibility and involvement in client's systems demands a greater awareness and level of professional skills in such areas as risk management and legal and contractual negotiation.

3. Industry Driving Forces

The fundamental force for change in the computer industry is the phenomenon of rapid technological advance. However, this is not just affecting the particular products and services available for carrying out data processing work, but is also having an impact on the wider business environment. The driving forces of the computer software and services business can thus be grouped under the headings of:

- Technology
- Information systems change
- Environmental change

a. Technology

At the technology level, key areas of advance are in integrated circuit technology, data storage devices, telecommunications and natural human interfaces (audial, visual) for information systems input/output. In turn, these technological advances create the environment which encourages development of sophisticated new software capabilities and the possibility for completely new applications.

Relational data structures, for example, offer new possibilities for organising and assessing data. Open systems standards and multiplatform software create opportunities to achieve far greater flexibility in the design of information systems and in the approach to the management of an organisation's information systems investment.

The level of microcomputer sophistication that is being achieved, in terms of both size and cost, is impelling digital control over an ever-widening set of applications. The advances in the availability of communications products is also a key factor in widening the application of information systems.

These technology advances act as a driving force to systems development, through the following process. At the leading edge, innovative users will adopt new advanced products to the particular needs of their organisation—for example, the innovative and pioneering use by airlines of computer/telecommunication systems for real-time reservation

systems. Once some users have clearly established a competitive advantage through such a process, their competitors are largely compelled to follow, and imitators will emerge from other industries. It should be noted, however, that they do not always achieve the same success as the originators. It is also true that in some cases innovative users of new technology fail, and it is the second-wave user that succeeds by learning from the mistakes of the pioneers.

b. Information Systems

The rapid technological advance in the computer industry has brought and will continue to bring fundamental changes to the range of computer applications and to the way they are managed. In general we can typify this process of change over the last twenty years as follows:

- From relatively simple stand-alone systems to highly complex, interrelated systems
- From homogeneous to heterogeneous, in respect of vendors
- From relatively isolated 'back-office' systems applied to discrete areas of an organisation, to systems operating at the front-end and affecting virtually every aspect of the organisation, with a need for communication between the different parts

These changes have had two very powerful effects on the significance of information systems to an organisation. Firstly, they have made these systems indispensable to an organisation's successful and continued operation; today's systems can be described as 'mission-critical'. Secondly, they have presented senior executives with the need to strategically manage their application and use.

The information system has become a powerful agent for change in the way that an organisation conducts its affairs, competes with similar organisations and manages itself profitably. The information system can be so tightly integrated into the operations of an organisation that it becomes the principal factor in determining the types of services and products that can be provided; particular examples are banks and airlines. There has been much discussion about the gaining of competitive advantage through the application of IT, and doubt has been cast as to how long such a competitive advantage can be sustained. Nevertheless, no organisation today can afford not to achieve parity with its competitors on basic information systems infrastructure.

Today, the need for strategic management of information systems investment and development is clear, and we have witnessed the gradual elevation of this function higher and higher within the user organisation.

At the operational level, the application of new technological developments presents management with considerable challenges:

- The challenge of adopting new technology successfully
- The challenge of integrating different technologies or different computer systems and communications networks

These challenges place heavy demands on the need for key technical skills and project management capabilities that in many cases are just not available within the user organisation.

There is another significant challenge that the information systems management function must face today that twenty years ago was not a major issue—systems maintenance. As systems have been built up continuously, have become more complex and more interrelated with the enterprise functions, so the task of maintaining them has grown. This has now become a major problem for the in-house information systems department. Professional services firms are beginning to derive substantial revenues from contracting to take responsibility for this function.

Since many existing systems are ageing, it follows that there exists an opportunity to redevelop them. In the future it can be expected that users may turn to outside contractors to help them 'modernise' their existing information systems. Many existing systems remain isolated, not integrated with other systems, inaccessible, out-of-date and difficult to maintain.

c. The Environment

Rapid advances in every aspect of science and technology are having considerable impact upon the overall environment within which all organisations must operate. As has often been commented upon, we now exist in an information-orientated society. Technology advance has made this a widespread phenomenon. This information-oriented environment is creating a more competitive environment, it is changing the way that organisations are structured and is breaking down geographic and other market barriers.

Faster communication allows a more rapid response to consumer actions. This has the effect of increasing competition in markets, placing emphasis on the need for more-rapid change and development of products, as well as the need to reduce costs and develop more efficient ways of managing business.

Organisations are consequently seeking to reduce their bureaucratic overhead, shorten their decision structures and timescales and of course, utilise information systems to provide the tools for achieving these ends.

A key phenomenon is the emergence of global markets. No longer do geographical and physical limitations restrict the potential of an organisation to its physical base.

Competitive conditions and the search for efficiency demand that producers seek commonality in basic product design and manufacture, but increasingly customise the delivered product. This is not only to suit the ingrained buyer tastes and habits that exist in different country markets, but to serve the competitive need to meet emerging niche requirements.

Within Europe, other environmental changes of considerable importance are the liberalisation of telecommunications, liberalisation of the financial markets, and the Single European Market Initiative (the 1992 phenomenon). Each one of these developments adds further elements of uncertainty to the organisational development plan. In summary, the environment within which organisations must operate today demonstrates:

- A need for rapid change, the capability of shortening the response timescale to meet the challenge of uncertainty

- A new (or renewed) emphasis on quality, product design and customer service as key competitive marketing factors

In order to achieve these objectives, organisational structures are changing, with emphasis switching to smaller companies and an increased use of subcontractors.

B

Market Forecasts for Computer Software and Services, 1989-1994

The forecast data provided in this report is based on research conducted during 1989. Previous INPUT research was also considered. Market development for the 1988-1989 period was evaluated from in-depth face-to-face, mail, and telephone interviews with senior executives in user and vendor organisations. The analysis was supported by other public domain information.

The processing services sector was forecast for two constituent modes:

- Transaction, utility and other services
- Processing systems operations (facilities management)

Network services forecasts were divided into the following categories:

- Network applications
- Electronic information services

Software products were forecast:

- By systems and applications packages
- For independent suppliers and equipment vendors

Professional services were forecast for the following categories:

- IS consultancy
- Custom software development (including contract staff)
- Education and training
- Professional services systems operations (facilities management)

Systems integration at the West European level was broken down into:

- System equipment
- Professional services
- Software products
- Other services

Turnkey systems were forecast by:

- Equipment revenues
- Software and other charges

The forecasts cover the period 1989-1994 (including 1988 actuals) and assess end-user expenditures. Forecasts are made in local currency and converted into U.S. dollars for aggregation and comparative purposes.

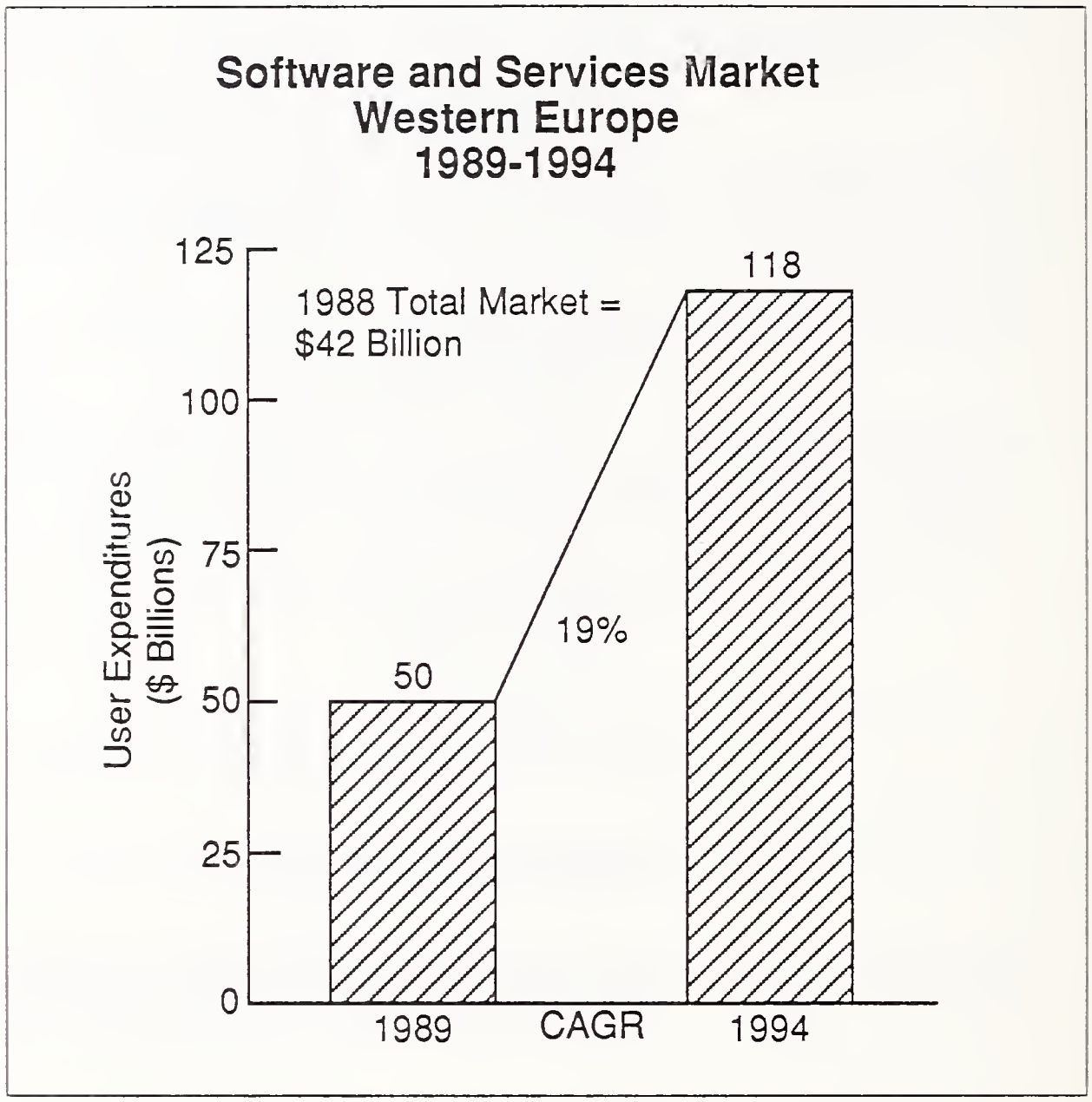
Owing to the unpredictability of international exchange rates, the U.S. dollar conversion rates used for all the forecasts have been taken as the average rate for 1989. These are listed in Appendix G.

In addition, the forecasts have been expressed in actual monetary terms. For the benefit of the reader, the average 1988 inflation rates for all West European countries have been included in Appendix G, together with estimates for 1989 and forecasts for the period 1990-1994. Background economic data on Western European countries is also given in Appendix G.

Exhibit III-6 shows INPUT's forecast for the total West European software and services market. It is expected to grow from $50 billion in 1989 to $118 billion by 1994, a compound annual growth rate of 19%.

The development of the six delivery modes as defined by INPUT is illustrated in Exhibits III-7, III-8 and III-9. Processing services remains the slowest sector at 6% per annum on average over the five year period 1989 to 1994. Systems integration is forecast to have the highest growth at 26% per annum over this period.

EXHIBIT III-6



Software products, the second largest sector, is forecast to continue its gradual increase in the share of the overall market. By 1994, INPUT expects it will account for 30% of the overall West European software and services market, compared with 29% in 1989.

Professional services will also increase its market share over this period, from 30% in 1989 to 32% in 1994. This sector is the most important delivery mode in Western Europe. As with software products, a strong growth of 20% per annum over this five-year period is forecast.

Network services are to seen to have even greater growth potential. INPUT forecasts an average growth rate of 24% per annum for this delivery mode between 1989 and 1994. Turnkey systems are expected to grow an average of 19% per annum.

EXHIBIT III-7

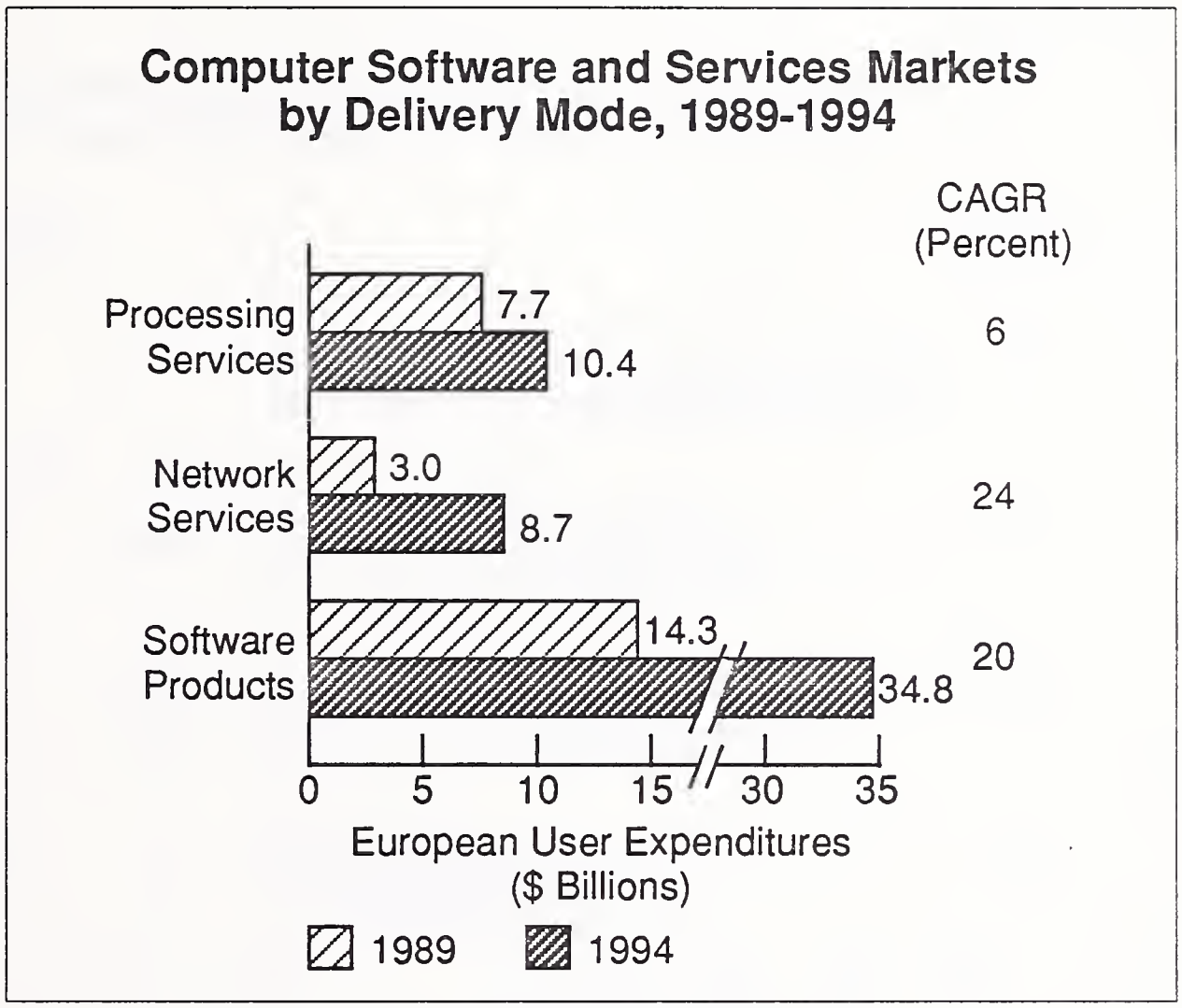


EXHIBIT III-8

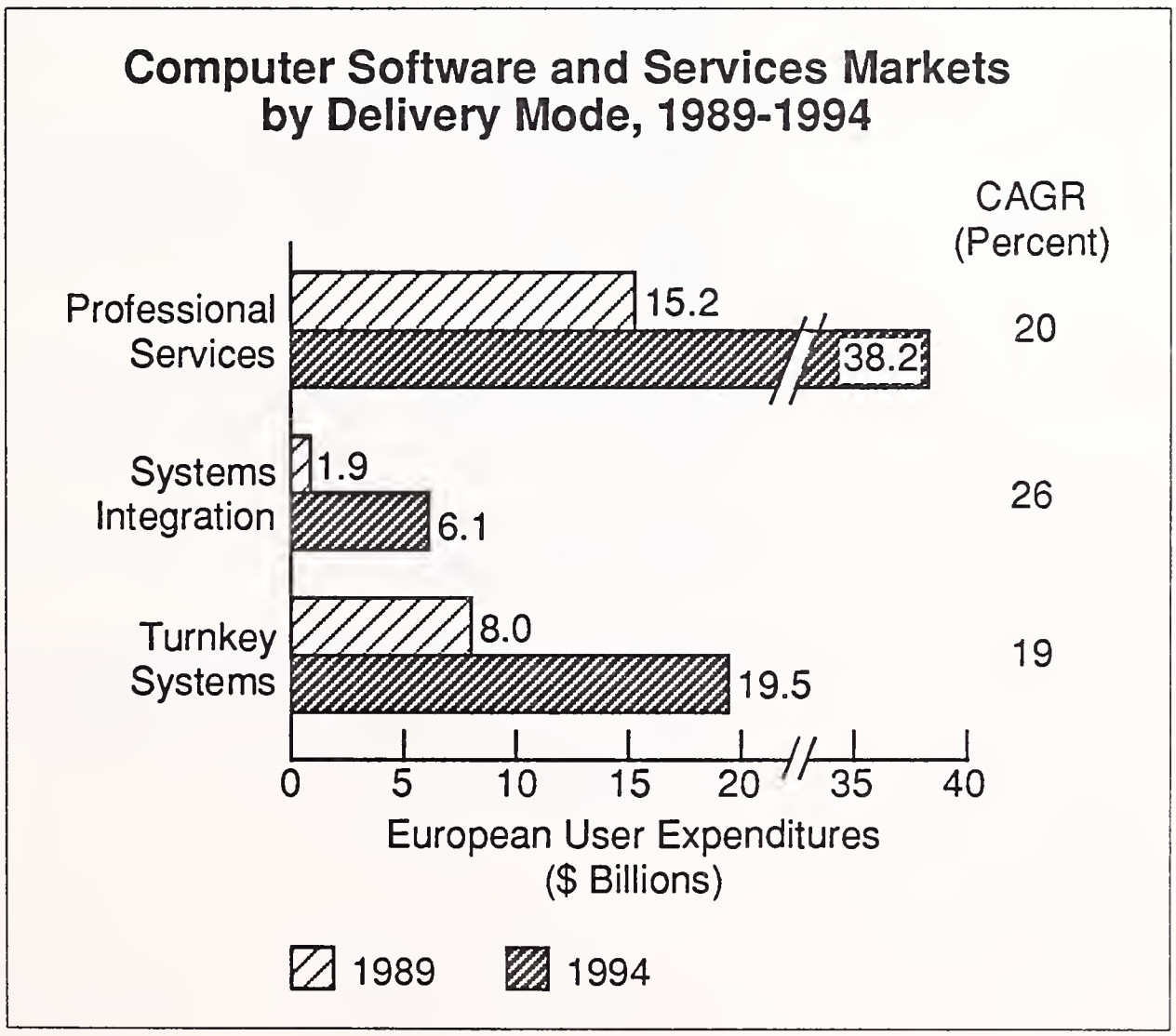


EXHIBIT III-9

Software and Services Market Forecasts Western Europe, 1989-1994

Subsector	Market Forecast ($ Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Processing Services	7,230	7,690	6	10,390
Network Services	2,160	2,960	24	8,720
Software Products	11,560	14,260	20	34,800
Professional Services	12,550	15,230	20	38,250
Systems Integration	1,520	1,920	26	6,110
Turnkey Systems	7,060	8,030	19	19,500
Total	42,080	50,090	19	117,770

Exhibits III-10, III-11 and III-12 illustrate INPUT's forecasts of the West European market by country and major regions. France remains the largest country market, accounting for some 24% of the total market in 1989.

Spain is forecast to have the highest growth, at 22% on average over the period 1989 to 1994. Scandinavian countries are expected to have the slowest growth rates, at some 15% to 18% per annum over this period.

Exhibit III-13 illustrates the importance of software and services in key major global markets.

Exhibit III-14 analyses the West European software and services market by major industry sectors. The two leading sectors are discrete manufacturing and banking/finance. Together they account for just over 40% of the total market.

EXHIBIT III-10

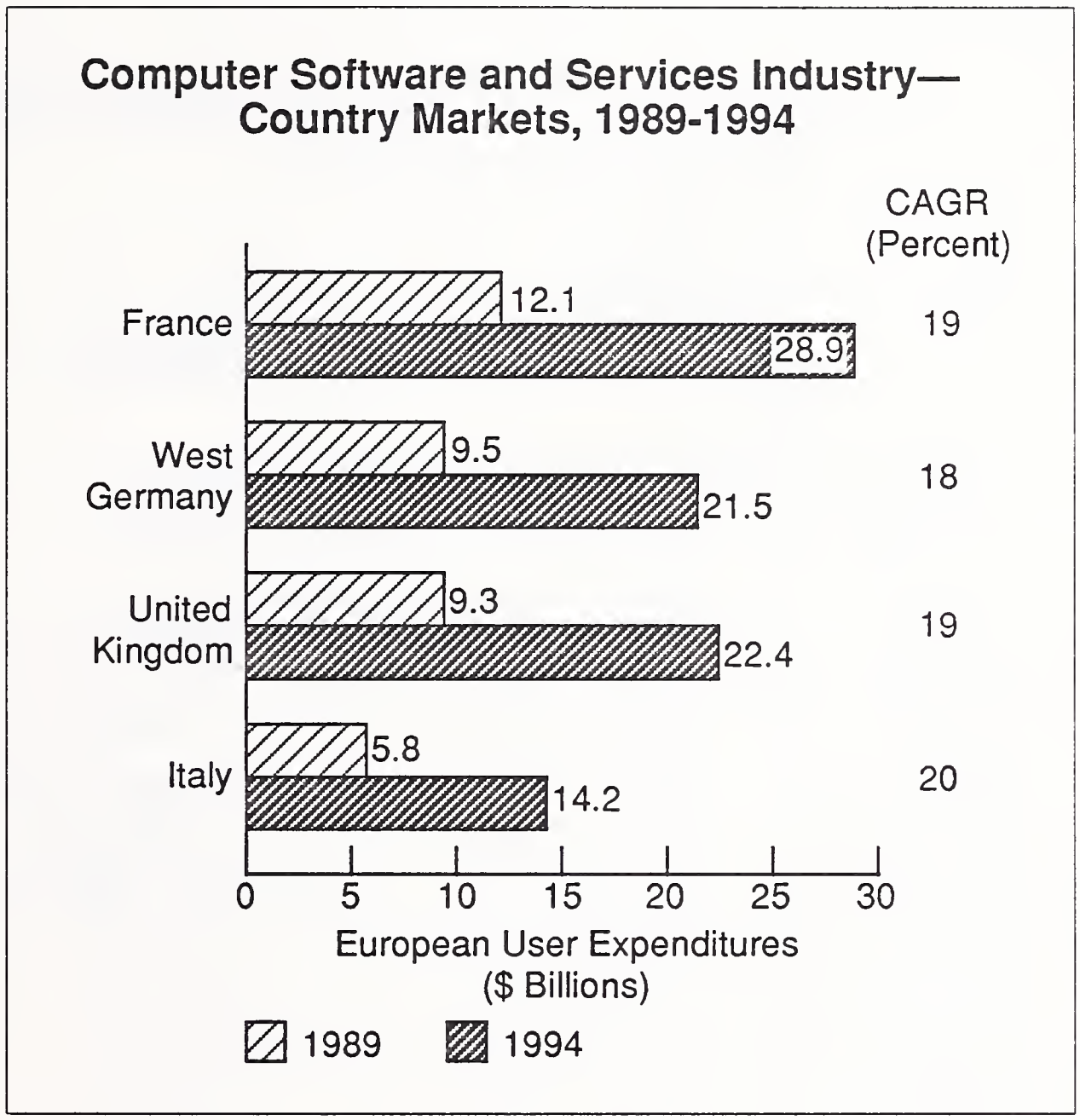


EXHIBIT III-11

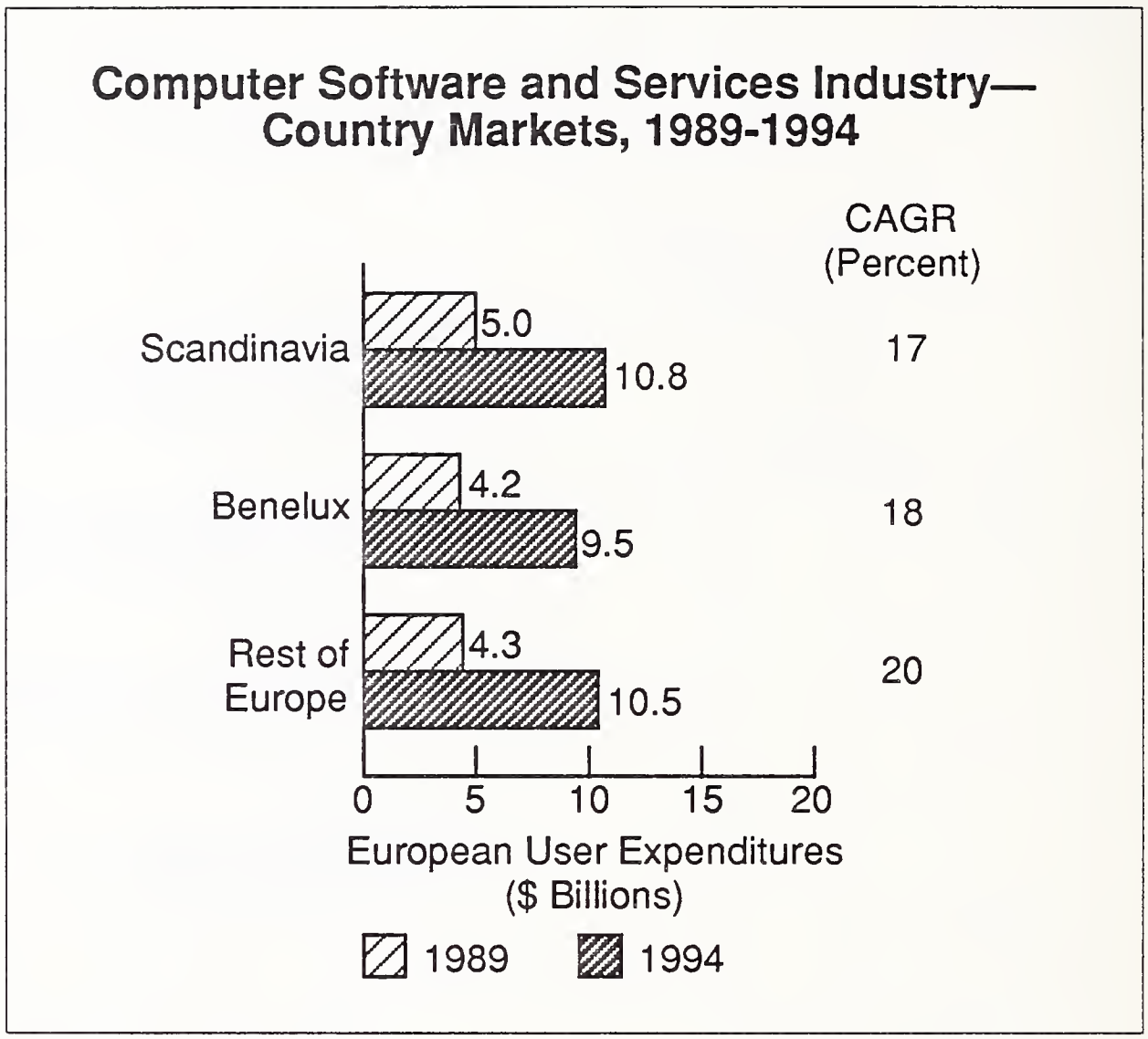


EXHIBIT III-12

Computer Software and Services Comparative Country Markets Western Europe, 1989-1994

Country	Market Forecast ($ Millions)			
	1988	1989	1989-1994 CAGR (Percent)	1994
France	10,130	12,060	19	28,870
West Germany	8,100	9,480	18	21,470
United Kingdom	7,740	9,330	19	22,360
Italy	4,780	5,810	20	14,190
Sweden	1,400	1,640	18	3,700
Denmark	1,080	1,250	17	2,710
Norway	990	1,130	15	2,260
Finland	780	940	18	2,140
Netherlands	2,290	2,710	18	6,180
Belgium	1,210	1,440	19	3,360
Spain	1,230	1,520	22	4,030
Switzerland	1,290	1,530	18	3,520
Austria	670	780	18	1,780
Rest of Europe	390	470	21	1,200
Total	42,080	50,090	19	117,770

EXHIBIT III-13

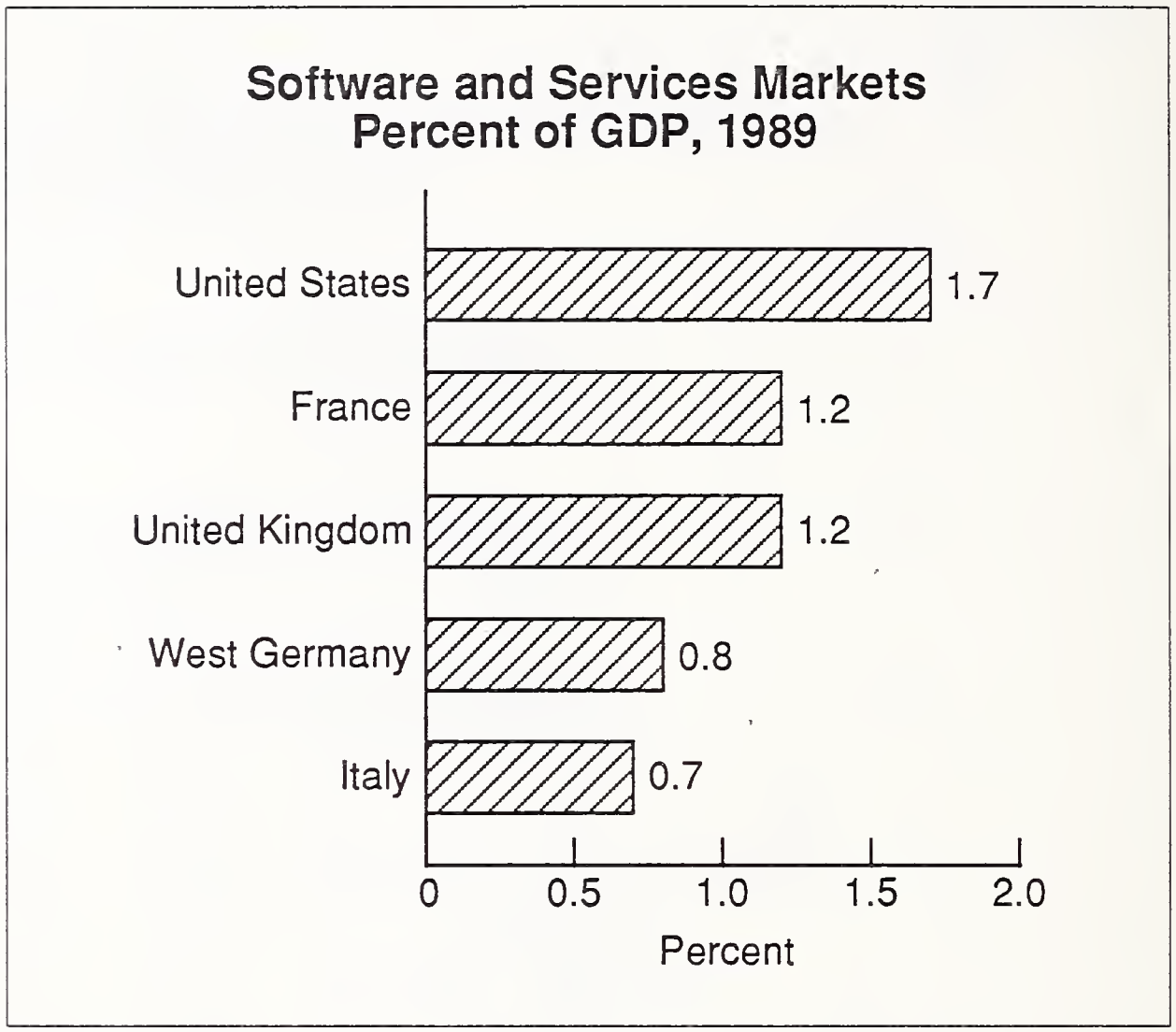


EXHIBIT III-14

Software and Services Industry Market Analysis Western Europe, 1989

Industrial Sector	Market Size ($ Millions)	Percent of Total
Manufacturing		
- Discrete	10,520	21.0
- Process	4,260	8.5
Distribution (Retail and Wholesale)	4,250	8.5
Transportation	2,250	4.5
Utilities	2,000	4.0
Banking and Finance	10,520	21.0
Insurance	4,010	8.0
Government		
- National	3,260	6.5
- Local	3,510	7.0
Services	3,760	7.5
Others	1,750	3.5
Total	50,090	100.0

C

The Competitive Environment

Exhibit III-15 lists the worldwide revenues of the leading West European-owned software and services vendors. Most of these revenues are from end users in Western Europe, as illustrated in Exhibit III-16. The exception is Transpac, most of whose revenues are from third parties which resell to end users in France.

EXHIBIT III-15

Worldwide Revenues, 1988
Europe-Based
Independent Vendors—Top 10

Rank	Vendor	Estimated Revenues ($ Millions)
1	Reuters	1,030
2	Cap Gemini Sogeti	890
3	Finsiel	500
4	SD-Scicon	450
5	Transpac	410
6	Sema	400
7	Sligos	310
8	Datev	260
9	Volmac	260
10	Concept	250

Exhibit III-17 lists the top independent vendors in Western Europe. Leading vendors are generally one of four national ownerships—U.S., French, West German or U.K. These also tend to be the main exporters throughout Europe. Other leading vendors, from Italy and the Netherlands, are predominantly domestic.

EXHIBIT III-16

Top Vendor Rankings and Market Shares, 1988 Software and Services Western Europe—All Vendors

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	IBM	6.8	3,420
2	Nixdorf	2.1	1,060
3	Cap Gemini Sogeti	1.6	800
4	Reuters	1.6	780
5	Siemens	1.5	740
6	Bull	1.3	660
7	Unisys	1.3	640
8	Prime	1.0	520
9	Finsiel	0.9	470
10	Olivetti	0.9	430
11	GEIS	0.8	410
12	ICL	0.8	400
13	Mannesmann Kienzle	0.8	390
14	McDonnell Douglas	0.7	360
15	Sema	0.7	350
16	SD-Scicon	0.7	340
17	Digital	0.7	330
18=	Andersen	0.6	280
18=	Sligos	0.6	280
20	Computer Associates	0.6	270
21=	Datev	0.5	260
21=	Volmac	0.5	260
23	GSI	0.5	230
24	Intergraph	0.4	210
25	NCR	0.4	200
26=	Concept	0.4	180
27=	Hoskyns	0.3	175
27=	EDS	0.3	175
27	Telekurs	0.3	175
30	Philips	0.3	170
	Others	70.1	35,125
	Total Market	100.0	50,090

EXHIBIT III-17

Top Vendor Rankings and Market Shares, 1988
Software and Services
Western Europe—Independent Vendors

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	Cap Gemini Sogeti	1.6	800
2	Reuters	1.6	780
3	Finsiel	0.9	470
4	GEIS	0.8	410
5	Sema	0.7	350
6	SD-Scicon	0.7	340
7=	Andersen	0.6	280
7=	Sligos	0.6	280
9	Computer Assoicates	0.6	270
10=	Datev	0.5	260
10=	Volmac	0.5	260
12	GSI	0.5	230
13	Concept	0.4	180
14=	Hoskyns	0.3	175
14=	EDS	0.3	175
14=	Telekurs	0.3	175
17	CISI	0.3	170
18	Tietotehdas	0.3	155
19	Thorn EMI	0.3	150
20=	Software AG	0.3	145
20=	Logica	0.3	145
22	Kommunedata (Denmark)	0.3	140
23=	Telerate	0.3	135
23=	CGI	0.3	135
23=	Datacentralen	0.3	135
26	Istel	0.3	130
27=	SAP	0.2	125
27=	Oracle	0.2	125
27=	Kommunedata (Norway)	0.2	125
30	GEAC	0.2	115
	Other	85.3	42,725
	Total Market	100.0	50,090

D

Comparison with the World Market

During 1989, INPUT conducted a major assessment of the worldwide computer software and services industry, *Information Services Worldwide Market Forecast, 1989-1994*. The comparison of INPUT's assessment of the size of the Western European market with that of the other two major markets (U.S. and Japan) is shown in Exhibit III-18. This exhibit serves to underline the importance of the Western European market on a world scale.

EXHIBIT III-18

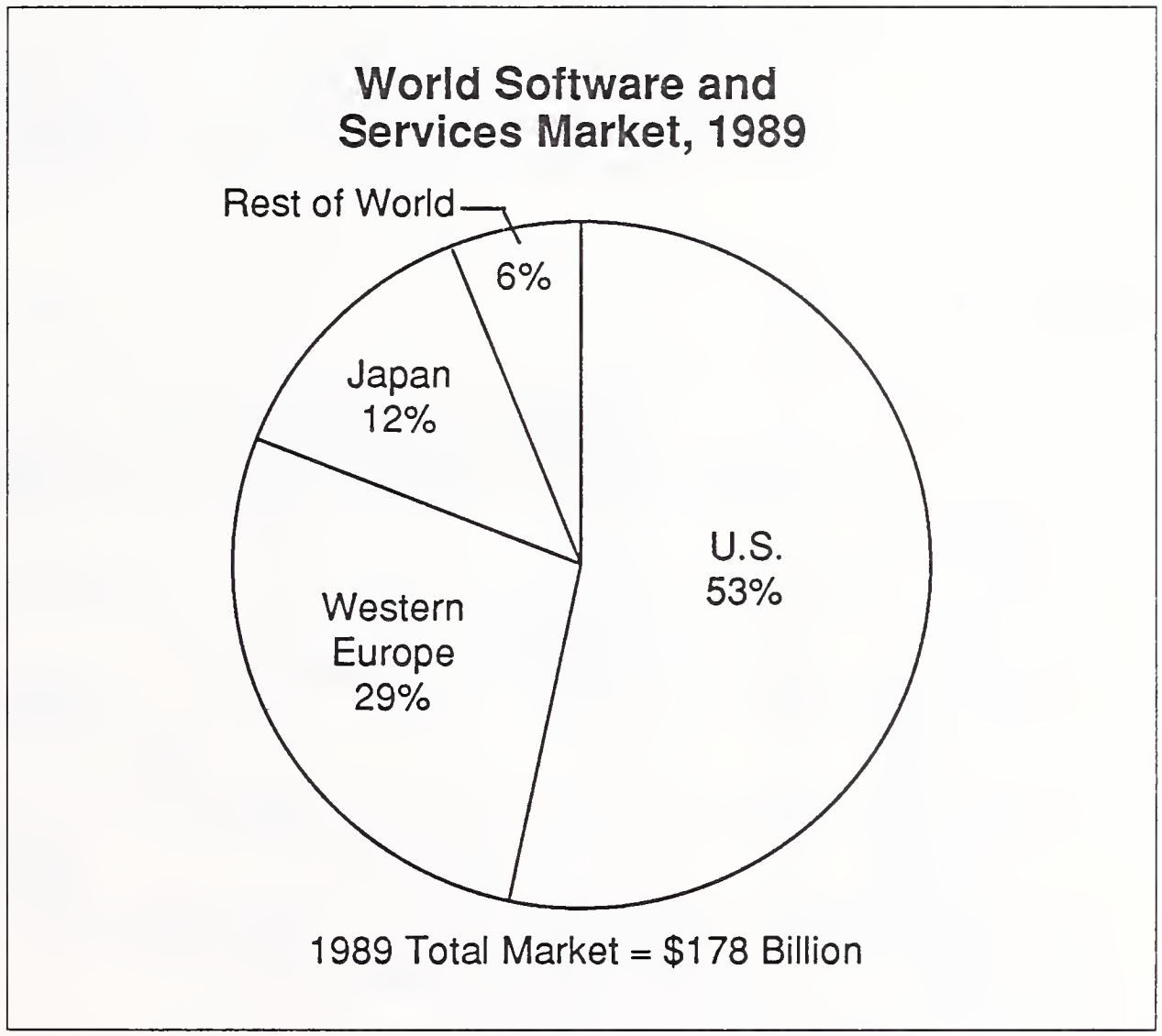
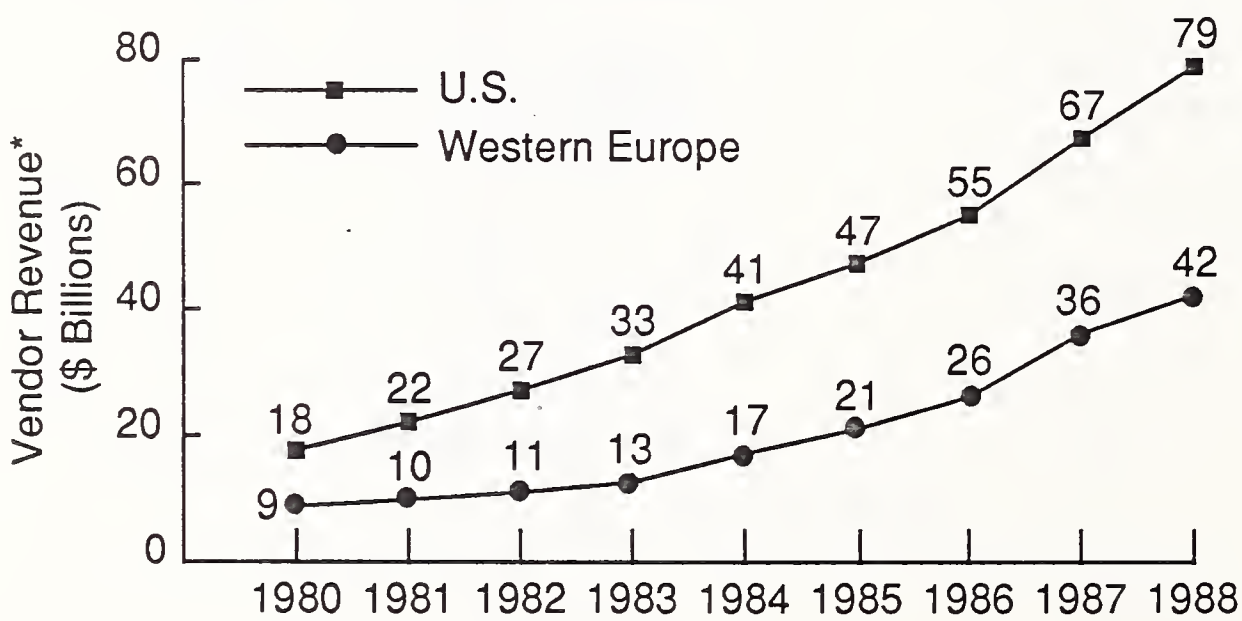


Exhibit III-19 illustrates the comparative historical growth of the Western European and U.S. markets. Fluctuations in the dollar exchange rate relative to European currencies have led to some relatively distorted growth rates on a year-to-year basis, particularly for 1986-1987, and 1987-1988.

Exhibit III-20 provides a more detailed sectoral comparison between the Western European market and that of the United States. The computer software and services market in the U.S. is considerably larger than that of Western Europe, not only in absolute terms, but relative to population size and GDP. Currently, the U.S. has a population of approximately 235 million, compared to 350 million for Western Europe, and a GDP of around $4.1 trillion, compared to Western Europe's $4.5 trillion. The greater service orientation of the U.S. and its culture which encourages greater risk-taking and outsourcing, contribute to this situation.

EXHIBIT III-19

Revenue Growth in the Software and Services Industry, 1980-1988



*Note: Average U.S. dollar exchange rates have been used for each year in this exhibit to convert West European revenues to U.S. dollars so as not to distort the relative growth rates of the U.S. and West European markets.

EXHIBIT III-20

Comparison of U.S. and Western European Software and Services Market Development, 1988-1994

Subsector		Market Forecast ($ Billions) 1988	1989	1989-1994 CAGR (Percent)	1994
Processing Services	U.S.	18.1	20.3	12	35.8
	W.E.	7.2	7.7	6	10.4
Network Services	U.S.	5.7	7.0	20	17.5
	W.E.	2.2	3.0	24	8.7
Software Products	U.S.	25.5	30.8	17	66.3
	W.E.	11.6	14.3	20	34.8
Professional Services	U.S.	15.0	17.5	14	34.0
	W.E.	12.5	15.2	20	38.3
Systems Integration	U.S.	4.8	5.8	24	17.2
	W.E.	1.5	1.9	26	6.1
Turnkey Systems	U.S.	9.6	10.7	10	16.8
	W.E.	7.1	8.0	19	19.5
Total	U.S.	78.7	92.1	15	187.6
	W.E.	42.1	50.1	19	117.8

IV

Market Sector Analysis

IV

Market Sector Analysis

A

Processing Services

1. Market Overview and Structure

INPUT splits this delivery mode into two subsectors:

- Transaction, utility and other services
- Systems operations

The transaction, utility and other services subsector continues to grow at near the level of inflation throughout Europe. The trend towards lower-cost computing power available at desktop or divisional level through supermicros and minicomputers is limiting the growth potential for central processing services.

These services in most Western European countries are predominantly for payroll processing and financial services for individual, or groups of banks and insurance companies. The exception to this tends to be Scandinavia, where society is structured more towards socialistic cooperative groupings. As a result, there are many central processing vendors supplying transactional services for cooperatives of farmers, local governments and industrial groups.

Processing systems operations is that sector of systems operations where vendor-owned, rather than client-owned equipment is used in providing the service. Client-owned systems operations revenues are included under the professional services delivery mode. Compared to the traditional transaction processing services, processing systems operations is a fast-growth opportunity area, in which vendors throughout Western Europe are showing increasing interest.

2. Market Size and Growth, 1989-1994

Exhibit IV-1 illustrates the size and growth of the overall processing services market forecast by INPUT for the period 1989 to 1994. In 1988, this market was $7.2 billion and INPUT expects that it will have grown to $7.7 billion by 1989, representing a 7% annual growth. Over the five-year period from 1989 to 1994, INPUT forecasts that the average growth rate for this market will be 6% per annum and that by 1994 the market will have reached $10.4 billion.

EXHIBIT IV-1

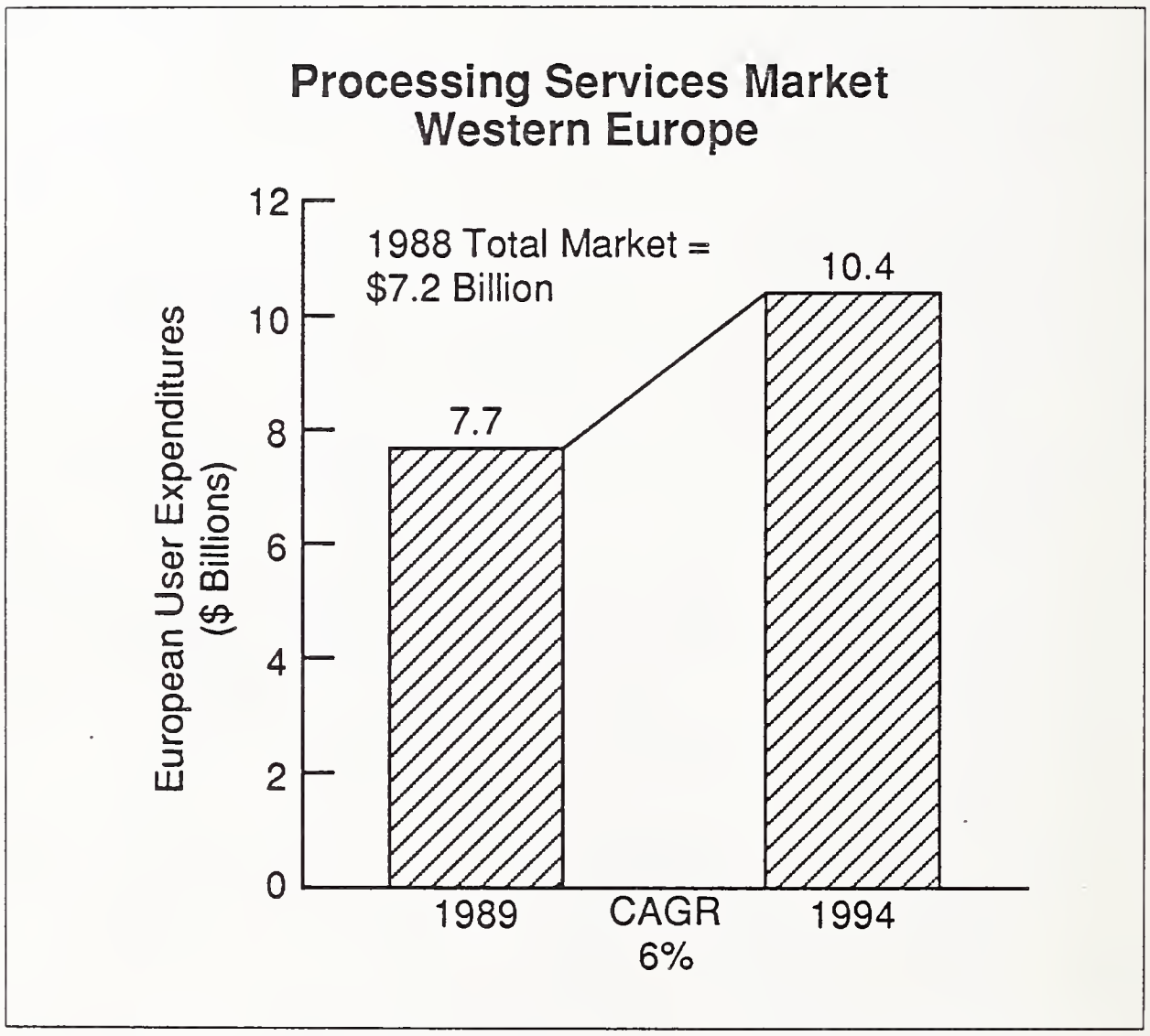


Exhibit IV-2 gives INPUT's detailed forecast by subsector for the period 1989 to 1994. Transaction, utility and other services are expected to grow by only 5% per annum between 1989 and 1994. However, processing systems operations is forecast to grow by 20% on average and to increase from 9% of the overall processing market in 1989 to 18% in 1994.

EXHIBIT IV-2

Processing Services
Market Forecasts, 1989-1994
Western Europe

Subsector	Market Forecast ($ Millions)			
	1988	1989	1989-1994 CAGR (Percent)	1994
Transaction, Utility and Other Services	6,705	7,050	5	8,820
Systems Operations	525	640	20	1,570
Total	7,230	7,690	6	10,390

A breakdown of the overall processing services market for Western Europe is given in Exhibit IV-3. The largest country market is France, where central processing services are used extensively by the large banking and financial sector. However, this exhibit does not show up the relative importance of different regions for the two processing services subsectors; these are illustrated in Exhibits IV-4 and IV-5.

EXHIBIT IV-3

Processing Services
Comparative Country Markets
Western Europe, 1989-1994

Country	Market Forecast ($ Millions)			
	1988	1989	1989-1994 CAGR (Percent)	1994
France	1,680	1,730	4	2,150
West Germany	1,375	1,450	5	1,820
United Kingdom	925	1,015	8	1,510
Italy	765	835	8	1,240
Sweden	365	395	6	530
Denmark	365	375	6	500
Norway	395	420	5	550
Finland	220	235	7	340
Netherlands	365	395	6	500
Belgium	195	205	5	260
Spain	200	225	13	410
Switzerland	200	215	7	300
Austria	120	130	6	170
Rest of Europe	60	65	12	110
Total	7,230	7,690	6	10,390

As Exhibit IV-4 illustrates, in 1989 the three regions of France, West Germany and Scandinavia were roughly equal in total size for transaction, utility and other processing services. Each accounts for roughly 20% of the total Western European market for this subsector. For processing systems operations, the two major markets were the U.K. and France, as Exhibit IV-5 illustrates. These two countries account for just over 50% of the total Western European market for processing systems operations.

EXHIBIT IV-4

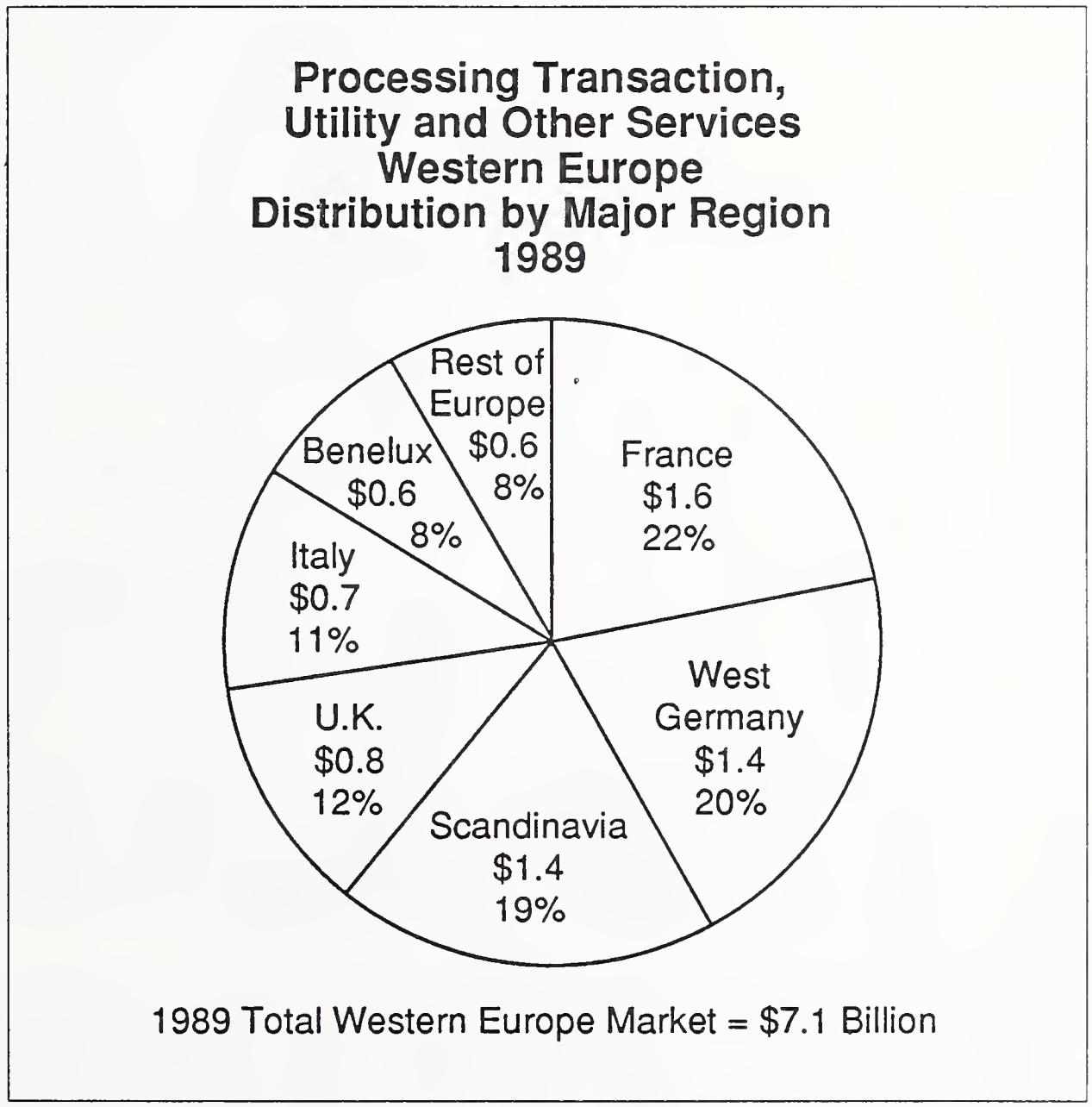
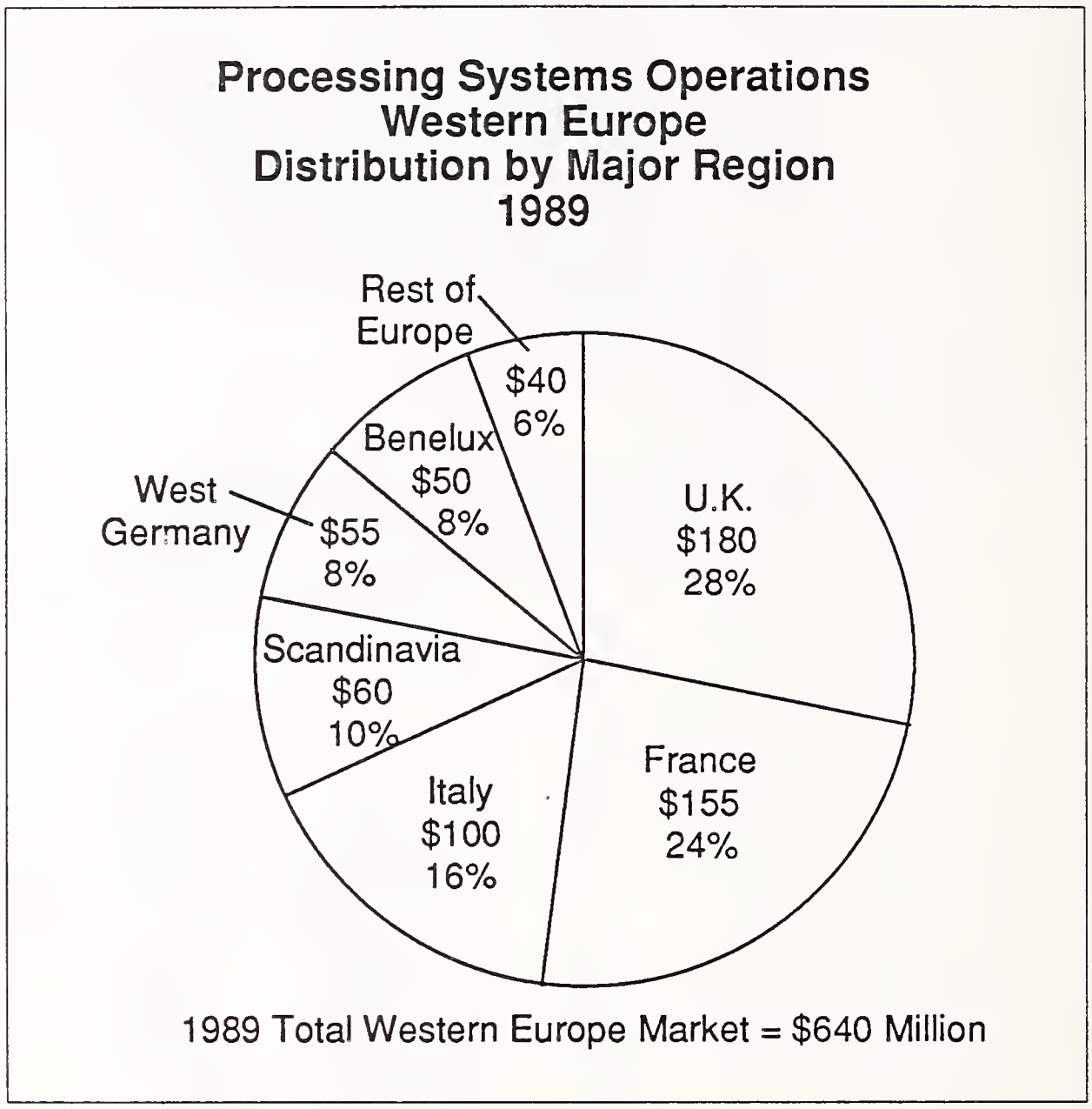


EXHIBIT IV-5

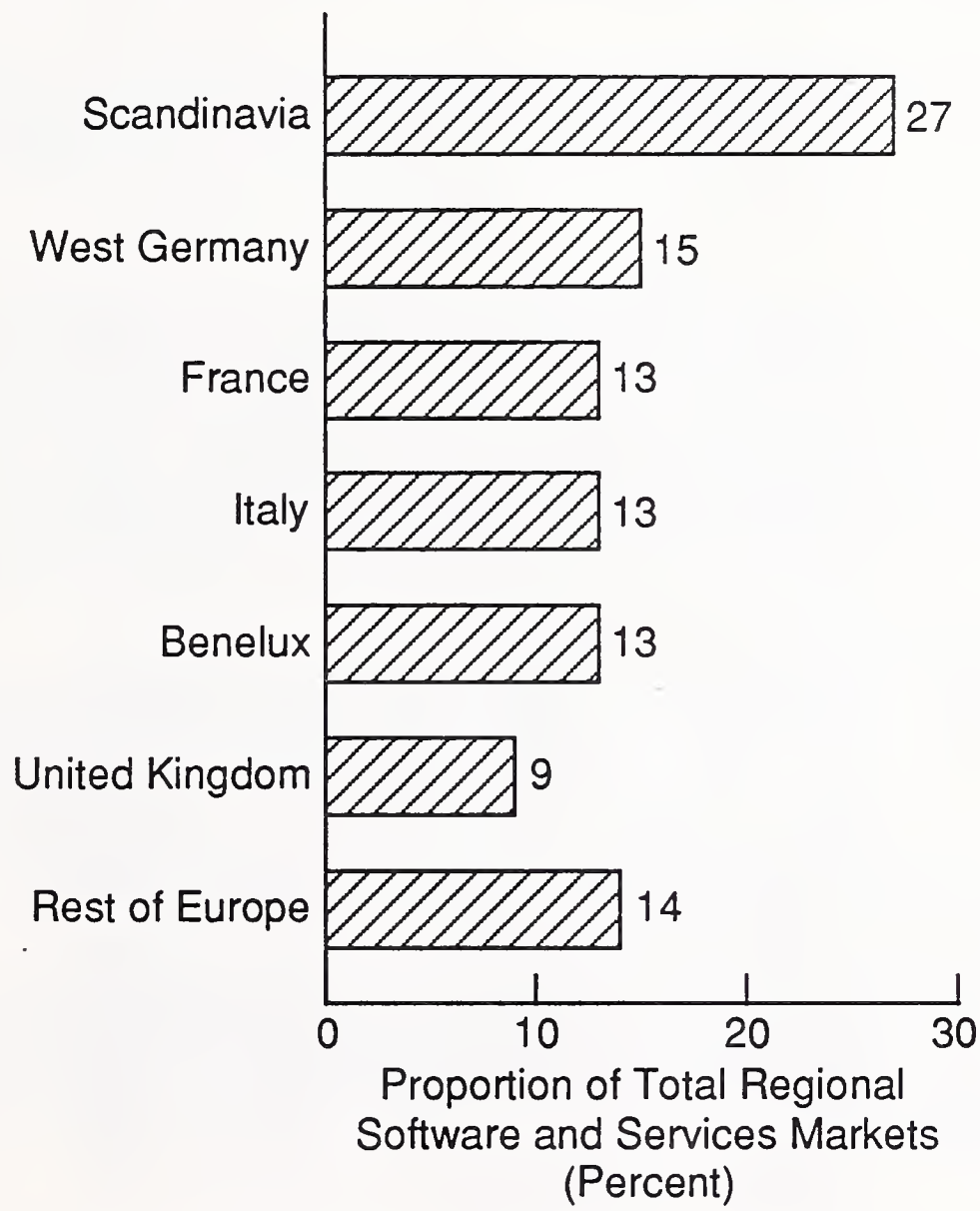


The importance of transaction, utility and other processing services for the Scandinavian market is more clearly illustrated in Exhibit IV-6, which shows the proportion that this subsector represents for different regional markets around Europe.

For Scandinavia, this subsector accounts for 27% of the total software and services market. For most other countries or regions, it represents some 13% to 15%, except for the U.K., where is has fallen to only 9% in 1989.

This subsector is therefore still a very important part of the Scandinavian software and services market. Vendors see that they have the advantage of interlinking central mini and mainframe processing capacity to decentralised PC and mini computing power through wide-area networks to give the most economic utilisation of overall computing resources. Other Western European markets which have been less centrally organised have developed away from central processing to local processing.

EXHIBIT IV-6



With the gradual development of wide-area network facilities in the late 1980s and early 1990s, the Scandinavians have the ability to obtain a better balance between central and local processing through their coordinated distributive computing strategy. Other Western European countries might find it less easy to obtain such a balance.

3. Market Dynamics

a. Processing Services

Traditional vendors in this subsector continue to maintain their market share, although growth is not expanding significantly above inflation in most countries.

Vendors such as ADP continue with payroll services and GEIS in financial settlements and cash and treasury management systems. In Switzerland, Telekurs provides central settlement services between Swiss banks.

In Scandinavia, vendors such as Lantbruksdata in Sweden specialise in central processing for local farmer cooperatives and are expanding into the forestry sector. The two Kommunedata companies in Norway and Denmark provide central administrative data processing services for local government bodies throughout their respective countries. In Finland, some 80% of revenue for the Finnish State Computing Centre, VTKK, comes from supplying processing services to major central government ministries.

In these market sectors, there are few economical alternatives to central processing on large mainframe computers. As wide-area network services continue to develop in individual countries and throughout Europe, there are opportunities for vendors to offer enhanced central processing services in specific markets where there are large volumes of data.

For those processing services where relatively small volumes of data have in the past been processed, for example, by overnight batching, there has recently been a strong tendency for these to switch to local processing on powerful desktop PCs or corporate minicomputers.

b. Systems Operations

Outsourcing of computer operations continues to be a growing trend throughout Europe. As computer technology increases in complexity, and skilled manpower is in shorter supply, medium to large end-user enterprises are seeking external suppliers who can manage their internal computer operations.

Shortage of skilled staff continues to be a major driving force in this market, as INPUT has again confirmed during its 1989 research. Certain vendors, such as Andersen Consulting, sell their services at the corporate board level, rather than at the computing DP level. This tactic is key in selling systems operations, where the vendor is taking responsibility to run a major part of the client's internal operations.

As Exhibit IV-5 illustrated, the U.K. is the major market in Western Europe for processing systems operations. Hoskyns is the acknowledged market leader. During 1989, Plessey, which took over control of Hoskyns in 1988, was itself bought out in a joint bid by GEC of the U.K. and Siemens of West Germany. Hoskyns is now owned 50/50 by GEC and Siemens. This new international ownership should allow Hoskyns to spread its systems operations expertise into new Western European markets.

Hoskyns has two key marketing thrusts in systems operations:

- Management of change
- Alternative computing

One of the sensitive issues that must be managed by vendors involved in systems operations is the likely loss of jobs of the client's computing staff. Through systems operations contracts, vendors have the opportunity to take over some of the client staff. This gives the vendor access to high-quality, well-trained additional staff. For the employees of the client, it provides the opportunity for a more secure and varied future.

EDS claims to have invented facilities management (now referred to as systems operations by INPUT) in 1962 in the U.S. EDS has brought its systems operations expertise across the Atlantic and offers services throughout Western Europe.

With the gradual evolution of pan-European markets during the 1990s, as researched in INPUT's report *The Challenge of the Single European Market—1992 and Beyond*, the ability of vendors to offer Europe-wide, if not global services is an important issue. To obtain major systems operations contracts with major international corporations, vendors must be able to show that they have 100% international coverage. If they only have perhaps 80% coverage, clients will use the bigger vendors with the more comprehensive geographic coverage.

This means that in the Western European arena, the large U.S. vendors such as EDS and Andersen Consulting have an advantage over traditional European vendors such as Hoskyns.

4. Competitive Environment

Exhibit IV-7 lists the top ten processing services vendors in Western Europe in 1988.

Three of these vendors are U.S.-owned—IBM, GEIS and EDS. Finsiel is the largest independent Italian vendor, 83% state-owned and 17% by Banca d'Italia. Datev is a West German cooperative processing service for accountants. GSI and Sligos are both French-owned. GSI offers a

EXHIBIT IV-7

Top Vendor Rankings and Market Shares, 1988
Processing Services
Western Europe

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	IBM	3.6	265
2	GEIS	3.5	255
3	Finsiel	3.1	225
4	Datev	2.8	200
5	EDS	1.3	95
6	GSI	1.2	90
7 =	Sligos	1.2	85
7 =	Kommunedata (Denmark)	1.2	85
9	Telekurs	1.1	80
10	Fiducia	1.0	70
	Others	80.0	5,780
	Total	100.0	7,230

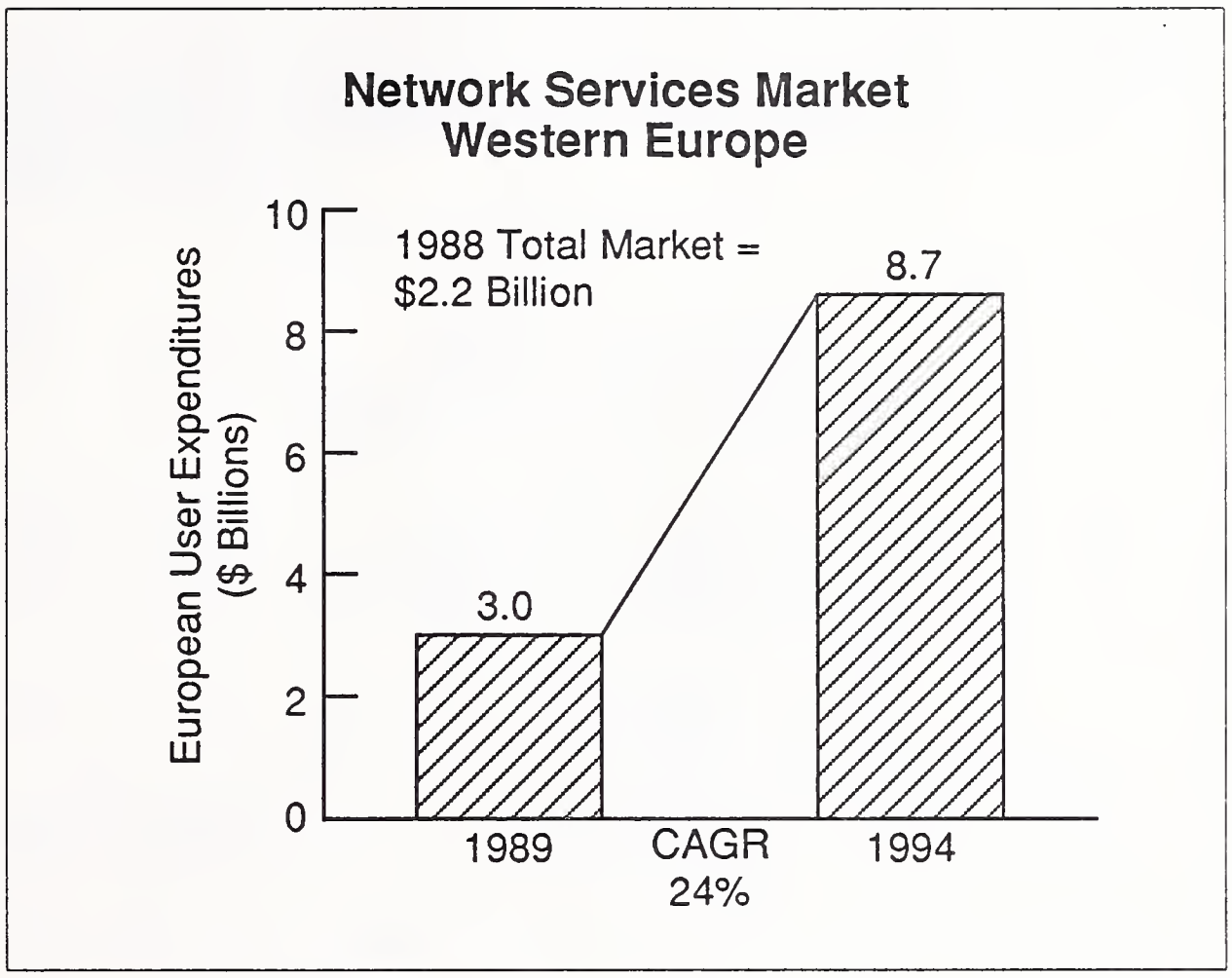
range of services from its Paris-based computer centre, for example to airlines, whilst Sligos handles electronic card settlements and is 63% owned by Crédit Lyonnais.

B
Network Services

1. Market Overview and Structure

Once viewed as a slow-growth public service utility, i.e. a natural monopoly in need of public subsidies for investment, network services is currently a high-growth, profitable and competitive sector with a plethora of new business opportunities. Networks, as vehicles for carrying information, are a vital component in the growth of the Western European economy, where economic development is linked to the free flow and sharing of information. INPUT's market size and forecast is illustrated in Exhibit IV-8.

EXHIBIT IV-8



INPUT defines this sector as comprising the following subsectors:

- Network applications
- Electronic information services

The market size and forecast for these subsectors is included in Exhibit IV-9. The network applications subsector, consisting primarily of electronic mail (E-mail), Electronic Data Interchange (EDI) and Electronic Funds Transfer (EFT), has experienced high rates of growth over the past year.

As markets become increasingly competitive, networked electronic intelligence is being used as a strategic tool. The growth of network services has been reinforced by the proliferation of high-speed and increasingly powerful personal computers with communications capabilities, as well as by the acceptance of open systems standards in place of proprietary offerings.

High-capacity networks will be an essential, dynamic element of Western Europe's productive capacity. The activities of many of the leading national and international vendors are providing stimulus to the market. Telecommunications links are vital if Europe is to achieve a real single market by 1992. Vendors have been addressing this challenge through

EXHIBIT IV-9

Network Services
Market Forecasts, 1989-1994
Western Europe

Subsector	Market Forecast ($ Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Network Applications	560	780	29	2,840
Electronic Information Services	1,600	2,180	22	5,880
Total	2,160	2,960	24	8,720

merger and acquisition activity and strategic alliances in order to develop or increase their presence in both national and international markets.

The electronic information services (EIS) subsector has continued to expand. Though it is not fulfilling the more bullish projections made by some industry analysts, the continued demand for information in the financial sector has resulted in vendors developing analytical tools and alternative delivery mechanisms (such as CD ROM) to increase volume usage by their current customer base and to attract new customers.

The impact of new technology on network services supply and demand has been pervasive: digitisation, fibre optics, mobile radio, and satellite have all expanded the access to sources of information—databases, knowledge and image banks, expert systems and television—allowing a varied range of services to be provided and significantly lowering the barriers to market entry.

2. Market Size and Growth, 1989-1994

INPUT assesses the Western European market for network services in 1989 as worth $3.0 billion, with the EIS subsector accounting for $2.2 billion and the network applications sector $780 million. Joint venture, acquisition and merger activity is expected to be high through Western Europe in network services over the next few years. INPUT forecasts

that all the individual country markets will continue to grow at a higher compound annual growth rate than other sectors of the computer software and services market—24% between 1989 and 1994, as Exhibit IV-10 illustrates.

EXHIBIT IV-10

Network Services
Comparative Country Markets
Western Europe, 1989-1994

Country	Market Forecast ($ Millions)			
	1988	1989	1989-1994 CAGR (Percent)	1994
France	510	670	24	1,970
West Germany	310	440	27	1,450
United Kingdom	705	925	22	2,470
Italy	230	320	23	910
Sweden	45	70	26	220
Denmark	35	50	27	160
Norway	25	35	27	120
Finland	25	35	26	120
Netherlands	90	120	25	370
Belgium	50	70	25	200
Spain	40	80	29	290
Switzerland	55	85	25	250
Austria	25	40	25	120
Rest of Europe	15	20	27	70
Total	2,160	2,960	24	8,720

The twin forces of technology-push and market-push are redrawing the lines of the network services market. However, INPUT has highlighted four key factors that are likely to prove inhibiting forces to the opening up of the European telecommunications market. These factors are listed in Exhibit IV-11.

EXHIBIT IV-11

Factors Inhibiting Network Services

- Political ideology
- Cross-subsidy of nonprofitable services
- Union opposition
- Fear of competition

Whilst concepts such as Open Network Provision (ONP) in Europe and Open Network Architecture in the U.S. point to policy convergence, there is still a considerable range of opinion from country to country on the means and pace of reform. Political, financial and trade worries lead to a split between the countries that feel they will gain from reform and those that believe they have much to lose.

3. Market Dynamics

The changes in the structure of the network services market have resulted in reduced product life cycles and shortened production runs, creating the need to look for growth through international sales. With too many suppliers chasing too few market opportunities, there have been a host of mergers and alliances over the past year.

Competition in domestic markets has led to the emergence of a new brand of multinational: AT&T, France Telecom and British Telecom have sought to compensate for loss of domestic share by international expansion.

a. Network Applications

The sophisticated needs of users (in particular the multinationals who are themselves being driven by the process of "globalisation") have caused a shift from the supply side (exemplified by the national PTTs) to the demand side, where the user is looking for multivendor solutions from multiple suppliers.

However, with the failure of the pan-European MDNS, one-stop shopping remains unattainable for multinationals. As Western Europe moves towards the Single European Market in the 1990s, the failure of the European Commission to resolve this and other key issues (such as tariff harmonisation), indicates that the approach for users should be a pluralistic one, marked by coexistence between a hybrid mix of private and public network solutions.

With such dynamics, there is a blurring of the distinctions between transport and information processing, between telecommunications and broadcast networks, and between wirebound and wireless networks. Furthermore, the increasingly vertical and international strategies of such industries as banking, insurance, travel and transportation will drive demand.

In order to counter the proposed threat and to increase market presence, the following key developments have occurred over the past twelve months:

- British Telecom acquired Tymnet from McDonnell Douglas.
- France Telecom and the Deutsche Bundespost acquired a 30% stake in GSI's Travel and Tourism division and set up a joint venture company, Eucom.
- IBM and Fiat finally obtained agreement from the Italian government for their joint venture, Intesa, to offer network services.
- GEIS responded by concluding a deal with Stet in Italy.
- AT&T acquired Istel in the U.K.
- INS (the U.K. joint venture between ICL and GEIS) and GEIS developed their "European" bridge between the U.S., the U.K., and Europe.
- Transpac and BT announced that they would be offering EDI services.
- INS and the National Westminster Bank will be trialling an EDI/EFT link.

The moves by British Telecom in acquiring Tymnet and by AT&T in buying Istel has resulted in telecommunication carriers beginning to operate in one another's territory. Equipment vendors are entering the services business to maintain growth and profitability, with the result that they are competing against their own customers, i.e., the national PTTs.

Examples of this are Siemens with its Vascom network services subsidiary, Alcatel with the construction of a global internal network and Motorola with its participation in consortia to operate PCN and digital cellular radio networks. Furthermore, large users are also joining these consortia, a trend that will continue as network services are opened to private investment over leased lines.

b. Electronic Information Services

The EIS market in Western Europe is a buyer's market—supply exceeds demand. As a consequence, vendors are seeking to expand their market beyond a small core of heavy users, with features that make access more attractive. These include gateways, thematic bundling of databases, differing price structures and training courses.

The real-time financial sector, though still an expanding market, has recently experienced price erosion and lower profitability due to the intense competition in niche markets.

The advent of optical storage media, such as CD ROM, will alter the user's economic relationship with EIS, enabling them to avoid the "pay-per-view" pricing associated with remote databases.

Other technologies that will benefit the EIS market in the 1990s are listed in Exhibit IV-12.

EXHIBIT IV-12

EIS Market—Technological Drivers

- Front-end procesinq with A1 templates as an alternative to key word searching
- Image-based databases
- Satellite technology

4. Competitive Environment

The network services sector, as can be seen from Exhibit IV-13, is dominated by the large multinationals. This is likely to continue over the forecast period, as concentration of supply occurs and the full-service suppliers offering business solutions achieve an even stronger market position.

EXHIBIT IV-13

Top Vendor Rankings and Market Shares, 1988
Network Services
Western Europe

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	Reuters	28.4	615
2	GEIS	6.5	140
3	Telerate	4.9	105
4	Transpac	3.7	80
5	Telekurs	2.7	60
6	Dun & Bradstreet	2.3	50
7 =	Sligos	1.9	40
7 =	GSI	1.9	40
7 =	IBM	1.9	40
10	Bull	1.4	30
	Others	44.4	960
	Total	100.0	2,160

Reuters is the leading vendor, as a result of its activities in the real-time financial information sector. The high profit to be made from this area is evidenced by the presence of Telekurs, Telerate and Dun & Bradstreet in the top six.

Service providers are being forced to differentiate their offerings amid mounting competition in the network services market. Although most of them can offer global services and a complete range of managed network services, multinational users are increasingly looking for international private networks or shared services on private networks.

GE Information Services' strong international presence includes direct network connections in all Western European countries, providing end-user service and support. GEIS' strategy is significant: it focuses on high-value-added applications for specific industries, such as banking, trade and transport on an international basis.

Such a strategy is a result of the perceived development of the network services market: demand will be for high-added-value applications rather than for basic carrier services. High-volume E-mail and EDI are basic services onto which industry-specific processor-intensive applications can be added.

C
Software Products

1. Market Overview and Structure

The software products delivery mode is split into two subsectors—applications software products and systems software products.

Applications software is software which interfaces with the end user. Exhibit IV-14 provides the definitions used in both the systems and applications software products subsectors. Application software is classified as either industry-specific or as cross-industry, and systems software is classified according to its function.

In the software products market, there are sales between software and services vendors, as well as sales to end users. INPUT has attempted to eliminate these distinctions in estimating market sizes and top vendor rankings.

Revenues for software products are based on end users' purchase or lease of application and systems software for use on in-house computer systems. Where installation and support is handled by the software products vendor, INPUT includes this revenue in the software products delivery mode. When work on packages is carried out by third parties, this revenue is allowed for in the professional services delivery mode.

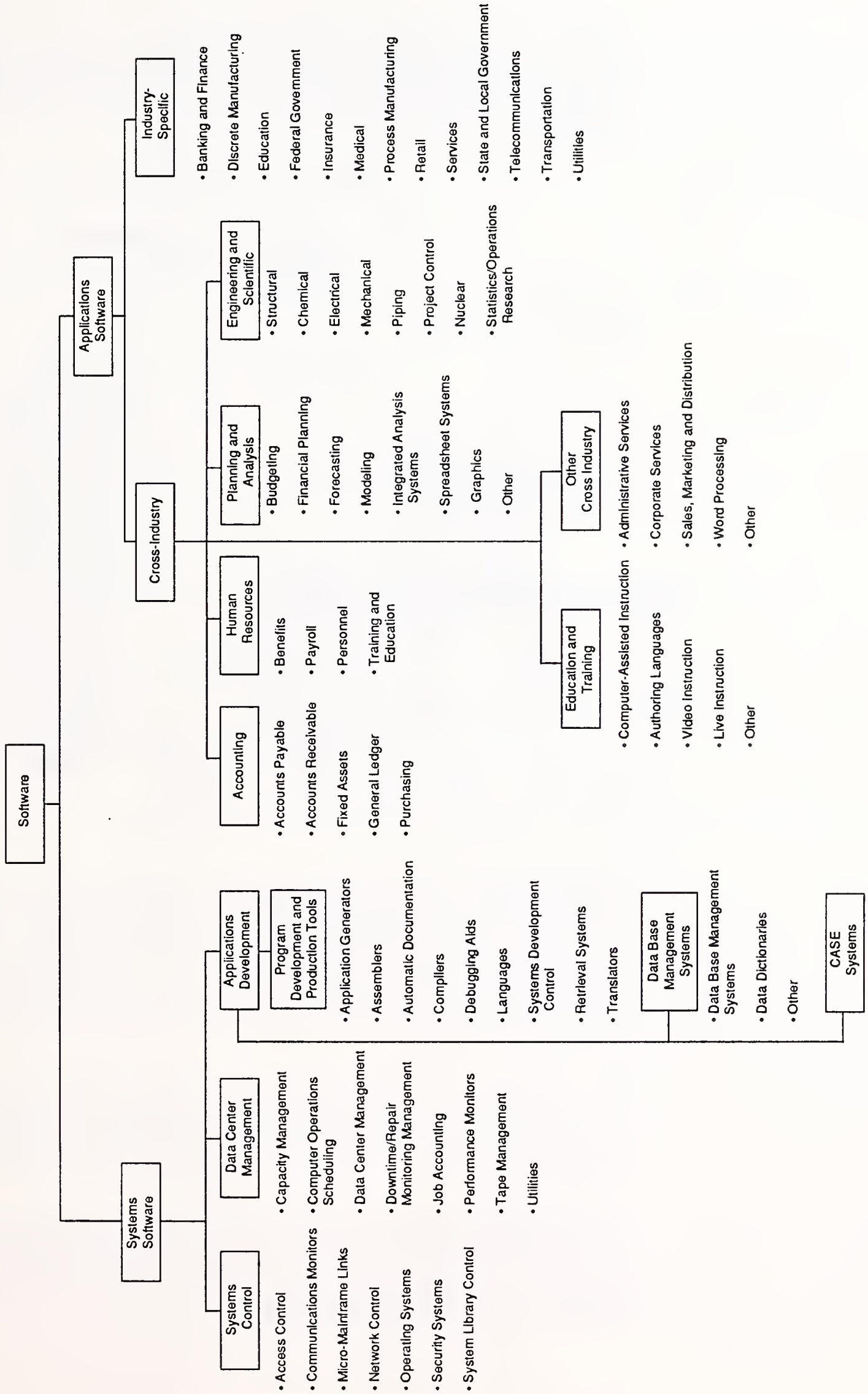
With the advent of the PC, many software products that were defined as systems software on larger equipment platforms have had to be redefined as application software on these smaller platforms. Database and spreadsheet PC software are typical examples. Where software has end-user interface and end-user documentation, it is defined as application, rather than systems software.

2. Market Size and Growth, 1989-1994

Software products is the second largest of INPUT's six delivery modes. INPUT estimates that the total size of the Western Europe software products market in 1988 was $11.6 billion, and grew to $14.3 billion by

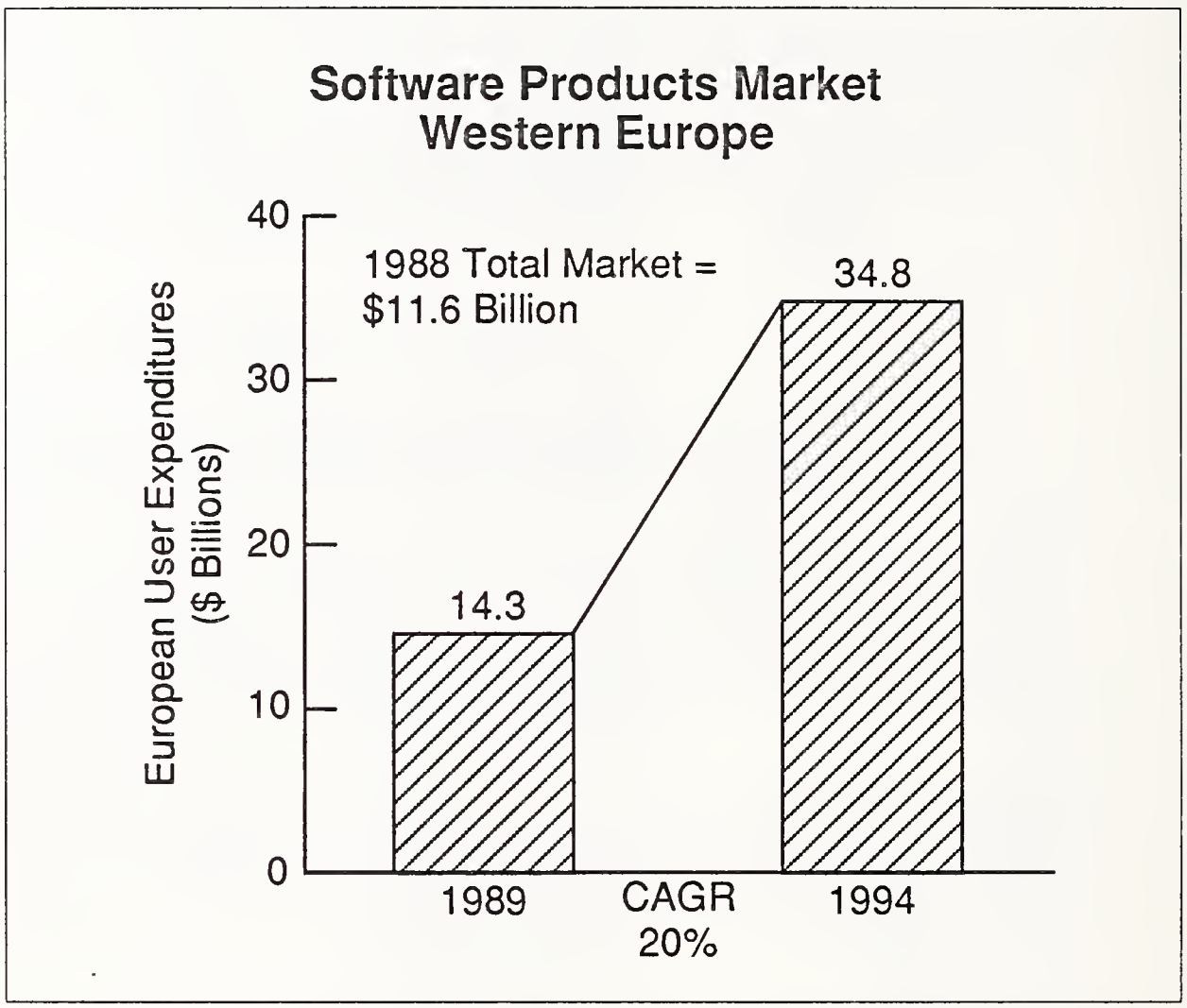
EXHIBIT IV-14

Software Products Market Structure



1989, a 23% growth rate. INPUT forecasts that the growth rate for software products over the period 1989 to 1994 should be 20% per annum, and that by 1994 the market will have grown to $34.8 billion, as is illustrated by Exhibit IV-15.

EXHIBIT IV-15



In 1989, INPUT estimated that software products accounted for 28% of the overall Western European software and services market. This can be compared with INPUT's estimate of this delivery mode accounting for 32% of the U.S. software and services market. By 1994, software products should account for 30% of the total Western European market and 34% of the U.S. market.

This gradually increasing importance of software products within the overall software and services markets of both areas is significant. It reflects the gradual movement away from bespoke software, towards standard software.

As the shortage of skilled programmers continues to get worse, there are more opportunities for vendors to develop and sell standard software products. For end users, the cost advantage of standard software over bespoke software can be considerable.

Exhibit IV-16 shows the breakdown of the total software products market for the period 1989 to 1994. Application software is expected to grow significantly faster than systems software. As a result, application software is expected to increase in importance within the overall Western European software products market—from 17% of the total market in 1989, to 33% by 1994.

EXHIBIT IV-16

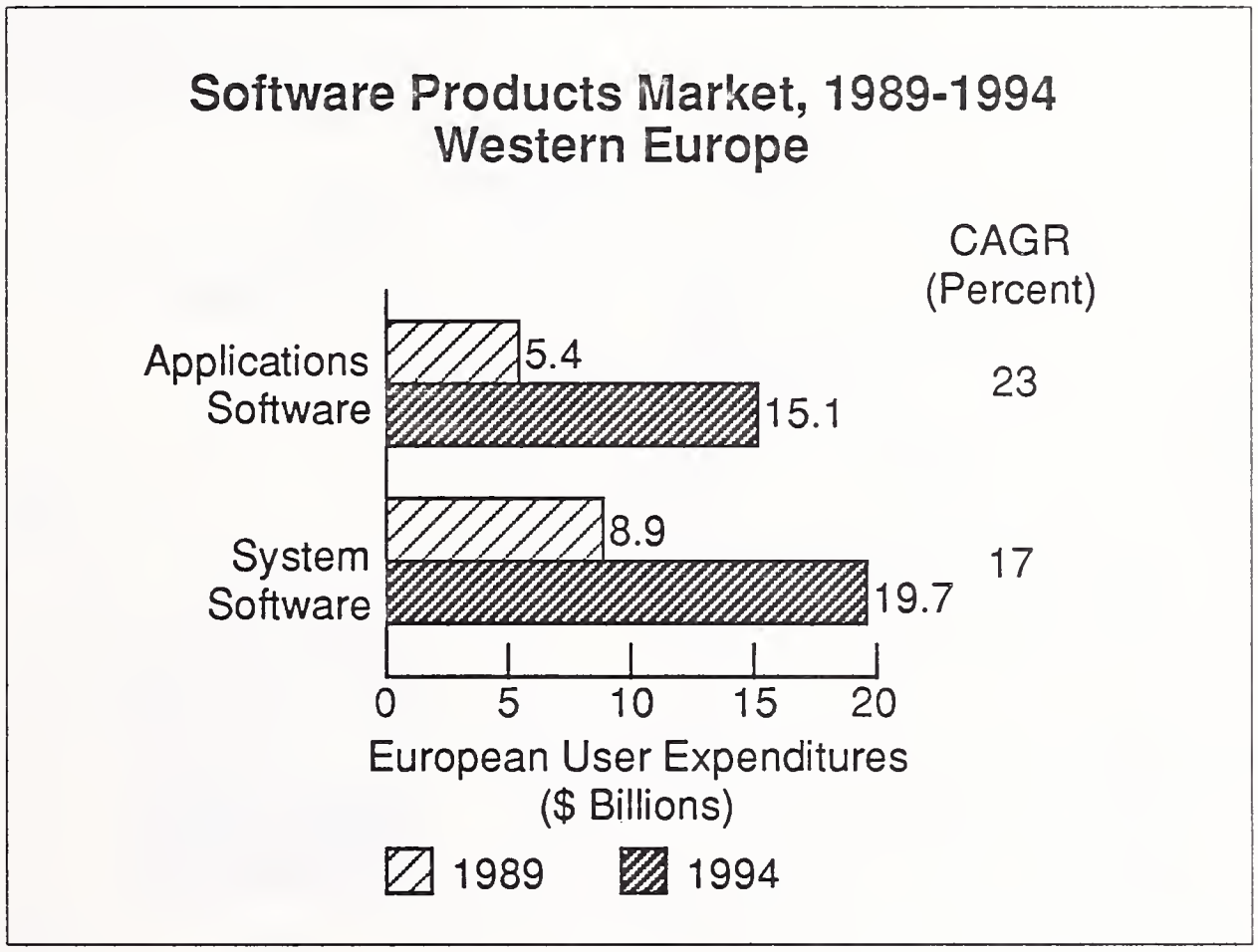
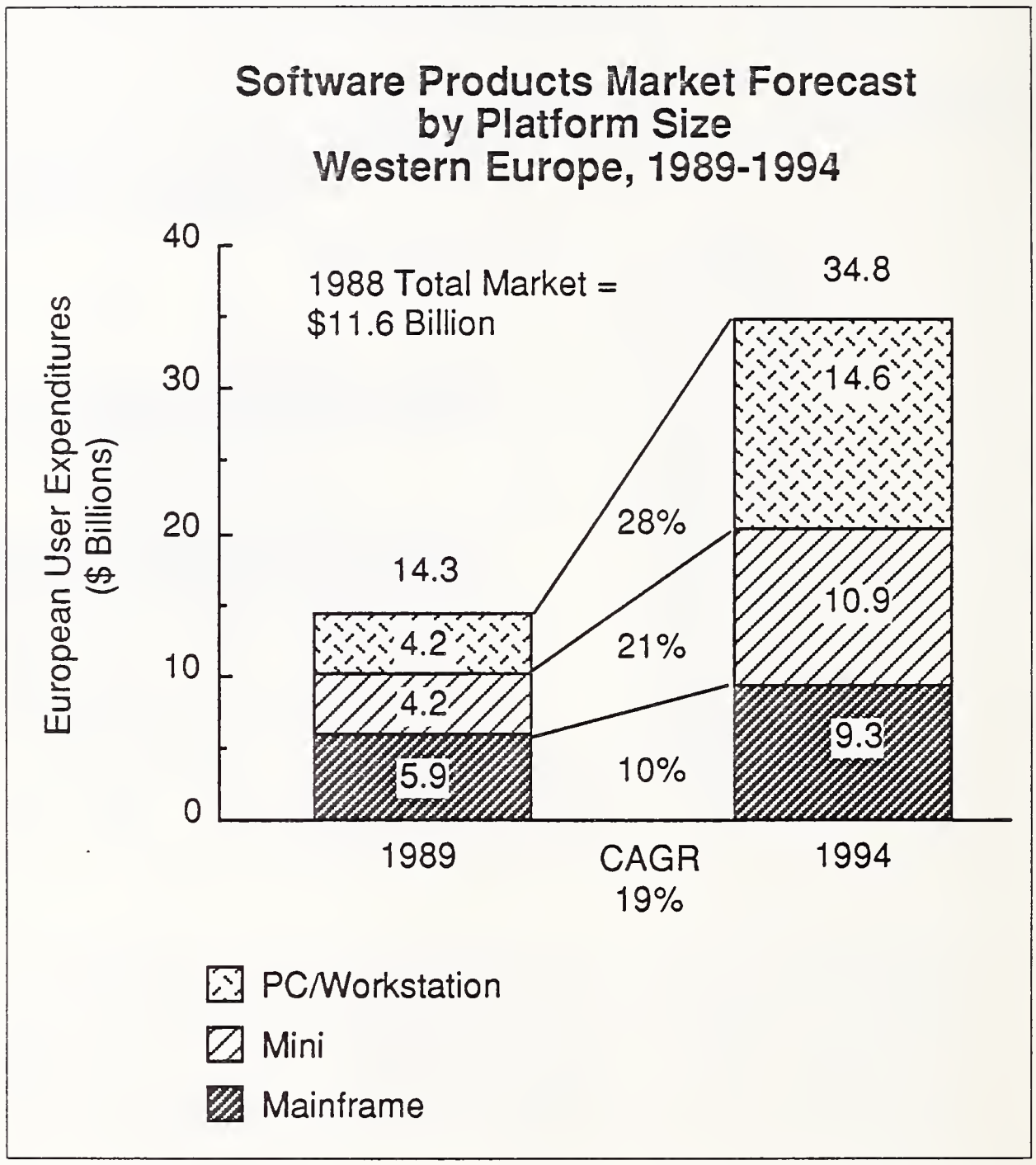


Exhibit IV-17 breaks down the overall software products market by equipment platform for the period 1989 to 1994. INPUT forecasts that the growth of software products within the three size categories of equipment platform will change significantly over the next few years.

EXHIBIT IV-17



In 1989, INPUT estimated that some 60% of software products were on mainframes, 25% on minis, and only some 20% on PCs/workstations. By 1994, this pattern is expected to have changed radically, with only some 35% on mainframes, 30% on minis and 35% on PCs/workstations.

Exhibit IV-18 illustrates the breakdown of the software products market between equipment and independent vendors. In 1989, equipment vendors continued to dominate the market, controlling 61% of overall revenues. The principal reason for this was the strength of systems software for mainframes and minis within the overall market. However, with the PC/workstation segment growing fastest over the next few years, INPUT forecasts that by 1994, systems software will be less important.

EXHIBIT IV-18

Software Products Market Forecasts, 1989-1994 Western Europe

Subsector	Market Forecast ($ Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Equipment Vendors				
Systems	5,935	7,245	17	15,965
Applications	1,205	1,510	23	4,310
Subtotal	7,140	8,755	18	20,275
Independents				
Systems	1,315	1,635	18	3,715
Applications	3,105	3,870	23	10,810
Subtotal	4,420	5,505	21	14,525
Total Market				
Systems	7,250	8,880	17	19,680
Applications	4,310	5,380	23	15,120
Total	11,560	14,260	20	34,800

This will reduce the influence of equipment vendors in the market and will be a balancing force. It is the growing desire of equipment vendors to move more into owning, or at least benefiting from software and services revenues. As a result, INPUT sees that equipment vendors will still control 58% of the overall software products market in 1994.

The breakdown of the software products market by country is illustrated in Exhibit IV-19. In 1989, INPUT estimated that France was the largest country market, followed by West Germany. This is a reversal of the estimate made for 1988 in INPUT's review of the West European software and services market. The reason for this is that INPUT now sees that a far higher proportion of software in West Germany is sold as turnkey systems, rather than software products.

3. Market Dynamics

a. Application Software

Exhibit IV-18 illustrated that INPUT forecasts a significantly higher growth for application software products over the period 1989 to 1994, at 23% per annum on average, than for systems software at 17% per annum. The key reasons for this are:

- the much faster growth of PCs/workstations than minis and mainframes
- the trend towards standard rather than bespoke applications, as the cost of skilled programmers continues to rise
- the time saved in buying standard rather than custom solutions
- the availability of more and better standard applications, a trend driven by the increasing power of equipment platforms
- the movement within Western Europe for agreed international standards, allowing a more stable environment within which software developers can operate
- the trend towards graphical end-user interfaces, making it easier for software developed to sell new standard applications
- the increasing use of kernel software, allowing vendors to customize applications for different West European countries or end-user environments

The growing importance of the PC/workstation is a direct reflection of the continuing improvements being made in the power/performance of

EXHIBIT IV-19

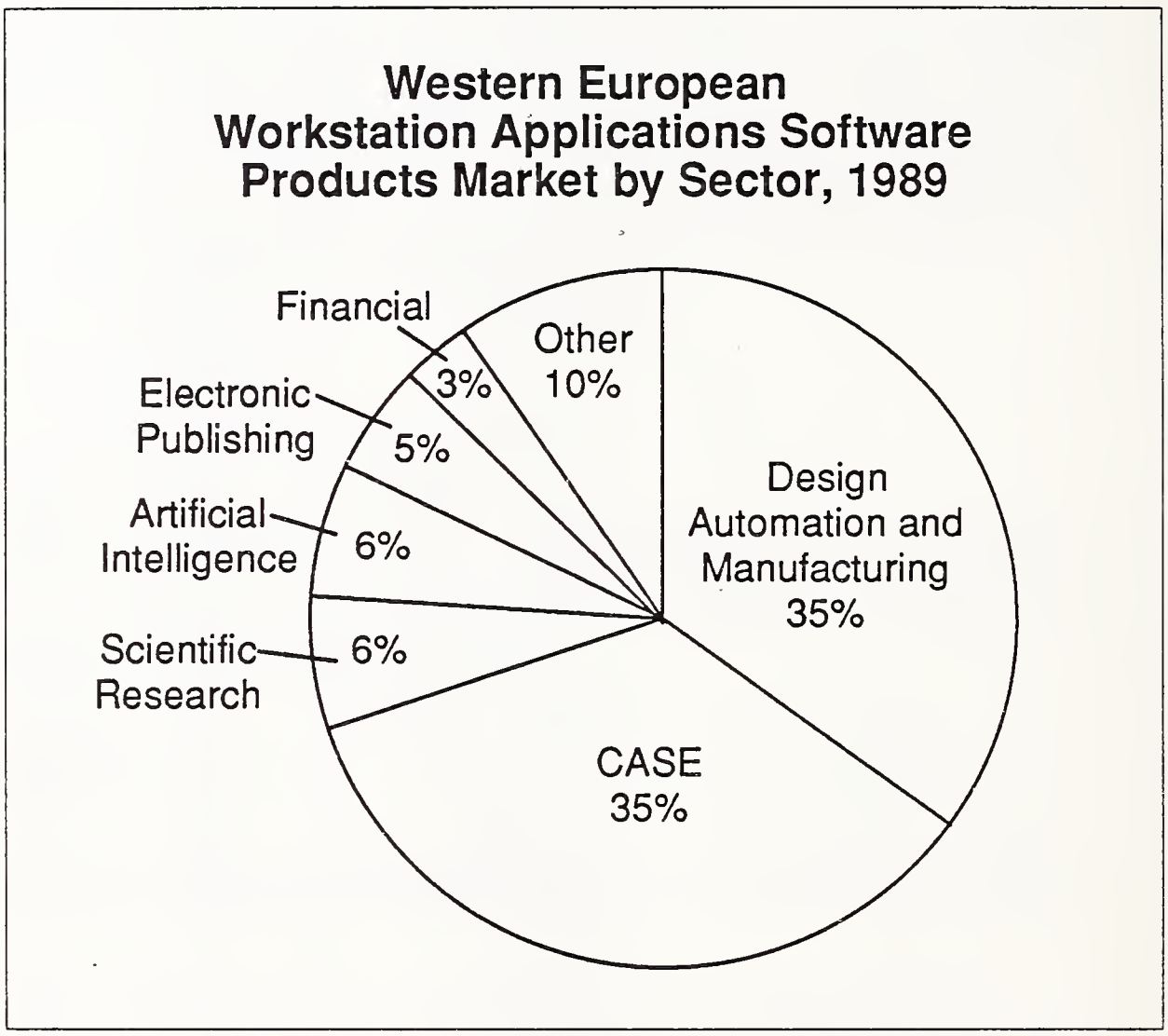
Software Products
Comparative Country Markets
Western Europe, 1989-1994

Country	Market Forecast ($ Millions)			
	1988	1989	1989-1994 CAGR (Percent)	1994
France	2,785	3,415	20	8,370
West Germany	2,145	2,630	19	6,150
United Kingdom	1,805	2,230	20	5,360
Italy	1,745	2,165	20	5,560
Sweden	345	430	20	1,080
Denmark	250	305	20	770
Norway	210	260	19	630
Finland	200	260	20	650
Netherlands	640	790	19	1,900
Belgium	370	460	19	1,100
Spain	355	445	22	1,200
Switzerland	385	480	19	1,090
Austria	205	245	18	570
Rest of Europe	120	145	21	370
Total	11,560	14,260	20	34,800

this type of equipment platform. The Intel 486 chip today allows equipment vendors to sell desktop PCs that are as powerful as minis were a few years ago. These machines can run on a variety of operating systems—MS/DOS, PS/2, or UNIX. End users have much greater flexibility and can choose between single tasking/single user environments under MS/DOS or multitasking/multiuser environments under UNIX.

Workstation applications were still predominantly highly specialised in 1989. Design applications and CASE accounted for some 70% of all applications software products according to INPUT's research, as is illustrated in Exhibit IV-20.

EXHIBIT IV-20



Software products for minicomputers and mainframes are and will continue to be dominated by systems software. As the movement to decentralised computing continues, through both LANs and WANs, these platforms will become central processors and retainers of data within a complex network of PCs and workstations. The end-user interfaces will be on these PCs and workstations, rather than on dumb terminals linked directly to the mini or mainframe.

During 1989, it was interesting to note that shipment of upgraded versions of well-known software products such as Lotus had delays, due to vendors' problems with the new demand for graphical end-user interfaces. There is a major shortage of skilled programmers and designers who can integrate existing, or build new applications in these environments today.

Potentially, these interfaces offer vendors major opportunities to make applications more user friendly, and hence more saleable. However, in the short run, the skill and experience shortages in this area are causing real problems.

b. Systems Software

The systems software market is undergoing radical changes due to a number of very important forces:

- growing end-user demand for UNIX as a future option, even if not required today
- the need for efficient and flexible network-controlling software for both LANs and WANs
- increasing use of CASE and other tools in an attempt to offset shortages of skilled programmers
- a move to relational data base management systems (DBMS)
- the start of the development of standard systems architectures, such as IBM's SAA

The growth of UNIX within Western Europe was estimated in 1989 by INPUT to be in the range of 40% to 60% per annum. The European Commission has been one of the major driving forces in pushing agreed international standards within Europe. In 1989, many EEC public tenders demanded a UNIX option, as did many important private sectors such as banking, finance and retail.

The demand for efficient LAN-to-LAN and LAN-to-WAN software continues to grow. Distributed computing is being driven by cheaper and more-powerful PCs. Network systems software has to be able to handle multiple operating systems environments at both the end-user and central computing sites, plus multiple network protocols.

CASE tools still have limitations in certain areas. These tools can be categorised as:

- development tools (I-CASE)
- maintenance tools

INPUT sees considerable opportunities for CASE tools in the 1990s.

IBM began to make moves into this area of software products during 1989 with its Application Development Cycle (AD/Cycle) standard.

4. Competitive Environment

The leading software products vendors in Western Europe in 1988 are listed in Exhibit IV-21.

EXHIBIT IV-21

Top Vendor Rankings and Market Shares, 1988 Software Products, Western Europe

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	IBM	18.2	2,100
2	Siemens	4.3	500
3	Bull	2.8	325
4	Unisys	2.3	260
5	Computer Associates	1.8	205
6	ICL	1.2	145
7	Digital	1.2	140
8	Software AG	1.1	125
9	Reuters	1.0	115
10	Steria	0.9	100
11=	Olivetti	0.8	90
11=	Oracle	0.8	90
13	SAP	0.7	85
14	EDV Ploenzke	0.6	65
15=	Concept	0.4	50
15=	CGI	0.4	50
15=	Philips	0.4	50
15=	Nixdorf	0.4	50
15=	SD-Scicon	0.4	50
20	Hewlett-Packard	0.4	45
	Others	59.9	6,920
	Total	100.0	11,560

IBM continues to dominate the market, with just under 20% of total West European software products revenues. Siemens, the largest European equipment vendor, was the second most important, with some 25% of the software products revenues of IBM.

U.S. and West German vendors were the two most important nationalities of software products vendors in 1988. Six of the top 30 software products vendors were U.S.-owned, accounting for some 25% of the total West European software products market. The five West German vendors in the top 30 accounted for only 7%.

In 1989, the chairman of IBM, John Akers, made a very important statement, that by 1995 35% of IBM's revenues will be from software and services. INPUT estimates that in 1989 only some 17% of IBM's West European revenues came from software and services. To double its involvement in software and services, whilst already being the market leader, must mean IBM will gain this growth through acquisition, rather than through indigenous expansion.

The start of this could be seen during 1989, with IBM taking minority shareholding in a number of strategic software products vendors. These ranged from major global software products vendors such as Computer Associates, to small specialist vendors like Bachman, KnowledgeWare and Index Technology, all operating in the area of CASE tools.

D

Professional Services

1. Market Overview and Structure

The professional services market is the largest sector of the computer services and software business in Europe. It accounted for about 30% of the total Western European market in 1989. It was valued by INPUT at over $15 billion, approximately $1 billion more than the software products sector.

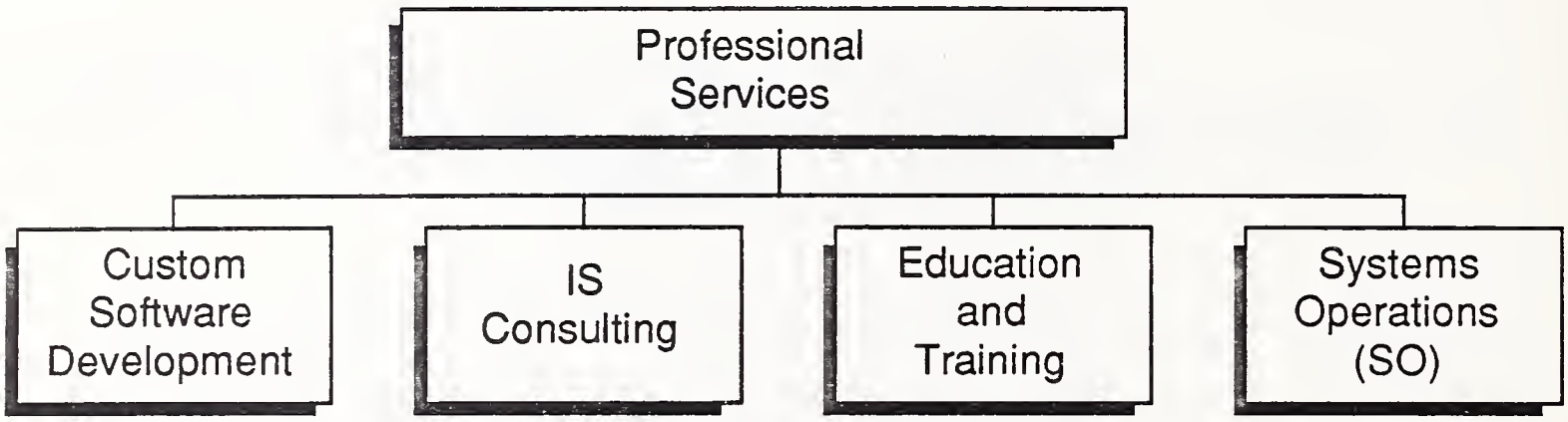
INPUT's schematic representation of the structure of the professional services sector by type of activity is given in Exhibit IV-22.

2. Market Size and Growth, 1989-1994

The total market for professional services in Western Europe is shown in Exhibit IV-23. It is estimated by INPUT to have reached $15.2 billion during 1989, having grown by 21% since 1988. INPUT estimates that a similar average rate of growth should be seen for professional services for the next five years, forecast at 20% per annum.

EXHIBIT IV-22

Professional Services Market Structure



Custom Software Development

- User Requirements Definition
- Systems Design
- Database Design
- Programming
- Testing
- System Modification
- Documentation
- Contract Staff

IS Consulting

- Software Installation Planning
- Information Systems Audit
- Security Audit
- Personnel Planning
- Policies and Procedures Development (Other Than Related to Software Development)
- Contractual Negotiation Advice
- IS Strategy

Education and Training

- Computer Operations Training
- Management Training
- Analyst/Programmer Training
- Systems Use Training
- Video Instruction (Related to Computer Topics)

Systems Operations (SO)

- User-Owned Equipment

As Exhibit IV-24 illustrates, the growth projection for IS consultancy is 22% per annum. Education and training is forecast at 21% per annum and systems operations at 24% per annum, but the weight of the custom software subsector gives an overall growth rate of approximately 20% per annum for the market sector.

EXHIBIT IV-23

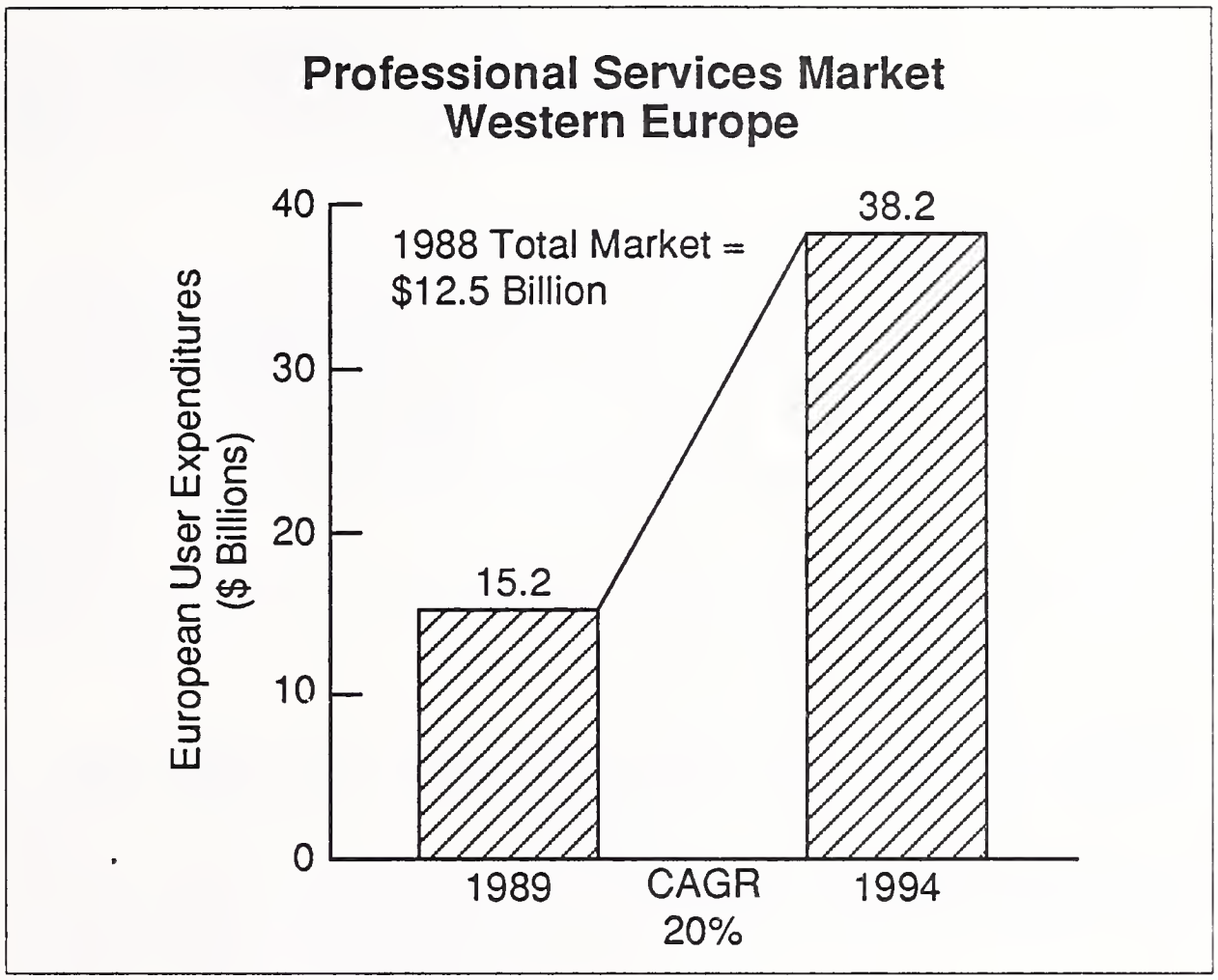


EXHIBIT IV-24

Professional Services Market Forecast, 1989-1994 Western Europe

Subsector	Market Forecast ($ Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
IS Consultancy	1,570	1,925	22	5,100
Custom Software Development	9,550	11,590	20	28,600
Education and Training	1,320	1,570	21	4,120
Systems Operations	110	145	24	430
Total	12,550	15,230	20	38,250

As well as difference in size, the various country markets have different projected growth rates for 1989 to 1994. As illustrated in Exhibit IV-25, country growth rates for this period vary between 17% and 23% per annum.

EXHIBIT IV-25

Professional Services
Comparative Country Markets
Western Europe, 1989-1994

Country	Market Forecast ($ Millions)			
	1988	1989	1989-1994 CAGR (Percent)	1994
France	3,760	4,590	21	11,920
West Germany	1,760	2,095	19	5,000
United Kingdom	2,330	2,870	20	7,130
Italy	1,455	1,790	21	4,640
Sweden	390	465	19	1,110
Denmark	250	305	20	750
Norway	210	250	17	550
Finland	210	255	20	640
Netherlands	850	1,000	19	2,380
Belgium	405	485	20	1,200
Spain	350	440	23	1,250
Switzerland	320	375	19	900
Austria	160	185	19	440
Rest of Europe	100	125	22	340
Total	12,550	15,230	20	38,250

3. Market Dynamics

There are a number of forces that are driving the continued growth of the professional services market:

- Companies are becoming more aware of the importance of effective computer systems in helping them to meet the demands of their own market. In many cases, it is no longer a departmental, but a boardroom issue. Although a great deal of the "competitive edge" and "critical mission" talk is discounted, in general the need for effective computer systems is now recognized by executives as important.

- Most companies with their own IS services functions are still suffering an acute people shortage that leads them to use external professional services.

- The shortage of people has been greatly exacerbated by the decentralisation of the in-house IS department, and the need to learn new skills.

- New equipment and software products and even new technologies are arriving in the market-place faster and faster, along with cheaper, more sophisticated versions of old products.

- As fast as systems are built, other systems require replacement, and new technology presents opportunities for new applications.

- In Europe, in particular, the impact of 1992 is generating a number of factors such as the liberalisation of telecommunications, pan-European research, the effort to create European standards, and mergers of companies with their associated systems problems, that are all creating additional opportunities in the professional services market.

INPUT's vendor and end-user research during 1989 has shown that the current and recent measures to improve quality, such as the methodologies, quality assurance and CASE tools, have so far been of limited success, since they tend to be too technically-oriented and do not sufficiently address users' real needs and the control of project risks.

Although the methodologies were conceived originally as end-user-oriented, and were a standard business approach to projects, they have since become too technical for the end user. While great efforts are being made to improve the quality of the computer system, the lack of understanding of the real business problem leaves a serious gap between the real needs and the stated requirements. This tendency in the search for new business (to commit to a project when the risks are still unnecessarily high) is a missed opportunity for the methodology to have solved a critical problem at the initial contract stage of the client-vendor relationship. This lack of business focus has reduced profitability and has been

exacerbated by the change in emphasis of client projects, which are now more open-ended and commercial, and less like the fixed administrative problems for which the methodologies were built.

CASE tools are an important step in the struggle to improve quality and productivity, but the required link to methodologies may exacerbate the quality problem, if the methodology is insufficiently client-oriented, and make it even less flexible than before. There is also a tendency to see tools as a solution, without realising that significant investment is necessary to improve the capability of the tool users.

Many vendors are widening their range in order to offer "one-stop shopping". This trend is both in response to the needs of the client, and in order to defend against competition. However, claims to offer "total solutions" have led to loss of quality as product-oriented companies grapple unsuccessfully with services and vice versa, and lack of experience leads to failure to deliver the "total solution" envisaged by the client.

The nature of quality assurance has been misunderstood, and it has been thrown in with standards as a kind of enforcer, rather than addressing some of the more critical management concerns such as risk management and the relationship with the client. The term quality assurance is now dying out, and it more common for people to refer to quality management systems as having less negative overtones.

The existence of a quality problem and the relative failure of measures adopted to solve it are clear evidence that the real skills shortage in professional services is one of management skills. In view of the recent rapid growth of many companies that are skills-dependent, this should not be surprising. The challenge to improve quality and develop management skills will become more critical as competition increases, and furthermore, it will become increasingly important to be able to meet these challenges in a multicultural environment.

It is extremely difficult, if not impossible, for any company that is totally dependent on people assets to grow in excess of the current industry average growth rates and still maintain the necessary high level of management quality. An improvement in the quality of project and client management would dramatically improve the skills shortage elsewhere. The impact of the Single European Act, and the impending need for cross-cultural management skills, makes this challenge even more significant.

4. Competitive Environment

The leading European professional services vendors for 1988 are presented in Exhibit IV-26, which shows that the market is very fragmented

in a pan-European context. Five of the top ten are equipment vendors. Cap Gemini Sogeti is the only independent professional services vendor that appears in the top ten in most European countries, and yet even it is outside the top twenty in the United Kingdom, which is the second largest professional services market in Western Europe. A company like Volmac, that obtains 90% of its revenues from the Netherlands (the fifth largest country market), can still get to third overall.

EXHIBIT IV-26

Top Vendor Rankings and Market Shares, 1988 Professional Services, Western Europe

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	IBM	5.3	660
2	Cap Gemini Sogeti	4.7	590
3	Volmac	2.0	245
4	Finsiel	1.8	225
5 =	Sema	1.8	220
5 =	Bull	1.8	220
7	Olivetti	1.6	200
8	Unisys	1.4	180
9 =	Digital	1.1	140
9 =	SD-Scicon	1.1	140
11	ICL	1.0	130
12	CISI	0.9	120
13	Andersen	0.8	105
14	CIG-Intersys	0.7	90
15	CMG	0.7	85
16	Siemens	0.6	80
17 =	CGI	0.6	75
17 =	Logica	0.6	75
19 =	Sligos	0.6	70
19 =	CSC	0.6	70
	Others	70.3	8,830
	Total	100.0	12,550

The strength of equipment vendors is despite the fact that custom software is the most important software delivery mode in Europe. However, it is expected that as the Single European Act takes effect, the relative importance of the custom market will slowly decrease. More opportunities will arise for pan-European applications packages, with a corresponding increase in software products and turnkey.

Here again, the effect will be different in different countries. The relative importance of professional services varies in each country, as is shown in Exhibit IV-27. On average in Western Europe, professional services accounts for just under 30% of total computer software and services revenues, but this varies from less than 23% in Norway and West Germany to more than 37% in France and the Netherlands.

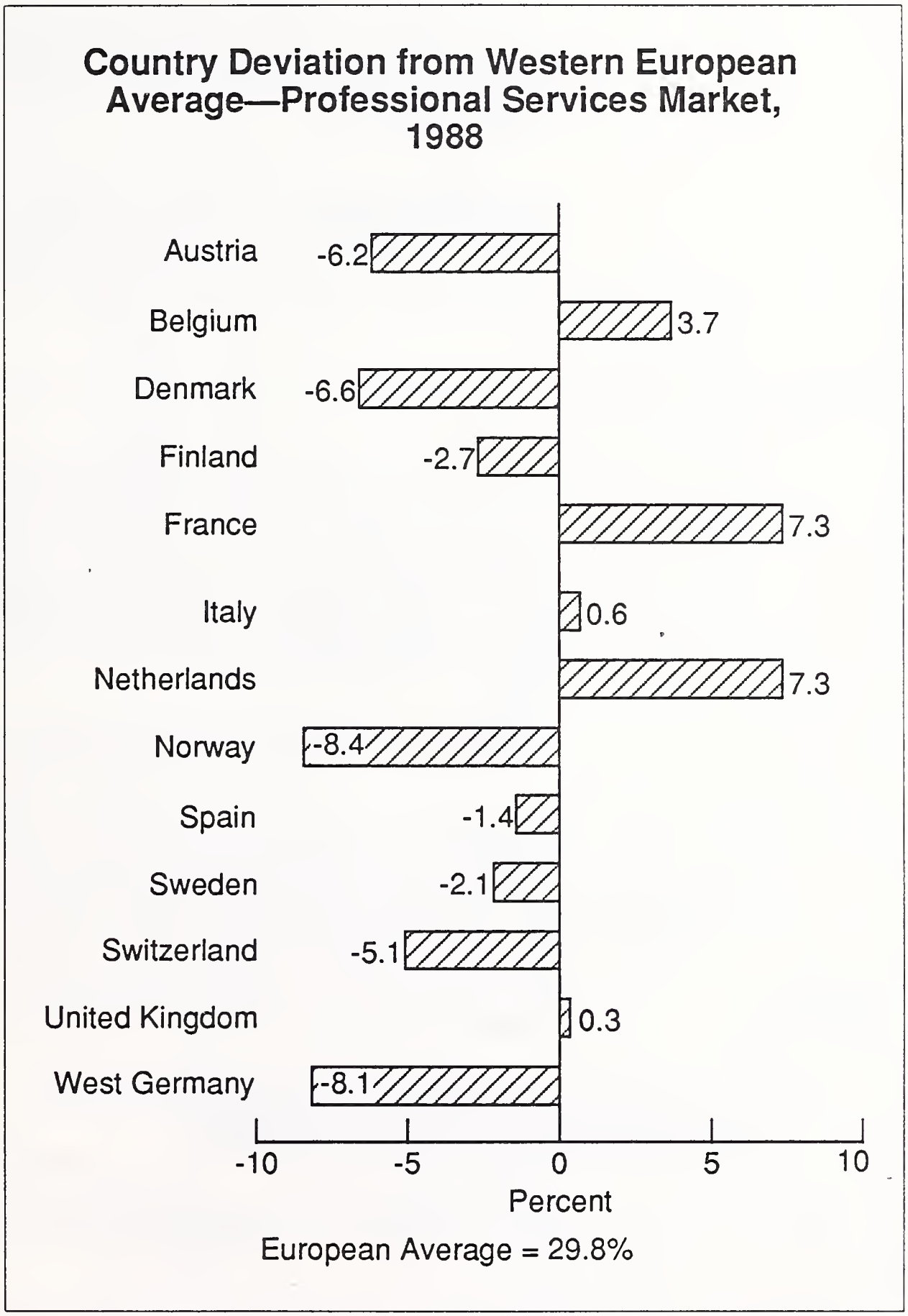
In professional services, in addition to the normal industrial mergers to increase size and financial resources (e.g. Ernst Whinney and Arthur Young), there are two kinds of consolidation taking place that will make this market progressively more competitive. These are the cross-competence moves to provide a more comprehensive service to clients, and the cross-border moves to provide a geographically wider service to clients. It will be necessary for many vendors to expand services, not only to meet the needs of clients, but also to defend against competitors who are diversifying.

Cap Gemini Sogeti has provided a good example of the cross-border move. More recent examples are PA's acquisitions in Northern Europe, Hoskyns Group's acquisition of Programm-Standard, and the creation of the Sema group. This activity is likely to continue and to increase over the next five years.

Although less obvious, of greater significance are the moves to provide more comprehensive services, by companies who are already multinational. The equipment suppliers are making significant efforts to enter this market, and multinational management consultants are also moving into systems development. However, although the needs of the client encourage these trends, they are not easy to put into effect. IBM's strategy, acquiring shares in small software and services companies, is in recognition of this fact. Based upon past performance, it is highly probable that many mergers will fail to achieve the desired results. Experience has shown that in markets experiencing dynamic change, for example after deregulation, those companies that are clearly focussed do better than companies that are only concerned with establishing a presence.

IBM's strategy of minor share participation is low-cost and lower risk than acquisition. In professional services, there is always the risk that after a takeover, a mass exit of people will leave behind an empty shell.

EXHIBIT IV-27



As a lower-risk alternative to fusion, there is also evidence (of a confidential nature from our vendor research) of many informal alliances at both ends of the market. Larger companies, which are sometimes competing with each other, are willing to form temporary alliances or consortia in order to win big systems integration contracts. This is a relatively

new phenomenon which can be expected to continue and increase. At the lower end of the market also, small specialist companies are "hunting in packs" in order to maximise their smaller marketing and sales and technical resources.

Notwithstanding the difficulties, as the forecast shows, the opportunities for vendors in the 1990s are quite significant, and companies that can achieve the right balance between the flexibility of independent partnership, and the coherence of central management will, in INPUT's opinion, undoubtedly reap significant benefits.

E

Systems Integration

1. Market Overview and Structure

One of the difficulties of analysing systems integration as a market is that it can mean different things to different companies. Many services vendors recognize systems integration as a major opportunity, and some consider it to be the most important issue in the industry. Others consider it to be just a new title for something that has been going on for years. For the purpose of clarification, the INPUT definition of systems integration is given here.

- Systems integration is the provision of an integrated solution to a multidisciplinary information systems requirement

Systems integration projects are large, generally over $1 million. Vendors in this market provide a total solution of equipment, software and consultancy. Software is primarily bespoke, although some software products will generally be included. Projects have generally been limited to a specific country. Increasingly there is demand for international systems integration services within Europe, especially as the EEC moves towards a single open market in the 1990s.

2. Market Size and Growth, 1989-1994

Exhibit IV-28 shows INPUT's overall assessment of the size and growth of the systems integration sector over the period 1989 to 1994. Overall growth is assessed at a compound annual rate of 26%, to achieve a market in excess of $6 billion by 1994.

The overall Western European market for systems integration can be split into three broad constituent parts: commercial, central government, and defense. Exhibit IV-29 shows the analysis of these three segments for 1989 and 1994. INPUT is anticipating much higher growth in the commercial segment than in the other two segments.

EXHIBIT IV-28

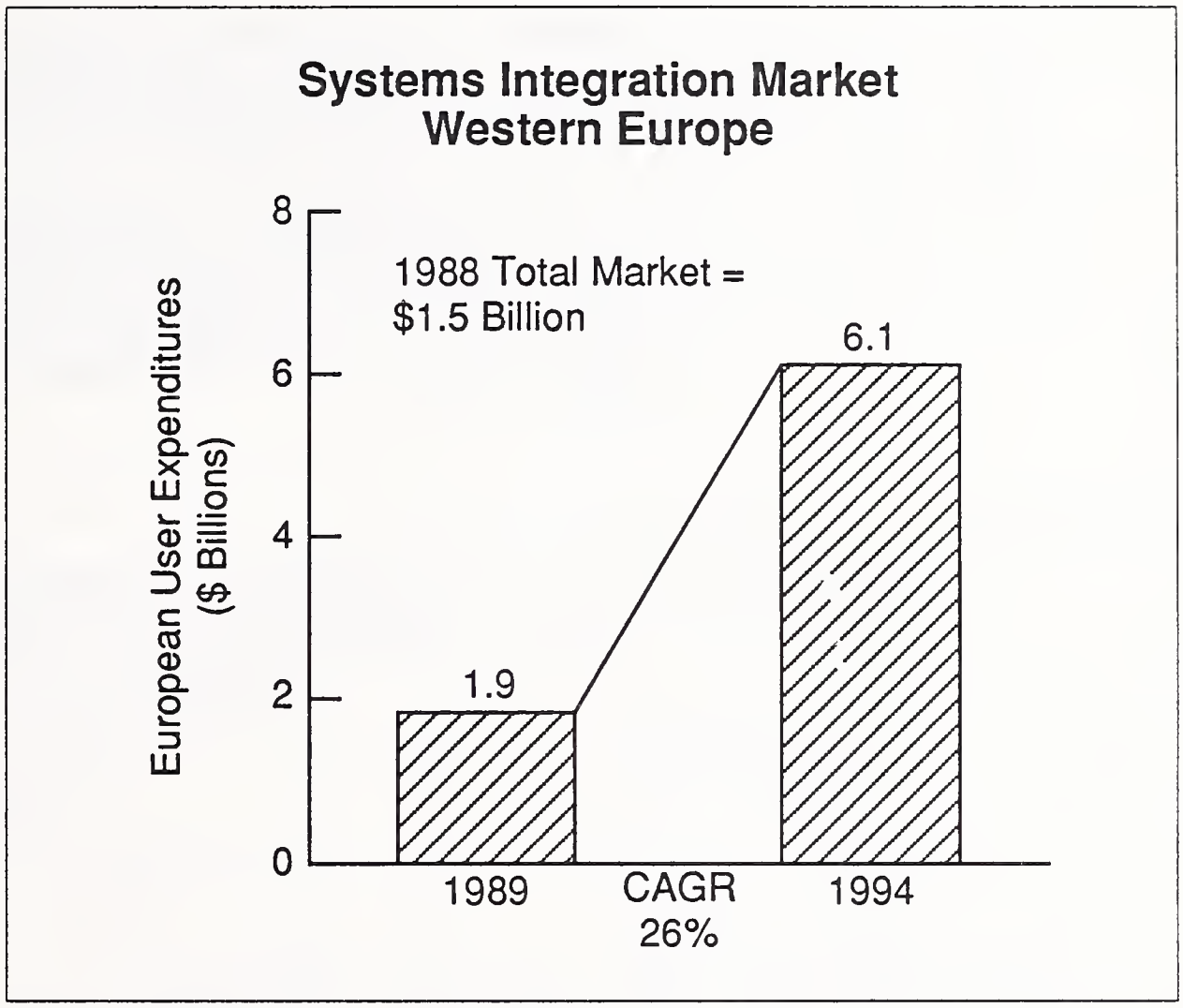
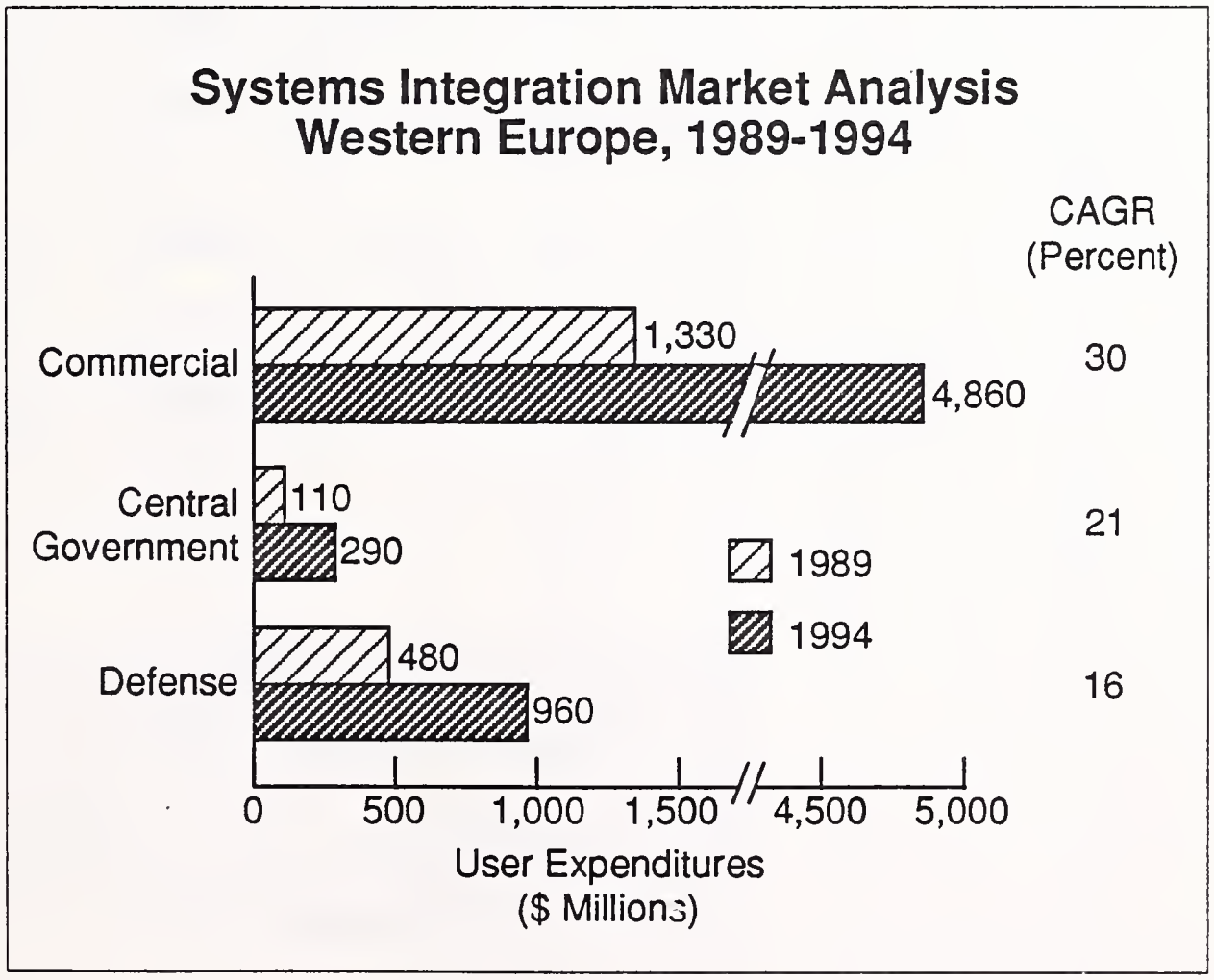


EXHIBIT IV-29



The forecast for Western European systems integration is shown differently in two further exhibits, by principal subsector in Exhibit IV-30, and by country in Exhibit IV-31, for the period 1989 to 1994.

It can be seen from Exhibit IV-30 that equipment and professional services are the dominant subsectors of this market, but it is important to recognize that individual systems integration projects will not necessarily reflect this balance of expenditure. Systems integration projects are complex by definition, and the types of expenditure vary greatly from one project to the next.

EXHIBIT IV-30

Systems Integration
Market Forecast, 1989-1994
Western Europe

Subsector	Market Forecast ($ Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
System Equipment	655	785	21	2,020
Professional Services	730	960	30	3,600
Software Products	90	115	26	365
Other Services	45	60	17	125
Total	1,520	1,920	26	6,110

As systems increase in complexity and equipment prices continue to fall, it is expected that the software element of this market will grow faster than the equipment element. Despite more companies developing their capabilities to incorporate kernels into software, the need for greater applications and project management expertise to incorporate those kernels will continue to drive the growth of the professional services element of systems integration.

The different country markets are shown in Exhibit IV-31, which illustrates the relative importance of the United Kingdom in this market. The United Kingdom is the third largest software and services market in Western Europe, but the largest country market for systems integration. Efforts by the United Kingdom Government to externalise services in government has assisted this development, and it is possible that the European Economic Community's emphasis on the liberalisation of public procurement as a result of the Single European Act will extend this driving force to other countries in Europe.

EXHIBIT IV-31

Systems Integration Comparative Country Markets Western Europe, 1989-1994

Country	Market Forecast ($ Millions)			
	1988	1989	1989-1994 CAGR (Percent)	1994
France	330	410	28	1,400
West Germany	355	455	26	1,450
United Kingdom	415	525	24	1,560
Italy	140	170	28	590
Sweden	30	35	27	120
Denmark	20	25	24	70
Norway	15	20	20	50
Finland	10	15	28	40
Netherlands	60	75	24	230
Belgium	50	60	24	180
Spain	40	55	27	180
Switzerland	30	40	28	130
Austria	15	20	26	60
Rest of Europe	10	15	24	50
Total	1,520	1,920	26	6,110

3. Market Dynamics

The desire to take advantage of the benefits of technology while not having the resources to do it is certainly not new, but there are aspects to the current situation that are making systems more complex, and therefore makes systems integration an important opportunity.

- Systems projects tend now to incorporate several technologies at once, hence greater complexity and the need for integration.
- Greater complexity is also due to the fact that systems are becoming more distributed.
- More volatile business conditions mean projects are often more time-critical.
- Standard finance and control applications are already computerised, and new systems are breaking new ground and taking greater risks.
- Globalisation of markets and the companies operating within them creates a greater need for projects of an "integrating" nature, and makes projects bigger. This is accentuated in the EEC by the Single European Act.

Systems integration is clearly an opportunity for larger, more established companies to differentiate themselves from smaller ones as prime contractors. Indeed, it is believed that as the systems integration market grows, it will act as another force to polarise the industry into large suppliers, and smaller niche suppliers. This opportunity for larger companies to build an image is especially important in the more fragmented markets, such as in West Germany.

At the same time, although potentially attractive, it must be recognized that systems integration is also high-risk. It has been suggested by some vendors that companies are moving into the systems integration market that do not have the requisite skills. These skills will have to be acquired, and although it is possible to buy into a market in order to gain a presence, with large complex projects, this is a very dangerous strategy.

It is believed that systems integration will accelerate the restructuring process taking place in the industry. This will be a result of company failures, and also of the need of large companies to absorb smaller, specialist companies. Since the risk of large contracts cannot be absorbed easily by small companies, some companies will get into serious trouble in big projects with a high software content. This is perceived as an opportunity for serious professional companies who are quality-conscious and who have the necessary management skills. The potentially lucrative nature of systems integration will force large companies

without all the requisite skills to obtain those additional skills by acquisitions of smaller ones.

The systems integration market has further implications for the skills shortage: bigger, more complex projects imply a premium for project management skills, but in Europe, more international projects would also imply the need for a new breed of project manager who can manage multidisciplinary multicultural projects, and a new breed of line manager who can negotiate and assimilate these projects.

4. Competitive Environment

Exhibit IV-32 shows a listing of the top ten ranked vendors in the systems integration market sector. Equipment vendors are strongly represented, and for many, the systems integration sector is an important part of a strategic move into services.

EXHIBIT IV-32

Top Vendor Rankings and Market Shares, 1988
Systems Integration, Western Europe

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	IBM	12.5	190
2	Cap Gemini Sogeti	11.8	180
3	Andersen	10.2	155
4	SD-Scicon	5.6	85
5	Sema	5.3	80
6 =	Logica	4.3	65
6 =	Siemens	4.3	65
8	Unisys	3.6	55
9	Olivetti	2.9	45
10	Bull	2.3	35
	Others	37.2	565
	Total	100.0	1,520

In examining revenues in a pan-European context, it is important to recognize that since equipment vendors tend to have a more established international network than professional services companies, their revenues tend to be a sum of more, but smaller parts. However, there are a number of professional services companies using their project management and software skills in systems integration as part of the move to create pan-European services companies.

Andersen Consulting has significantly improved its share of the systems integration sector, from 7% in 1987 revenues to 10% in 1988 revenues. Andersen Consulting, Cap Gemini Sogeti, SD-Scicon, and Sema Group represent the emerging pan-European professional services element of this market.

The move into services is evident in other related areas, such as the software products sector with companies such as Oracle, and with other equipment vendors such as telecommunications equipment companies. Systems integration can be an important part of a move into services and with planning and management being the key skills, many companies with related technological or applications knowledge will see systems integration as an important opportunity.

F

Turnkey Systems

1. Market Overview and Structure

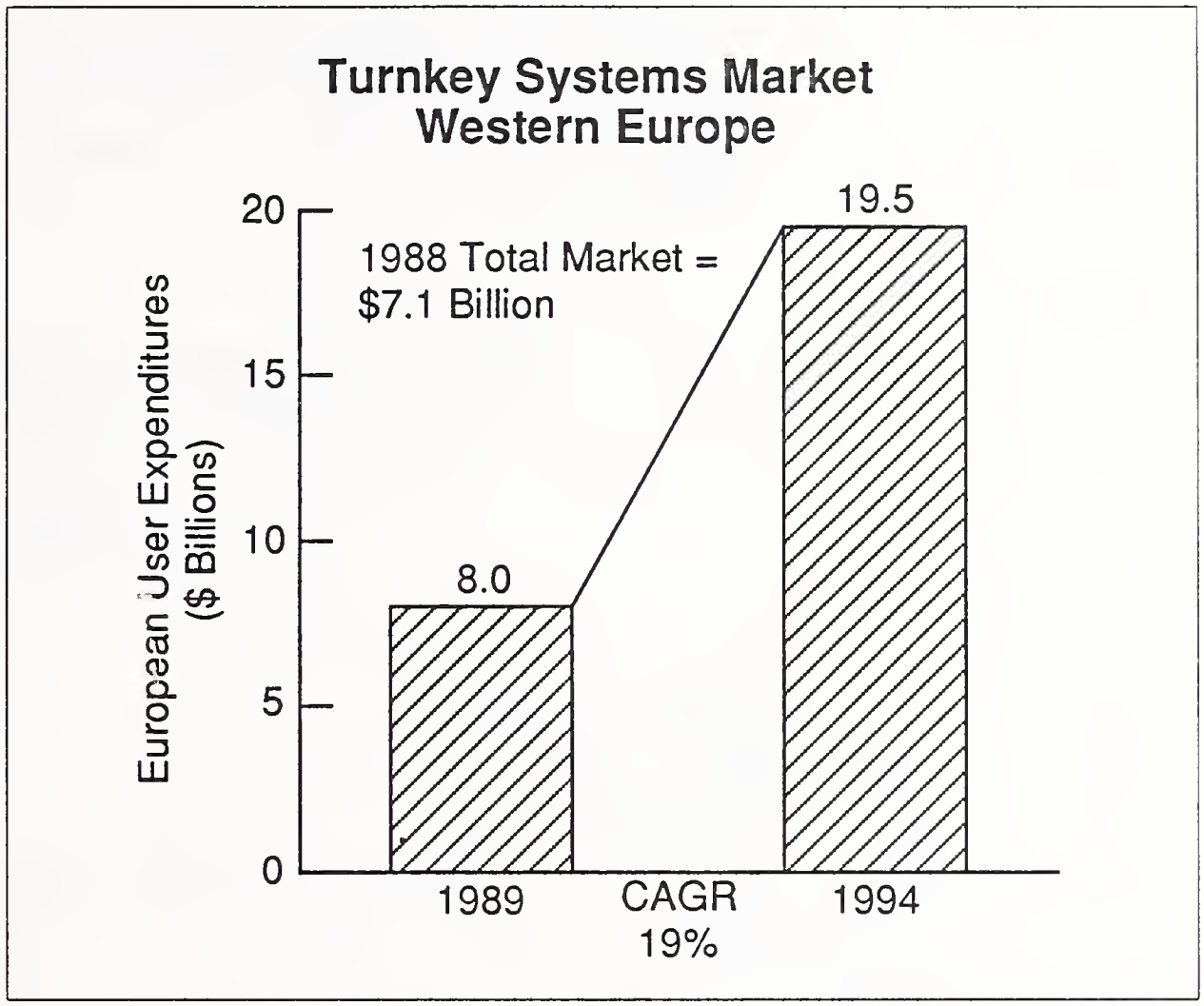
The turnkey market was valued at $7.1 billion for West Europe in 1988, and is forecast to grow to $8.0 billion in 1989, a 13% growth rate. As Exhibit IV-33 illustrates, INPUT forecasts that this market sector should grow on average at 19% per annum over the period 1989 to 1994, to reach $19.5 billion in 1994.

In 1989, INPUT estimates, the turnkey systems sector represented 16% of the overall West European software and services market. This can be compared with the U.S., where INPUT values this sector at 12% of the total U.S. software and services market. The forecast average growth rate for West Europe for the period 1989 to 1994 of 19% per annum can be compared with an estimated 9% per annum for the same period for the U.S. turnkey systems market.

"Total solutions" has become one of the in phrases in the industry. Many vendors state that they provide total solutions. Where vendors sell a complete package of equipment and standard software, plus customization if required, and support the complete system themselves, such total solutions are defined by INPUT as turnkey systems.

Equipment vendors are increasingly packaging up application software on their equipment platforms and selling the resulting turnkey systems via their sales force. Similarly, when independent vendors take title to

EXHIBIT IV-33



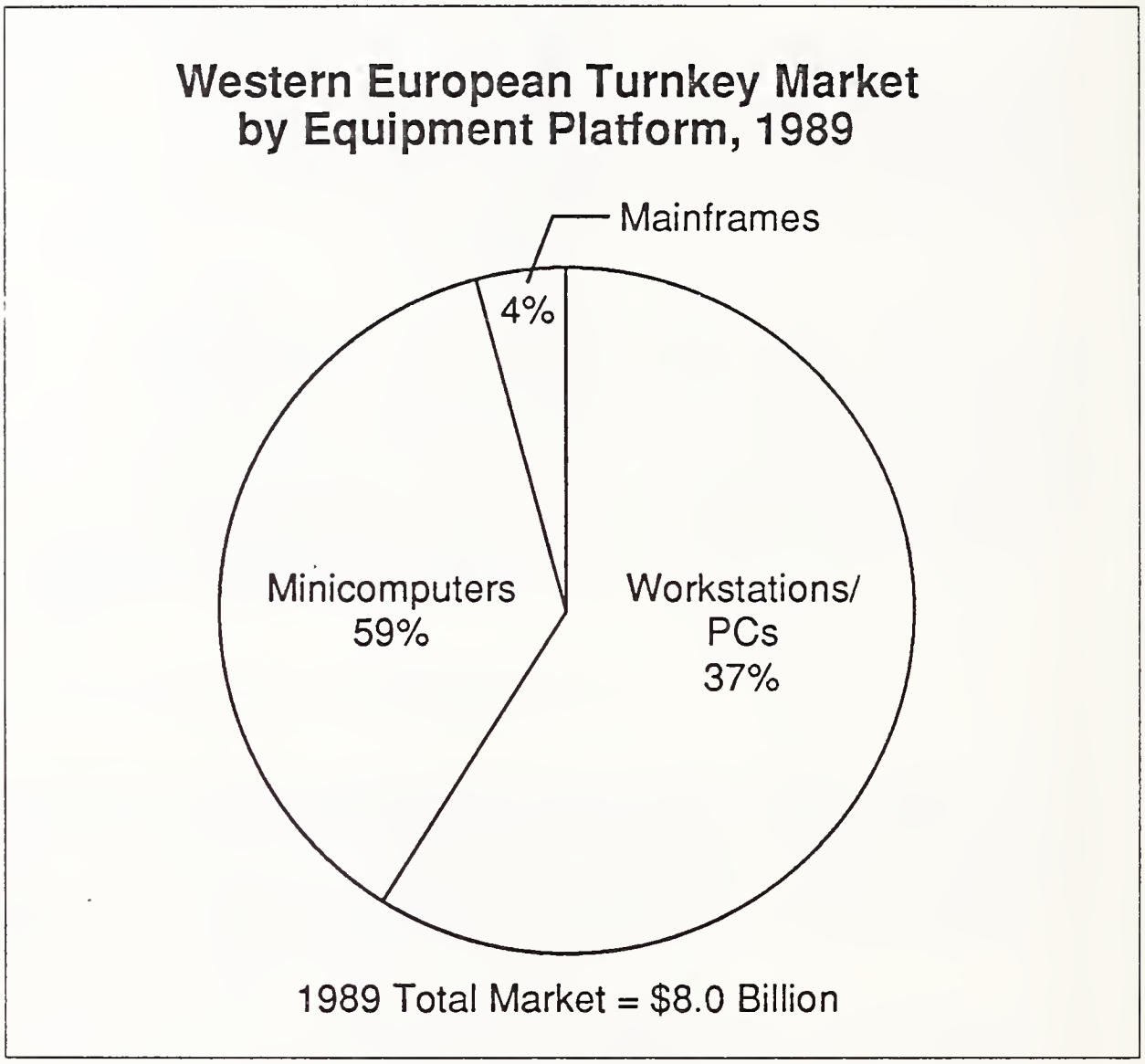
the equipment, sell and support a comparable package of equipment, standard software and related professional services, they are defined as turnkey vendors. However, many independent vendors selling such total solutions on midrange equipment platforms do not take title to the equipment. They work in conjunction with one or more equipment vendors, leaving it to the equipment vendor to contract, deliver and support the equipment. In these cases, INPUT does not define such sales as turnkey systems, but as component sales of software products and related professional services.

During 1989, INPUT ascertained that many markets around Europe call such component sales turnkey systems. As a result, INPUT has had to undertake a major revision of its turnkey systems forecasts for Western Europe on a country-by-country basis.

Traditionally, turnkey systems were sold on minicomputers. With the development of PCs during the 1980s, many small business turnkey systems have been developed on PC platforms. As the power of the PC continues to increase, INPUT sees that the PC will gradually become the most important equipment platform for turnkey systems. This trend can certainly be seen with the introduction of the new Intel 486 microprocessor which gives a desktop PC the power of the minicomputers of a few years ago.

As Exhibit IV-34 illustrates, in 1989 the most important equipment platform for West European turnkey systems was the minicomputer, accounting for nearly 60% of market revenues. PCs and workstations accounted for just over 35%, and mainframes had some 5% of the market.

EXHIBIT IV-34



Turnkey systems do not have the same appeal throughout Europe. In the Mediterranean countries, end users tend to prefer bespoke systems, rather than standard applications packaged up as turnkey systems. With the cost of turnkey systems significantly less than equivalent bespoke systems, INPUT sees that this attitude will gradually change during the 1990s as these areas of Europe gain exposure to foreign vendors.

Turnkey systems are sold in virtually every industrial market sector, from health care systems to CAD/CAM packages to motor trader systems. They can be broadly categorised as:

- cross-industry systems (CAD/CAM, office systems, desktop publishing)

- small- to medium-sized business systems (accounting, marketing, payroll, general manufacturing)
- specialist vertical or niche market systems (health care, banking, engineering, CIM, accountants and dentists systems)

2. Market Size and Growth, 1989-1994

Exhibits IV-35 and IV-36 summarise INPUT's market forecasts for the turnkey sector. Exhibit IV-35 shows the overall breakdown for the West European turnkey market and illustrates how INPUT sees that the value of equipment will decline in typical turnkey systems, from 55% in 1989 to 45% in 1994.

EXHIBIT IV-35

Turnkey Systems
Market Forecast, 1989-1994
Western Europe

Subsector	Market Forecast ($ Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
System Equipment	4,030	4,415	15	8,780
Software and Other Charges	3,030	3,615	24	10,720
Total	7,060	8,030	19	19,500

Exhibit IV-36 provides a comparative country market analysis in U.S. dollars. The West German market is the largest country market for turnkey systems in Western Europe, accounting for some 30% of the total in 1989. The three leading country markets—West Germany, France and the U.K.—accounted for 67% of the total Western European turnkey market in 1989.

EXHIBIT IV-36

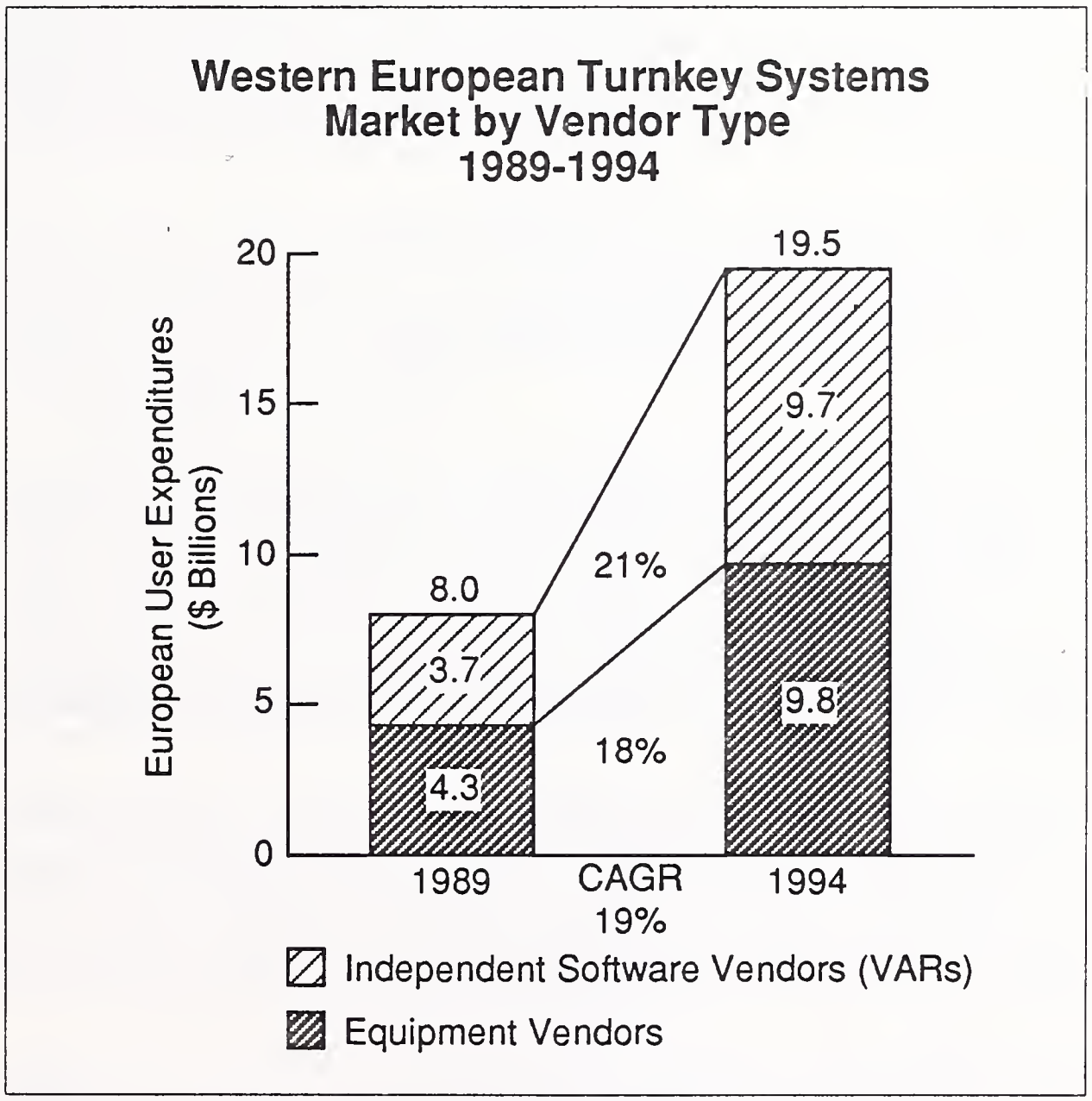
Turnkey Systems
Comparative Country Markets
Western Europe, 1989-1994

Country	Market Forecast ($ Millions)			
	1988	1989	1989-1994 CAGR (Percent)	1994
France	1,070	1,245	20	3,060
West Germany	2,150	2,405	18	5,580
United Kingdom	1,555	1,760	20	4,330
Italy	450	520	19	1,250
Sweden	225	255	21	640
Denmark	165	190	21	480
Norway	125	145	21	370
Finland	120	140	20	350
Netherlands	285	320	20	790
Belgium	140	160	20	410
Spain	245	280	20	710
Switzerland	305	345	20	860
Austria	145	165	20	420
Rest of Europe	80	100	20	250
Total	7,060	8,030	19	19,500

INPUT sees that on average the Western European turnkey market will grow by 19% per annum over the period 1989 to 1994. However, this average growth rate hides very different growth patterns for equipment vendors and independent vendors who sell turnkey systems.

INPUT estimates that equipment vendors accounted for some 54% of the total turnkey market in 1989, as Exhibit IV-37 illustrates. Currently, equipment vendors' sales of turnkey systems are only growing at some 10% to 15% per annum, compared with independent vendors, whose sales are growing at 20% to 30%.

EXHIBIT IV-37



The reason for this major difference is that equipment vendors have either been adversely affected by the forced move to port their application portfolios to UNIX, or by saturation in certain turnkey markets that they have targeted, such as CAD/CAM. Independent vendors have in general not been affected by such factors, and those that have quickly

moved to UNIX are enjoying high growth rates in the region of 40% per annum and above.

INPUT does not predict that the low growth of equipment vendor sales will continue. These vendors are now porting, or have ported their applications to UNIX. They are also looking closely at new turnkey markets into which they can move in the 1990s. The independent vendors will not be able to sustain very high growth rates for long. In addition, INPUT believes that many of the more successful independents may well be acquired by equipment vendors.

Overall, INPUT forecasts that equipment vendor sales will grow by 18% per annum on average over the period 1989 to 1994, and independent vendors by 21% per annum. The net result is that by 1994, equipment vendors should only control 50% of the total market, compared with 53% in 1989.

3. Market Dynamics

The turnkey market will be affected by a number a very significant forces in the 1990s:

- reduced equipment prices and margins
- the growing power of the PC as a competing equipment platform to minicomputers for turnkey systems
- UNIX and the drive in Western Europe towards open systems
- the Single European Act and the gradual evolution of pan-European markets for specific industrial sectors during the 1990s

Decreasing equipment prices means that, in the period 1989 to 1994, the software and services proportion of turnkey systems will become, for the first time, more important than the value of the equipment. As a result, equipment vendors are looking more to moving into software and services, and in particular selling turnkey systems themselves in direct competition with independent vendors.

Equipment vendors can develop turnkey application software themselves. However, it is quite common for them to license in the software from an independent and sell it under their name as their own turnkey system.

The increasing power of the PC means that more turnkey systems can be packaged up on PC platforms rather than on minicomputers. Apart from shifting the important of the equipment platform for turnkey systems towards the PC, this trend has is likely to effect radically the way independents sell their standard application software.

The main reason that so many independent vendors do not sell their standard applications as turnkey systems in the midrange equipment market is that both IBM and Digital, the leading minicomputer vendors in Western Europe, prefer to retain control over the title to their equipment. Independents working as value-added resellers (VARs) with these companies generally sell their total solutions via the component marketing channel, rather than as turnkey systems. Through this strategy, IBM and Digital retain control not only over the equipment sale, but also over the end user. The companies themselves, not the VARs, install and support the equipment with the end user.

In the PC market, equipment vendors have to rely heavily on third-party sales channels. The strength of MS-DOS in this market has created a layer between the equipment sale and the application sale. Equipment vendors therefore cannot control their VARs in the PC market in the way that they still can in the minicomputer market.

Independent vendors have far more freedom in how they sell their applications in the PC market and which equipment to package into their total solution. Therefore turnkey is the predominant marketing channel for independents in the PC market, as opposed to the component channel as it is in the minicomputer market.

As PCs continue to take over from minicomputers in this market, independents will become freer from the control of specific powerful equipment vendors. The likelihood is that they will elect to sell their applications as turnkey systems, when they are free to make the choice. As a result, equipment vendors will increasingly see that they are losing control over end users. INPUT believes that this will be another factor driving equipment vendors into selling turnkey systems themselves, so as to retain this control.

UNIX has become a Europe-wide movement today. Just as MS-DOS has created a layering between equipment and application software in the PC market, so UNIX will do in the minicomputer market. For equipment vendors, this will again lead to loss of control over end users and will be another force pushing them to sell turnkey systems rather than use VARs.

The effect of the Single European Act on the turnkey market will be to gradually open up specific vertical or niche markets and make them more pan-European. For the turnkey vendor, this will lead to greater opportunities to sell standard solutions to wider markets.

Many vendors, both independent and equipment, are looking closely at the likely impact of the Single European Act on specific industrial sectors and on their related software and services markets. There will be considerable competition in those markets positively affected by the Single European Act legislation. The larger independents will seek to take over those national independent vendors currently specialising in these areas.

Equipment vendors will look at either entering these turnkey markets themselves, or at ways to control the key VARs operating in them.

4. Competitive Environment

Exhibit IV-38 shows the ranking of the top turnkey vendors in Western Europe in 1988. CAD/CAM vendors such as Prime, McDonnell Douglas, Intergraph, and IBM all continue to occupy important positions in this market.

Of the top ten vendors, three are West German equipment vendors: Nixdorf, Mannesmann Kienzle and Siemens; and two are Scandinavian equipment vendors: Nokia Data and Norsk Data. Out of these, four use turnkey systems as their prime delivery mode—Nixdorf, Mannesmann Kienzle, Nokia Data and Norsk Data. All major equipment vendors have some turnkey systems within their portfolios of market offerings. For most, turnkey systems are a relatively minor delivery mode.

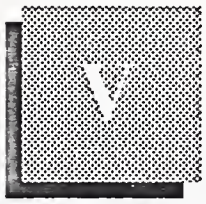
EXHIBIT IV-38

Top Vendor Rankings and Market Shares, 1988 Turnkey Systems, Western Europe

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	Nixdorf	14.0	985
2	Prime	6.7	475
3	Mannesmann Kienzle	4.8	340
4	McDonnell Douglas	4.0	280
5	Intergraph	3.0	210
6	IBM	2.3	165
7	Unisys	2.0	145
8	Nokia Data	1.6	110
9	Norsk Data	1.5	105
10	Siemens	1.3	95
	Others	58.8	4,150
	Total	100.0	7,060

V

Country Market Analysis



Country Market Analysis

Exhibit V-1 gives a breakdown of the Western European market by individual country markets. The largest country market is France, accounting for some 24% of the overall Western European software and services market in 1989. The software and services markets of the four major European economies—West Germany, France, the U.K. and Italy—accounted for 73% of the total market in 1989.

A

France—Market Commentary

1. Introduction

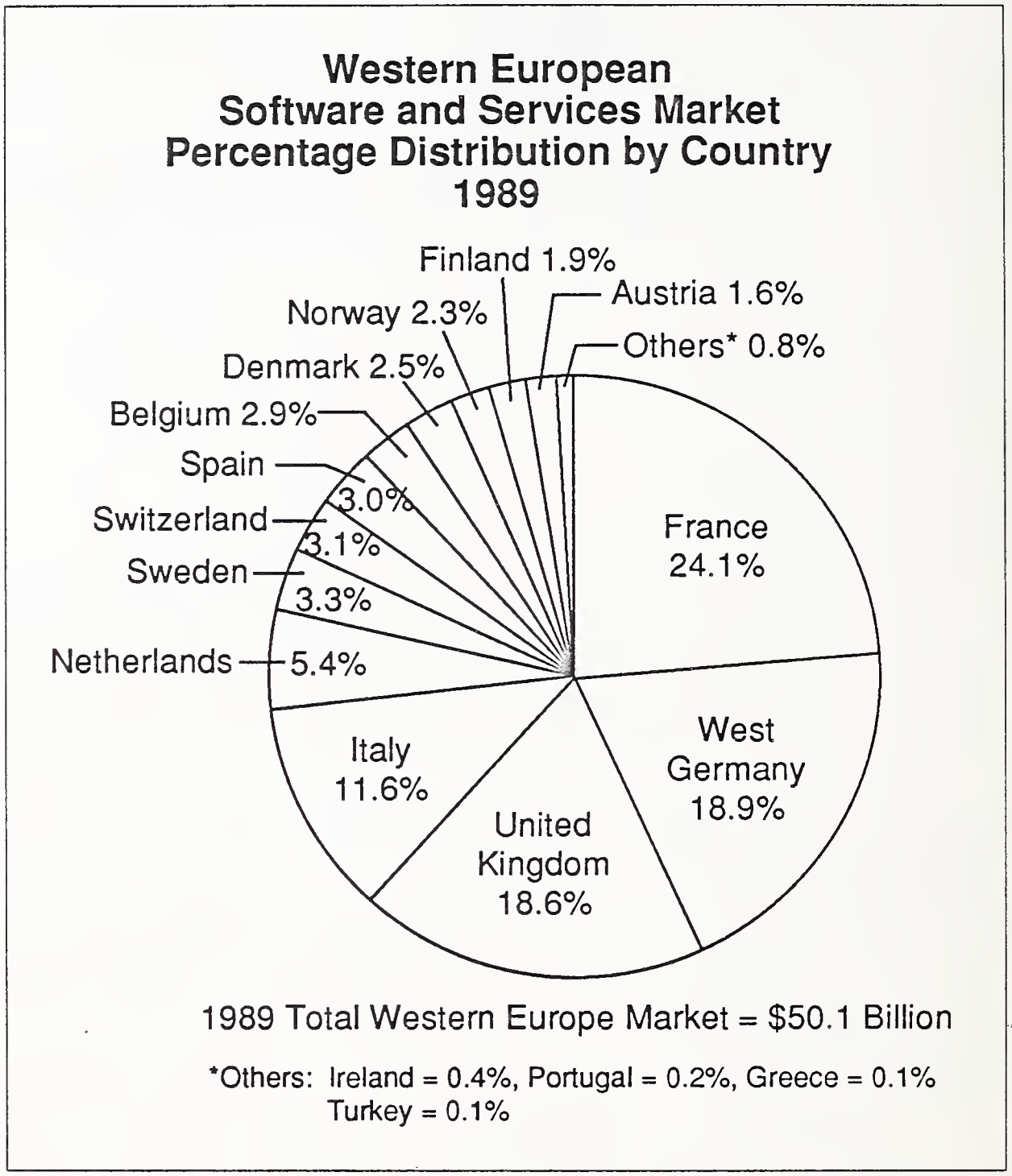
France has a population of 56 million and is a founding member of the EEC. Its software and services market is the largest in Europe—in 1988 it was FF66.4 billion ($10.1 billion).

Exhibit V-2 illustrates the growth of the French software and services market over the past ten years. In the first half of the 1980s, the annual growth rate was around 30%, but in the second half of the decade it settled back to around 20% per annum. The average compound growth rate over the period 1989 to 1994 is estimated to be 19% per annum, the same as that for the European market as a whole.

2. Economic Environment

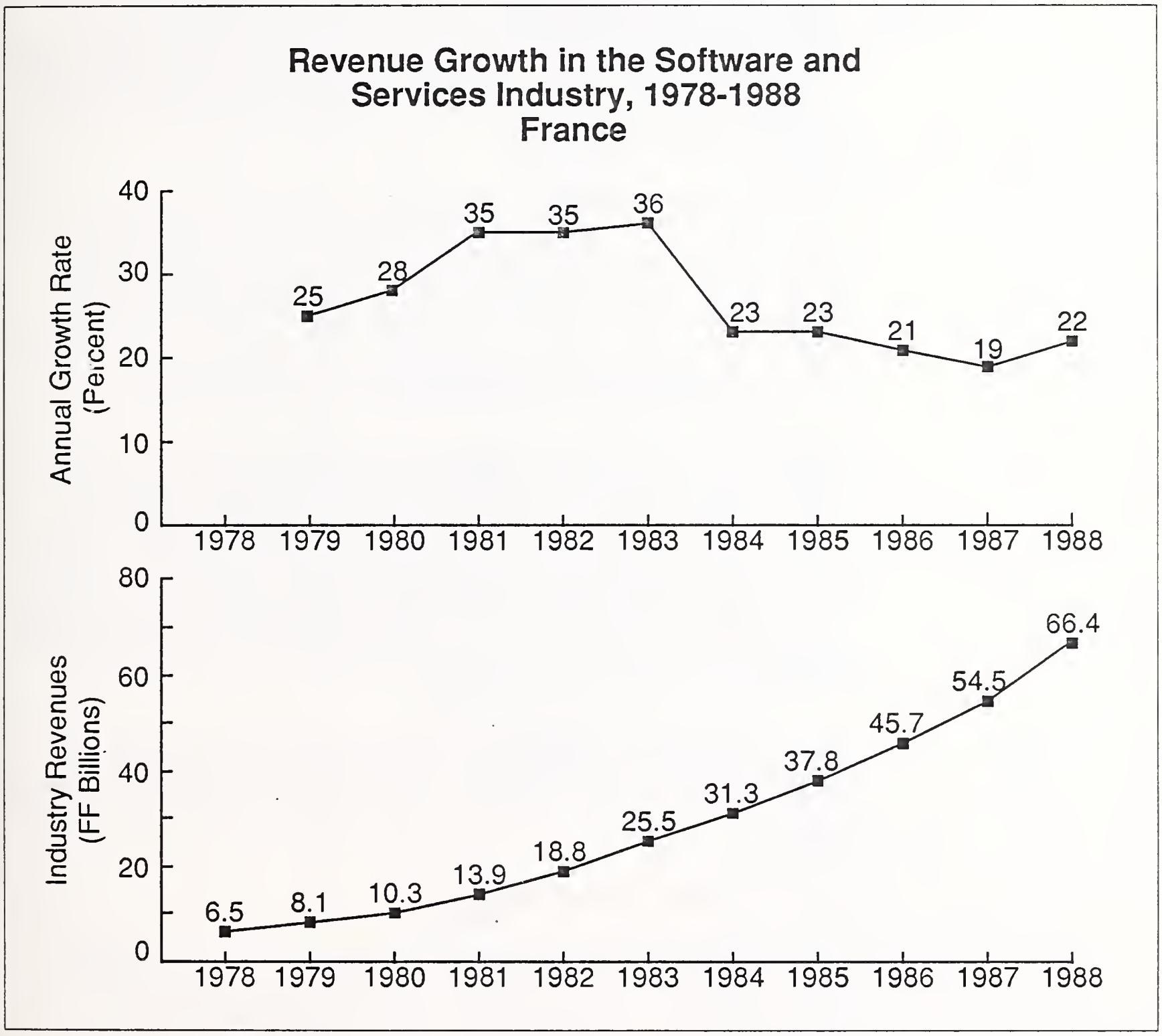
A GDP per capita of FF 110,000 ($16,800) and a relatively large population make France the second largest economy in Europe. The economy is growing at 3.4% per annum, projected to decrease slightly in 1990 to just under 3% per annum. Inflation is increasing slightly, from under 3% per annum to 3.3% per annum projected for 1990. France is running a current account deficit of FF24 billion ($3.6 billion) that is expected to have increased to FF33 billion ($5 billion) in 1989 and FF40 billion ($6 billion) in 1990.

EXHIBIT V-1



Although the French president Francois Mitterand is a Socialist, France has not had a Socialist government during his presidency. The two-tier system in France led to a situation from 1986 to 1988 where the government was under Jacques Chirac of the rightist Gaullist party, but the president was Socialist. France has undergone some very significant changes in economic and political style in the last decade. When the Socialists first came to power, they believed strongly in state intervention and nationalisation, but appeared to have a change of mind after less than two years. France therefore went through a period of nationalisation and then a pause, and then much re-privatisation. The present Socialist government is certainly less inclined to intervene than before, and is more centrist, helped to a great extent by a strong decline in the French Communist party.

EXHIBIT V-2



Although still inclined to spend government money on infrastructure, such as transport, there is a strong climate of liberalisation in France. In order to meet the requirements of the Single European Act and 1992, there was considerable merger and acquisition activity in France in 1989, in both the financial and industrial sectors. The French are very strongly in favour of European unity, and favour economic union as well as free trade.

The biggest companies in France are Renault, Electricité de France, CGE, Elf Aquitaine, and Peugeot. Seventeen of the European top 100 companies are French. France is strong in many manufacturing and service sectors, and also in agriculture, without any of these sectors being clearly predominant. There is respect in France for West German manufacturing, Spanish agriculture and United Kingdom services, especially financial services.

Until the mid-1980s, there was a strong bias towards French suppliers in many areas of the French market—local government contracts were nearly always based on Bull equipment. However, with the European Commission pushing for a more open EEC, especially with its 1992 initiative, the French market has changed. France is at the centre of the EEC and is the most pro-European nation. It has already dropped many of its national biases and is more accessible to foreign vendors.

As Exhibit V-3 illustrates, the banking and finance sector in the French software and services market represents some 21% of the total. French vendors in this sector will suffer possible adverse repercussions after 1992 when their domestic market will be opened up to foreign competition. They are specifically concerned over the strength of U.K. vendors in this sector. The location of the European Bank has yet to be decided. London, Paris and Frankfurt are all strong contenders and whichever city succeeds in becoming its home, the local software and services market for financial services will be boosted.

France is stable both economically and politically, and is centrally located in the EEC, which makes it extremely important, but there is some uncertainty as to how French industry will perform in a wider European market.

3. Software and Services Industry

The French market, the largest national market for computer software and services in Europe, represents some 24% of the total European market. INPUT estimates its size in 1989 was FF79 billion ($12.1 billion) and forecasts it will grow to FF189 billion ($28.9 billion) by 1994. This represents a compound annual growth rate over this five-year period of some 19%.

Exhibit V-4 gives a breakdown of the French market into the six delivery modes defined by INPUT. The French are very strong in logical thinking and have developed some of the leading professional services vendors in Europe. Relative to the overall European software and services market, professional services represent some 38% of the total French software and services market, compared with only 30% for the whole of Europe. As a result, the French professional services market accounts

EXHIBIT V-3

Software and Services Industry Market Analysis, 1989 France

Industrial Sector	Market Size (FF Millions)	Percent of Total
Manufacturing		
- Discrete	16,190	20.5
- Process	7,110	9.0
Distribution (Retail and Wholesale)	6,720	8.5
Transportation	3,160	4.0
Utilities	3,550	4.5
Banking and Finance	16,590	21.0
Insurance	5,530	7.0
Government		
- National	6,320	8.0
- Local	4,740	6.0
Services	6,720	8.5
Others	2,370	3.0
Total	79,000	100.0

EXHIBIT V-4

Software and Services Market Forecast, 1989-1994 France

Subsector	Market Forecast (FF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Processing Services	11,010	11,320	4	14,050
Network Services	3,340	4,400	24	12,900
Software Products	18,230	22,380	20	54,810
Professional Services	24,640	30,060	21	78,070
Systems Integration	2,150	2,700	28	9,200
Turnkey Systems	7,020	8,140	20	20,060
Total	66,390	79,000	19	189,090

for 30% of the total European professional services market, with French vendors strong in most other European national professional services markets.

INPUT's forecasts for the individual delivery modes of the French software and services market are given in Exhibits V-5 to V-9.

Processing services is forecast to grow at only 4% per annum over the period 1989 to 1994.

Network services is expected to grow on average at 24% per annum. INPUT forecasts that though this sector grew 30% in 1989, by 1994 this growth will settle down to some 17% per annum.

INPUT forecasts that the software products sector should expand at 20% per annum from 1989 to 1994. Growth rates for systems software have been reduced from last year's forecast, and so the penetration of this sector by equipment vendors is forecast to decline marginally.

EXHIBIT V-5

Processing Services Market Forecast, 1989-1994 France

Subsector	Market Forecast (FF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Transaction, Utility and Other Services	10,150	10,300	3	11,700
Systems Operations	860	1,020	18	2,350
Total	11,010	11,320	4	14,050

EXHIBIT V-6

Network Services Market Forecast, 1989-1994 France

Subsector	Market Forecast (FF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Network Applications	1,290	1,650	26	5,300
Electronic Information Services	2,050	2,750	23	7,600
Total	3,340	4,400	24	12,900

EXHIBIT V-7

Software Products
Market Forecast, 1989-1994
France

Subsector	Market Forecast (FF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Equipment Vendors				
Systems	8,440	10,110	17	22,180
Applications	1,745	2,180	23	6,135
Subtotal	10,185	12,290	18	28,315
Independents				
Systems	2,400	3,060	17	6,710
Applications	5,645	7,030	23	19,785
Subtotal	8,045	10,090	21	26,495
Total Market				
Systems	10,840	13,170	17	28,890
Applications	7,390	9,210	23	25,920
Total	18,230	22,380	20	54,810

The professional services sector in France is forecast to maintain strong growth, averaging 21% per annum over the five-year period 1989 to 1994. The importance of this sector in the overall French software and services market is therefore forecast to increase from 38% of the total in 1989 to 41% in 1994.

Turnkey systems are forecast to grow an average of 20% per annum to 1994. Although the French market has a bias towards custom-built applications, turnkey systems on PCs is a strong growth market.

EXHIBIT V-8

Professional Services Market Forecast, 1989-1994 France

Subsector	Market Forecast (FF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
IS Consultancy	2,680	3,295	20	8,200
Custom Software Development	19,690	24,020	21	62,300
Education and Training	2,060	2,475	22	6,680
Systems Operations	210	270	27	890
Total	24,640	30,060	21	78,070

EXHIBIT V-9

Turnkey Systems Market Forecast, 1989-1994 France

Subsector	Market Forecast (FF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
System Equipment	4,005	4,475	15	9,025
Software and Other Charges	3,015	3,665	25	11,035
Total	7,020	8,140	20	20,060

4. Competitive Environment

The French software and services market still has the one of the lowest penetrations by foreign vendors in Europe, only some 18%. French vendors who have moved into export markets have continued to look more to the south—to Spain and Italy—rather than to the north.

Exhibit V-10 shows the leading 30 vendors in the French market in 1988. The strength of domestic vendors in the top ranking is obvious, though there are some U.S. and a very few U.K. and West German vendors.

Exhibits V-11 to V-16 give the top vendor rankings in each of the six INPUT delivery modes.

The top five independent French vendors are Cap Gemini Sogeti, Sligos, Concept, Sema Group and CISI. Cap Gemini Sogeti is by far the largest independent West European professional services vendor, and Sema the fourth largest. Exhibit V-17 shows the ownership of Sema Group in mid-1989, following the merger of the U.K.-based CAP Group and Sema Metra of France in March 1988.

Cap Gemini Sogeti has made two dawn raids on Sema. Cap Gemini Sogeti has very poor coverage of the U.K. market, from which it gets only 1% of its revenues. Sema, with 48% of its revenues from the U.K., would be an ideal acquisition for Cap Gemini Sogeti. However, the high institutional holdings in Sema have put a halt to Cap Gemini's moves for the time being.

Cap Gemini Sogeti has also taken a 5% stake in Volmac, the leading Dutch professional services vendor. Volmac is the second leading independent professional services vendor in Europe and also has a 5% stake in Sema Group through its former 10% shareholding in CAP Group.

In August 1988, Concept purchased a controlling stake in its rival CCMC. This pushed its revenues up by 740%, making it the sixth largest vendor in the French market and second in processing services to Sligos. Sligos consolidated the revenues of CMG into its corporate accounts during 1988, following the acquisition of a majority shareholding, and so reported 46% growth. Sligos is expanding into turnkey systems on PCs, not only through CMG but with its own Managix service.

EXHIBIT V-10

Top Vendor Rankings and Market Shares, 1988
Software and Services
France

Rank	Company	Market Share (Percent)	Estimated Revenues (FF Millions)
1	IBM	6.1	4,030
2	Cap Gemini Sogeti	4.3	2,860
3	Bull	3.3	2,210
4	Sligos	2.6	1,740
5	GSI	1.6	1,060
6	Concept	1.5	1,040
7 =	Sema	1.3	830
7 =	CISI	1.3	830
9	CGI	1.2	770
10	Unisys	1.0	680
11	Nixdorf	0.9	630
12 =	Steria	0.9	590
12 =	Reuters	0.9	590
14 =	SG2	0.8	540
14 =	Transpac	0.8	540
16	Prime	0.8	510
17 =	Syseca	0.8	500
17 =	GEIS	0.8	500
19	SD-Scicon	0.7	490
20 =	Computer Associates	0.7	480
20 =	Alcatel CIT	0.7	480
20 =	Telesystemes	0.7	480
23	GFI	0.7	460
24	Dataid	0.7	450
25	SITB	0.7	440
26	Sopra	0.6	420
27	Segin	0.6	390
28	Sodinforg	0.6	380
29	Andersen	0.5	350
30	Digital	0.5	330
	Others	61.4	40,790
	Total Market	100.0	66,390

EXHIBIT V-11

Top Vendor Rankings and Market Shares, 1988
Processing Services
France

Rank	Company	Market Share (Percent)	Estimated Revenues (FF Millions)
1	Sligos	4.9	540
2	Concept	3.7	410
3 =	GSI	3.0	330
3 =	GEIS	3.0	330
5	IBM	2.8	310
6 =	Telesystemes	2.6	290
6 =	SG2	2.6	290
8 =	Segin	2.4	260
8 =	Sodinforg	2.4	260
8 =	SITB	2.4	260
	Others	70.2	7,730
	Total	100.0	11,010

EXHIBIT V-12

Top Vendor Rankings and Market Shares, 1988
Network Services
France

Rank	Company	Market Share (Percent)	Estimated Revenues (FF Millions)
1	Transpac	15.0	500
2	Reuters	13.7	460
3	Sligos	7.8	260
4	GSI	5.7	190
5	SD-Scicon	4.8	160
	Others	53.0	1,770
	Total	100.0	3,340

EXHIBIT V-13

Top Vendor Rankings and Market Shares, 1988
Software Products
France

Rank	Company	Market Share (Percent)	Estimated Revenues (FF Millions)
1	IBM	13.6	2,480
2	Bull	6.0	1,090
3	Computer Associates	2.0	370
4	Concept	1.7	300
5	CGI	1.6	290
6	Unisys	1.5	280
7	GSI	1.4	260
8	Siemens	0.9	160
9	La Commande Electronique	0.8	150
10	Digital	0.8	140
	Others	69.7	12,710
	Total	100.0	18,230

EXHIBIT V-14

Top Vendor Rankings and Market Shares, 1988
Professional Services
France

Rank	Company	Market Share (Percent)	Estimated Revenues (FF Millions)
1	Cap Gemini Sogeti	8.6	2,110
2	IBM	3.2	780
3	Bull	3.0	730
4	Steria	2.4	590
5	CISI	2.3	570
6	Sema	2.1	530
7 =	CGI	1.8	440
7 =	Sligos	1.8	440
9	Dataid	1.5	380
10	Syseca	1.5	370
	Others	71.8	17,700
	Total	100.0	24,640

EXHIBIT V-15

Top Vendor Rankings and Market Shares, 1988
Systems Integration
France

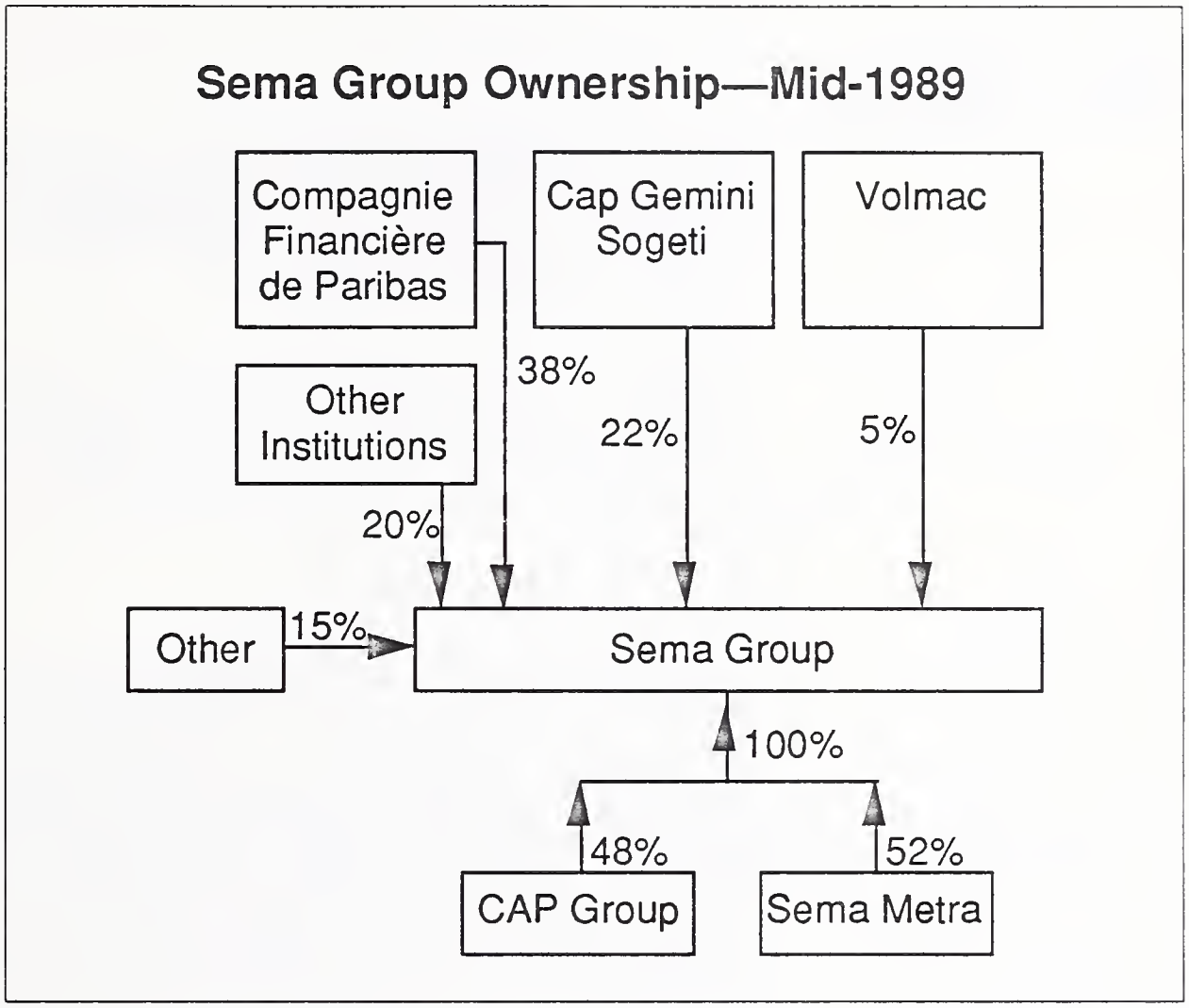
Rank	Company	Market Share (Percent)	Estimated Revenues (FF Millions)
1	Cap Gemini Sogeti	30.2	650
2	IBM	13.0	280
3	Thomson	9.3	200
4	Andersen	8.4	180
5	Sema	6.5	140
6	Alcatel ISR	4.7	100
7	Bull	2.8	60
8	Siemens	2.3	50
9	GFI	1.9	40
10	EDS	1.4	30
	Others	19.5	420
	Total	100.0	2,150

EXHIBIT V-16

Top Vendor Rankings and Market Shares, 1988
Turnkey Systems
France

Rank	Company	Market Share (Percent)	Estimated Revenues (FF Millions)
1	Nixdorf	8.2	580
2	Prime	6.7	470
3	Sligos	6.3	440
4	Mannesmann Kienzle	3.1	220
5	Intergraph	3.0	210
6 =	McDonnell Douglas	2.9	200
6 =	Alcatel CIT	2.9	200
6 =	IBM	2.9	200
9	Unisys	2.2	160
10	Bull	1.7	120
	Others	60.1	4,220
	Total	100.0	7,020

EXHIBIT V-17



B

West Germany—
Market Commentary

1. Introduction

The Federal Republic of Germany has the largest population in Western Europe, 61 million, and is a founder member of the EEC. The software and services market is the second largest, with a total size of DM15.6 billion in 1988 ($8.1 billion).

Exhibit V-18 shows the growth of the West German market during the 1980s. It has been consistently growing at 20 to 25% per annum. INPUT forecasts that the average compound growth rate over the five years from 1989 to 1994 should be 18%.

2. Economic Environment

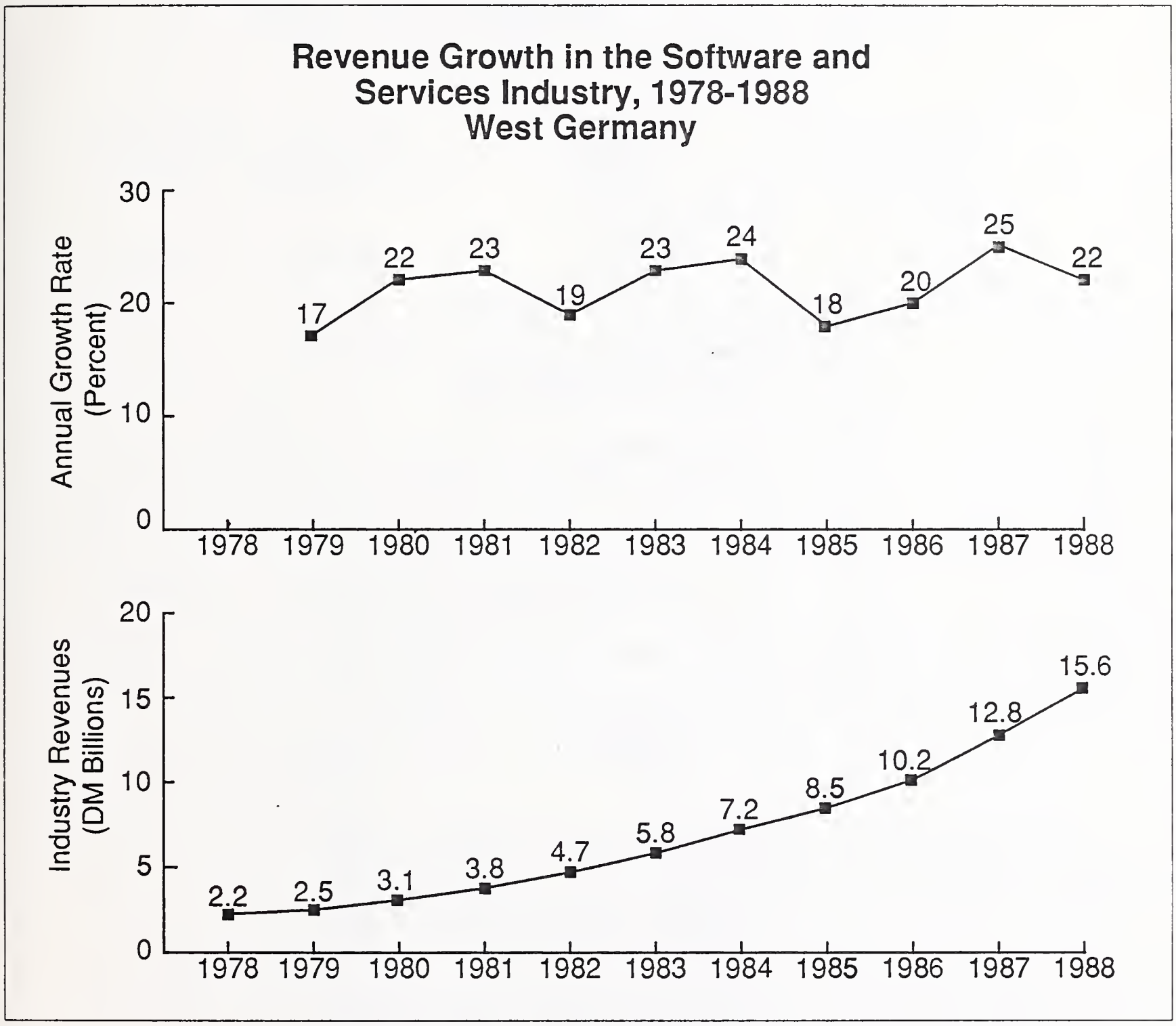
West Germany has the most powerful economy in Europe, with a GDP per capita of DM 38,000 ($19,700), making a total gross domestic product in excess of $1,200 billion. The West German economy is growing at around 4%, projected to drop in 1990 to 3%. Although inflation is expected to rise from around 1%, it is still not expected to exceed 3%. The West German economy has one of the world's healthiest current account surpluses outside Japan—DM94 billion ($48.5 billion) in 1988, approaching DM115 billion ($60 billion) by 1990.

The government tends to be either a centre-right Christian Democrat and liberal Free Democrat coalition, or alternatively a centre-left Social Democrat and Free Democrat coalition. At the moment it is the former. The most significant political changes are now clearly taking place outside rather than inside the Federal Republic, with the rapid collapse of the hard-line Communist governments in Eastern Europe. The re-unification of Germany would potentially make it much more powerful than it already is, and so the political debate in the rest of Europe concerns when, how, or if this should come about.

The biggest companies in West Germany are Daimler Benz, Volkswagen, Siemens, Deutsche Bundespost, and VEBA, and 29 of the European top 100 companies are in West Germany. The principal strength of the economy is its manufacturing base, and it is expected that this strength in manufacturing will benefit greatly from a single European market of 320 million people. The federal system of government makes the West German market complex, and industries tend to collect in particular states, so that commerce is in the north, banking in the centre, heavy industry in the west, and high technology in the centre and south.

As Exhibit V-19 illustrates, manufacturing is the largest sector of the West German software and services market. INPUT estimates that in

EXHIBIT V-18



1989 it represented some 26% of the total market. As a result, West Germany is the leading European market for CAD/CAM systems and in the development of CIM systems.

3. Software and Services Industry

The West German software and services market is the second largest market in Europe. INPUT estimated that in 1989 it totalled some DM18.3 billion ($9.5 billion), or 19% of the overall West European software and services market. INPUT forecasts that it should grow to

EXHIBIT V-19

Software and Services Industry Market Analysis, 1989 West Germany

Industrial Sector	Market Size (DM Millions)	Percent of Total
Manufacturing		
- Discrete	4,660	25.5
- Process	1,740	9.5
Distribution (Retail and Wholesale)	1,750	9.5
Transportation	820	4.5
Utilities	730	4.0
Banking and Finance	3,290	18.0
Insurance	1,370	7.5
Government		
- National	730	4.0
- Local	1,280	7.0
Services	1,370	7.5
Others	550	3.0
Total	18,290	100.0

DM41.4 billion ($21.5 billion) by 1994, at an average growth rate of 18% per annum, slightly lower than the European average of 19%.

The breakdown of the West German software and services market by delivery mode is illustrated in Exhibit V-20. Germans are very strong in engineering skills. This is reflected not only in West Germany being the major manufacturing nation in Europe, but also in the West German software and services market being the leader in software products and turnkey systems.

EXHIBIT V-20

Software and Services Market Forecast, 1989-1994 West Germany

Subsector	Market Forecast (DM Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Processing Services	2,660	2,805	5	3,520
Network Services	590	850	27	2,800
Software Products	4,140	5,070	19	11,880
Professional Services	3,400	4,040	19	9,650
Systems Integration	690	880	26	2,800
Turnkey Systems	4,150	4,645	18	10,780
Total	15,630	18,290	18	41,430

These two delivery modes represented some 53% of the total West German market in 1989, compared with only 45% for the overall West European market. In both of these delivery modes, the West German market is the largest in Europe.

Vendors have commented to INPUT that it is difficult for other European nations to sell software products in West Germany against domestic German competition. However, German end users have a very high regard for U.S. technical skills and U.S. vendors have had great success in selling in Germany, especially with CAD/CAM.

Exhibits V-21 to V-25 illustrate INPUT's forecasts for individual delivery modes of the West German software and services market.

Processing services are forecast to grow by only 5% on average over the period 1989 to 1994.

Network services have been growing by over 40% per annum. This high growth is expected to gradually decline, so that by 1994 growth will be

EXHIBIT V-21

Processing Services Market Forecast, 1989-1994 West Germany

Subsector	Market Forecast (DM Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Transaction, Utility and Other Services	2,570	2,700	4	3,300
Systems Operations	90	105	16	220
Total	2,660	2,805	5	3,520

EXHIBIT V-22

Network Services Market Forecast, 1989-1994 West Germany

Subsector	Market Forecast (DM Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Network Applications	70	140	34	600
Electronic Information Services	520	710	25	2,200
Total	590	850	27	2,800

EXHIBIT V-23

Software Products Market Forecast, 1989-1994 West Germany

Subsector	Market Forecast (DM Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Equipment Vendors				
Systems	2,445	2,960	17	6,485
Applications	350	440	22	1,185
Subtotal	2,795	3,400	18	7,670
Independents				
Systems	475	610	17	1,335
Applications	870	1,060	22	2,875
Subtotal	1,345	1,670	20	4,210
Total Market				
Systems	2,920	3,570	17	7,820
Applications	1,220	1,500	22	4,060
Total	4,140	5,070	19	11,880

down to some 17% per annum. Even so, the average growth over the period will be 27% per annum.

Software products is forecast to reflect the average European growth rate of 19% per annum, as should professional services.

Systems integration in West Germany is growing at some 28% per annum. This delivery mode is expected to continue to grow strongly and will average 24% annual growth over the forecast period.

EXHIBIT V-24

Professional Services Market Forecast, 1989-1994 West Germany

Subsector	Market Forecast (DM Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
IS Consultancy	415	495	19	1,180
Custom Software Development	2,365	2,820	19	6,720
Education and Training	605	705	19	1,690
Systems Operations	15	20	26	60
Total	3,400	4,040	19	9,650

EXHIBIT V-25

Turnkey Systems Market Forecast, 1989-1994 West Germany

Subsector	Market Forecast (DM Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
System Equipment	2,365	2,555	14	4,850
Software and Other Charges	1,785	2,090	23	5,930
Total	4,150	4,645	18	10,780

Turnkey systems in West Germany had a poor year in 1988 due to problems faced by major vendors such as Nixdorf. The growth in sales to the German banking market slowed down considerably, added to which both Nixdorf and Mannesmann Kienzle faced problems porting their huge portfolios of applications to UNIX.

4. Competitive Environment

Exhibit V-26 lists the top 30 vendors, as identified by INPUT, in the West German software and services market.

IBM is the leading software and services vendor. Both IBM's CAD/CAM and manufacturing software are strong in this market. Prime, the leading CAD/CAM vendor in Europe, is the sixth leading vendor in West Germany.

West Germany's three important domestic equipment vendors—Siemens, Nixdorf and Mannesmann Kienzle—are all major software and services vendors in the West German market. Siemens is the largest European-owned equipment vendor, and is very strong in software products. Nixdorf and Mannesmann Kienzle both use turnkey systems as their prime delivery mode.

During 1988, Siemens acquired 50% of Plessey, in conjunction with GEC of the U.K. As a result, it now owns 50% of the U.K. based Hoskyns, the leading systems operations vendor in Western Europe.

Exhibits V-27 to V-32 list the top West German vendors as identified by INPUT for each of INPUT's six delivery modes.

Many of the leading West German independent vendors have close financial links with their client bases. Datev, the fourth largest West German independent and the leading processing services vendor, is a cooperative owned by German accountants and tax specialists, and provides central processing services for them. Many industrial enterprises and groupings have shares in domestic West German software and services vendors.

The West German market is difficult for foreign vendors to penetrate. The U.S. has been successful in certain areas of software products and turnkey systems, and the Europeans in professional services and systems integration. Cap Gemini Sogeti from France and SD-Scicon from the U.K. are very strong in the West German systems integration market, as is Andersen Consulting.

The European Commission's 1992 initiative has already begun to open up high-value public sector procurement tendering. All the leading EEC member states are allowing vendors from other EEC nations to tender

EXHIBIT V-26

Top Vendor Rankings and Market Shares, 1988
Software and Services
West Germany

Rank	Company	Market Share (Percent)	Estimated Revenues (DM Millions)
1	IBM	9.3	1,450
2	Nixdorf	7.4	1,150
3	Siemens	7.0	1,100
4	Datev	3.2	500
5	Mannesmann Kienzle	2.5	400
6	Prime	2.2	350
7	Taylorix	1.3	200
8=	Reuters	1.1	170
8=	SAP	1.1	170
10=	Intergraph	1.1	165
10=	Fiducia	1.1	165
12	SD-Scicon/SCS	0.9	150
13	Unisys	0.9	140
14	Computer Associates	0.8	130
15=	Roland Berger	0.8	125
15=	GEIS	0.8	125
15=	GEI	0.8	125
18=	INFO	0.7	115
18=	EDV-Studio Ploenzke	0.7	115
20=	Cap Gemini Sogeti	0.6	100
20=	Digital	0.6	100
22	Alldata	0.6	95
23	McDonnell Douglas	0.6	90
24=	Bull	0.6	85
24=	Software AG	0.6	85
24=	Philips	0.6	85
24=	Krupp Atlas	0.6	85
28=	Ikoss	0.5	80
28=	DAT-Gruppe	0.5	80
30	ADV/ORGA	0.4	70
	Others	50.1	7,830
	Total Market	100.0	15,630

EXHIBIT V-27

Top Vendor Rankings and Market Shares, 1988
Processing Services
West Germany

Rank	Company	Market Share (Percent)	Estimated Revenues (DM Millions)
1	Datev	14.7	390
2	Fiducia	5.3	140
3	IBM	4.5	120
4	GEIS	3.0	80
5	Taylorix	2.2	60
6	GSI	1.1	30
7	Automation Center	0.9	25
8	Sietec	0.6	15
9 =	All Data	0.4	10
9 =	EDS	0.4	10
	Others	66.9	1,780
	Total	100.0	2,660

EXHIBIT V-28

Top Vendor Rankings and Market Shares, 1988
Network Services
West Germany

Rank	Company	Market Share (Percent)	Estimated Revenues (DM Millions)
1	Reuters	22.9	135
2	GEIS	6.8	40
3 =	Telerate	5.1	30
3 =	IBM	5.1	30
5	Dun & Bradstreet	2.5	15
	Others	57.6	340
	Total	100.0	590

EXHIBIT V-29

Top Vendor Rankings and Market Shares, 1988
Software Products
West Germany

Rank	Company	Market Share (Percent)	Estimated Revenues (DM Millions)
1	IBM	21.5	890
2	Siemens	17.9	740
3	SAP	2.8	115
4	Computer Associates	2.4	100
5 =	Datev	1.8	75
5 =	Software AG	1.8	75
7	Unisys	1.4	60
8	Nixdorf	1.3	55
9	Bull	1.1	45
10	Straessle	1.0	40
	Others	47.0	1,945
	Total	100.0	4,140

freely. This has become a major export opportunity for European systems integrators, especially in West Germany where domestic vendors are relatively weak.

Siemens is the leading European vendor selling software products, second only to IBM. Software AG is the leading independent software products vendor in Western Europe, with its well known products ADABAS (database system) and NATURAL (fourth-generation development environment).

Nixdorf is Europe's leading turnkey vendor, with total European turnkey revenues of some $1 billion. 1988 was a very bad year for the company. It reported a 20% decrease in equipment prices at the same time that it had to contend with increases in chip costs, a slowdown in its main market (German retail banking), and the costly decision to move to UNIX.

EXHIBIT V-30

Top Vendor Rankings and Market Shares, 1988
Professional Services
West Germany

Rank	Company	Market Share (Percent)	Estimated Revenues (DM Millions)
1	IBM	8.2	280
2	Siemens	3.5	120
3 =	Roland Berger	2.8	95
3 =	EDV Studio Ploenzke	2.8	95
5	All Data	2.4	80
6	Cap Gemini Sogeti	2.2	75
7	SD-Scicon/SCS	1.9	65
8 =	GEI	1.5	50
8 =	SAP	1.5	50
10	Digital	1.2	40
	Others	72.0	2,450
	Total	100.0	3,400

Nixdorf has been forced to accept the reality that it must port all its applications to UNIX so as to guarantee a seamless transition route for its customers from its proprietary operation system to UNIX, if and when they want it. The cost of this development will probably continue to adversely affect Nixdorf.

EXHIBIT V-31

Top Vendor Rankings and Market Shares, 1988
Systems Integration
West Germany

Rank	Company	Market Share (Percent)	Estimated Revenues (DM Millions)
1	IBM	15.9	110
2	Siemens	14.5	100
3 =	SD-Scicon/SCS	9.4	65
3 =	Cap Gemini Sogeti	5.1	35
5	Anderson	4.3	30
6	Mannesmann Kienzle	3.6	25
7	Ferranti	2.9	20
8	Unisys	2.2	15
9 =	Logica	1.5	10
9 =	Digital	1.5	10
	Others	39.1	270
	Total	100.0	690

EXHIBIT V-32

Top Vendor Rankings and Market Shares, 1988
Turnkey Systems
West Germany

Rank	Company	Market Share (Percent)	Estimated Revenues (DM Millions)
1	Nixdorf	25.8	1,070
2	Mannesmann Kienzle	8.0	330
3	Prime	7.2	300
4	Intergraph	3.8	160
5	Siemens	3.4	140
6	Taylorix	2.8	115
7 =	IBM	1.7	70
7 =	McDonnell Douglas	1.7	70
9	GEI	1.2	50
10	Krupp Atlas	0.9	40
	Others	43.5	1,805
	Total	100.0	4,150

C

United Kingdom—
Market Commentary

1. Introduction

The United Kingdom has a total population of 57 million and has been a member of the EEC since 1973. The software and services market is third largest in Europe, totalling £4.7 million ($7.7 billion) in 1988.

Exhibit V-33 illustrates the growth of the U.K. software and services market over the past ten years. This growth has gradually decreased from over 30% per annum in the early 1980s to between 20% to 25% per annum today. INPUT forecasts that over the next five years the compound annual growth rate for the U.K. market should be 19%.

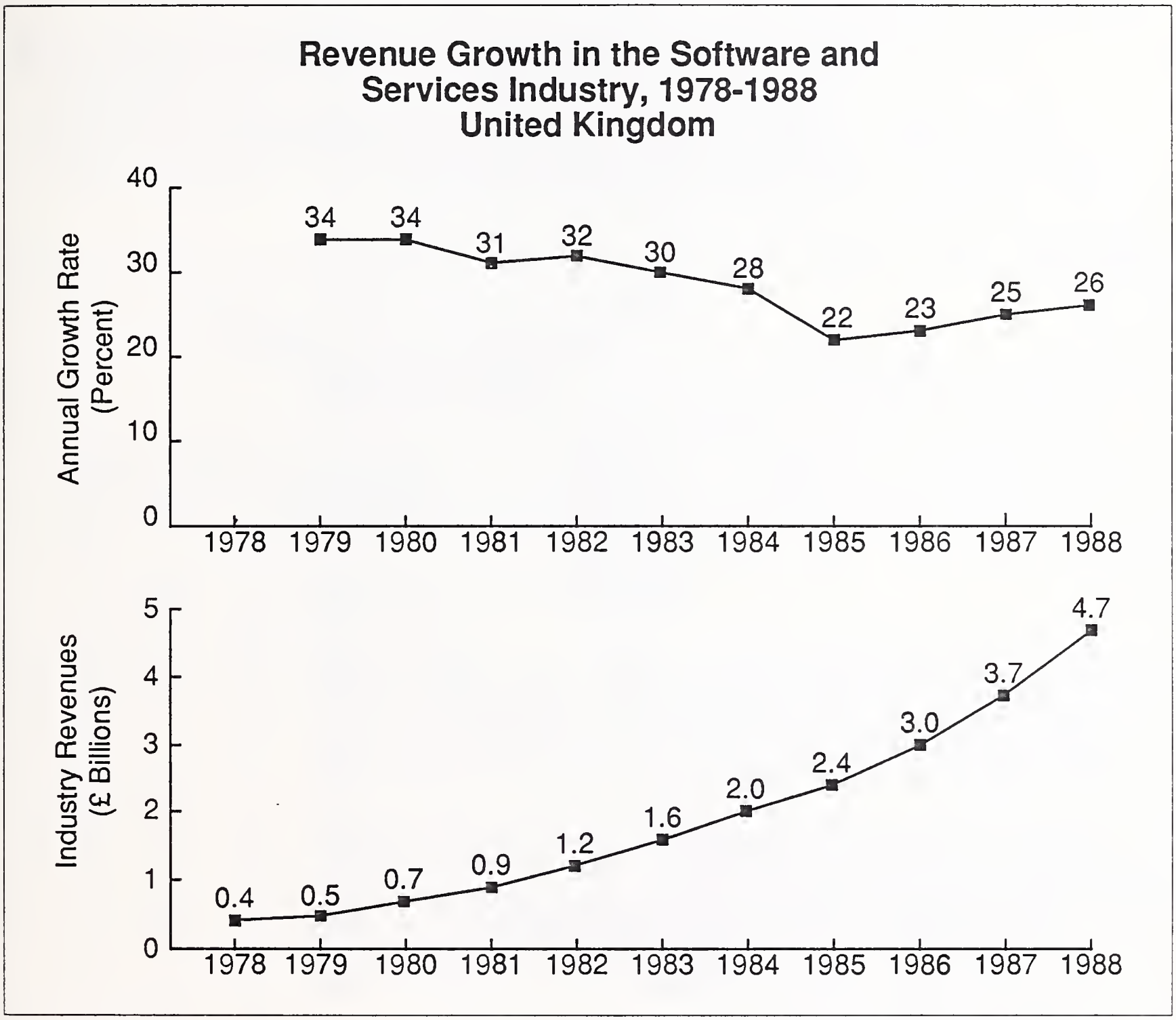
2. Economic Environment

In a European context, the United Kingdom has average wealth per capita. It has a GDP per capita of £8,700 ($14,300) which, with a population that is relatively large, makes it very important economically. The United Kingdom economy has shown some significant improvements during the past decade after a painful restructuring in some of the traditional manufacturing industries. There has also been the additional benefit of the growth of the offshore oil industry. However, in 1989 there were clear signs that the British economy had been overheating, and was on the brink of a recession.

From a growth rate of 4.6% in 1988, the forecast for 1990 has been progressively adjusted downwards and, excluding oil, has been forecast by the government in its autumn 1989 statement to be only three-quarters of one percent for 1990. Interest rates have been progressively raised to a base rate of 15% to counteract a spending boom and overheated economy. Inflation is greater than 7%, which is higher than most of its West European trading partners, and is projected to stay higher than 6%, dropping towards 5% in 1994. The United Kingdom is running a record current account deficit of £ 20 billion ($33 billion) that is expected reduce by 25% to £ 15 billion ($25 billion) in 1990.

The political party in power is the Conservative party, and has been for the last ten years. Prime minister Margaret Thatcher has won three general elections in a row since 1979, and is expected to lead her party into the next general election some time before 1992. However, there has been a strong revival of the main opposition Labour Party, which after an internal power struggle has moved back towards the political centre and caused the collapse of the new centre parties. The next election is expected to be close, and will be a return to the traditional two-party confrontation favoured by the British electoral system.

EXHIBIT V-33



A significant feature of the last ten years has been a shift of capital from the public to the private sector, including the privatisation and liberalisation of the telecommunications sector. This shift from public to private is overall worth about 5% of the total gross domestic product.

There have undoubtedly been some major improvements in productivity in British industry, which is not just due to the bankruptcy of the less efficient firms during the severe recession at the beginning of the 1980s. In addition to its strength in manufacturing, which represents about one-quarter of the economy, the United Kingdom has traditionally had a strong services sector, especially in finance, centred in London. The

financial markets have undergone a major transformation as a result of the deregulation in 1986, which is referred to as the "Big Bang".

As Exhibit V-34 illustrates, banking plus insurance add up to nearly 35% of the total U.K. software and services market. Vendors initially benefited from the Big Bang, but have been doing less well after the "Big Crash" of 1987. Many vendors have expanded into financial services, which puts them in a strong position to exploit any opening up of the European banking market in the 1990s.

EXHIBIT V-34

Software and Services Industry Market Analysis, 1989 United Kingdom

Industrial Sector	Market Size (£ Millions)	Percent of Total
Manufacturing		
- Discrete	1,050	18.5
- Process	455	8.0
Distribution (Retail and Wholesale)	600	10.5
Transportation	225	4.0
Utilities	200	3.5
Banking and Finance	1,425	25.0
Insurance	485	8.5
Government		
- National	285	5.0
- Local	340	6.0
Services	455	8.0
Others	170	3.0
Total	5,690	100.0

United Kingdom trade has shifted progressively towards Europe since the U.K. entered the EEC, but due to traditional cultural and language links there continues to be important economic activity with other parts of the English-speaking world such as the United States and Canada.

The biggest companies in the United Kingdom are Shell, British Petroleum, Unilever, British American Tobacco, the Electricity Council, Imperial Chemical Industries and British Telecom. Shell and Unilever are Anglo-Dutch companies, British Telecom is the result of the privatisation of the former state telephone company, and the Electricity Council is a public utility that is scheduled for privatisation. Twenty-eight of the European top 100 companies are British.

The strong British services sector is expected to prosper as a result of the Single European Act and 1992, but there is some debate over the future of the manufacturing industry in the face of very strong West German competition. British manufacturing suffered a long and significant decline until the recent improvements, and it remains to be seen whether those improvements are the start of a long-term revival, or just an aberration in a long-term decline.

3. Software and Services Industry

The U.K. software and services market is forecast by INPUT to grow from £5.7 billion ($9.4 billion) in 1989 to £13.6 billion ($22.4 billion) by 1994, at an average growth rate of 19% per annum. The U.K. has the third largest software and services market, following France and West Germany, accounting for some 19% of the total West European market.

Exhibit V-35 illustrates the breakdown of the U.K. market by delivery mode. The U.K. is strong in organisational skills and individualism: it is also the only island state in Europe. Its vendors are strong in professional services, systems integration and other services needing central management, like systems operations.

The U.K. has the largest systems integration market in the whole of Europe, and also the leading network services market. The U.K. network services market is two to five years ahead of the rest of Europe, especially in developing services such as EDI. Part of this is due to the influence of U.S. vendors in the U.K., part is the strength of the City of London after the Big Bang in 1986, which led to a major boom in financial electronic information services and dealing systems.

Exhibits V-36 to V-40 illustrate the forecasts for individual delivery modes over the period 1989 to 1994.

Processing services are forecast to grow at 6% per annum over the five-year period.

EXHIBIT V-35

Software and Services Market Forecast, 1989-1994 United Kingdom

Subsector	Market Forecast (£ Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Processing Services	565	620	8	920
Network Services	430	565	22	1,510
Software Products	1,100	1,360	20	3,270
Professional Services	1,420	1,750	20	4,350
Systems Integration	255	320	24	950
Turnkey Systems	950	1,075	20	2,640
Total	4,720	5,690	19	13,640

INPUT forecasts that the growth of network services in the U.K. will be slower than the European average, at 22% per annum. This is due to the lead that the U.K. has already built up in this sector. It has had the largest national market for network services in Western Europe, representing some 30% of the total 1989 West European network services market.

Software products is forecast to grow at 20% per annum over the period 1989 to 1994, as is professional services.

The U.K. remains the leading national market in systems integration, accounting for some 27% of the total West European systems integration market in 1989. Growth in this sector in the U.K. is forecast by INPUT to be 24% per annum from 1989 to 1994.

Turnkey systems are forecast to grow at 20% per annum over this period in the U.K.

EXHIBIT V-36

Processing Services Market Forecast, 1989-1994 United Kingdom

Subsector	Market Forecast (£ Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Transaction, Utility and Other Services	480	510	4	620
Systems Operations	85	110	22	300
Total	565	620	8	920

EXHIBIT V-37

Network Services Market Forecast, 1989-1994 United Kingdom

Subsector	Market Forecast (£ Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Network Applications	110	135	28	460
Electronic Information Services	320	430	20	1,050
Total	430	565	22	1,510

EXHIBIT V-38

Software Products
Market Forecast, 1989-1994
United Kingdom

Subsector	Market Forecast (£ Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Equipment Vendors				
Systems	590	705	17	1,555
Applications	105	135	23	375
Subtotal	695	840	18	1,930
Independents				
Systems	140	185	17	405
Applications	265	335	23	935
Subtotal	405	520	21	1,340
Total Market				
Systems	730	890	17	1,960
Applications	370	470	23	1,310
Total	1,100	1,360	20	3,270

4. Competitive Environment

Traditionally, the U.K. has been the first step for many U.S. vendors in their move into Europe. However, there is a trend developing of U.S. vendors preferring to locate their European headquarters in the Benelux so as to be nearer the centre of the EEC. The penetration of the U.K. market by foreign vendors remains very high. The level of U.S. vendor penetration is second only to that in Spain at 30%. Other European vendors remain relatively important in the U.K. with an 8% market penetration.

EXHIBIT V-39

Professional Services Market Forecast, 1989-1994 United Kingdom

Subsector	Market Forecast (£ Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
IS Consultancy	195	245	23	690
Custom Software Development	1,065	1,310	19	3,130
Education and Training	150	180	22	485
Systems Operations	10	15	28	45
Total	1,420	1,750	20	4,350

EXHIBIT V-40

Turnkey Systems Market Forecast, 1989-1994 United Kingdom

Subsector	Market Forecast (£ Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
System Equipment	545	590	15	1,190
Software and Other Charges	405	485	24	1,450
Total	950	1,075	20	2,640

Of the four major European economies—West Germany, France, the U.K. and Italy—the U.K. has by far the highest penetration by foreign vendors. INPUT estimates that only some 62% of the market was left to domestic vendors in 1989.

The reason for this is partly because of the minimal language barrier between the U.S. and the U.K. Also, the U.K. has traditionally been a more free and open market than many of its European counterparts. It has been easy to establish a local subsidiary in the U.K., or to acquire a U.K.-based company. As a result, the U.K. is still the most competitive and active computer software and services market in Europe.

Exhibit V-41 lists the top 30 software and services vendors, as identified by INPUT, in the U.K. market in 1988.

Three of the top five U.K. vendors are U.S.-owned. IBM is the largest software and services vendor, with 1988 revenues of £330 million, or 7% of the overall U.K. market. The U.K. is McDonnell Douglas Information Systems' most important European market, accounting for some 65% of its European revenues, or some £140 million in 1988. Similarly, the U.K. is Prime's main European market, accounting for some 40% of its European revenues—about £130 million.

McDonnell Douglas sells a wide range of turnkey systems, in local government market sectors and CAD/CAM. Prime specialises in CAD/CAM and graphics-related turnkey systems.

U.K.-owned Reuters is Europe's largest electronic information services vendor. It specialises in on-line financial and trading systems.

Istel was formed out of the U.K. car manufacturer Rover Group as BL Systems. Subsequently it became Istel through a management buyout. Although successful in the U.K., management realised that Istel could never offer internationally competitive services on its own and in late 1989 accepted a bid by AT&T.

Hoskyns, the leading systems operations vendor in Europe, also changed its ownership during 1989. Hoskyns was started up by John Hoskyns in 1964 and was bought out in the 1970s by Martin Marietta of the U.S. In 1988, Plessey bought out 98% control of Hoskyns, but then ran into financial difficulties. In 1989, it was acquired by a joint bid from GEC of the U.K. and Siemens of West Germany. Hoskyns is now jointly owned 50/50 by these two companies.

Exhibits V-42 to V-47 list the top vendors in individual delivery modes in the U.K. in 1988.

EXHIBIT V-41

Top Vendor Rankings and Market Shares, 1988
Software and Services
United Kingdom

Rank	Company	Market Share (Percent)	Estimated Revenues (£ Millions)
1	IBM	7.0	330
2	Reuters	4.9	230
3	ICL	4.2	200
4	McDonnell Douglas	3.0	140
5	Prime	2.8	130
6	SD-Scicon	2.1	100
7	Hoskyns	2.0	95
8	Sema	1.9	90
9	Istel	1.7	80
10	Unisys	1.6	75
11	Thorn	1.5	70
12=	Logica	1.3	60
12=	Centre File	1.3	60
14=	Digital	1.2	55
14=	Andersen	1.2	55
16	Computer Associates	1.0	50
17=	GEIS	1.0	40
17=	Olivetti	1.0	40
19=	Telerate	0.7	35
19=	Bull	0.7	35
19=	Siemens	0.7	35
19=	Mannesmann Kienzle	0.7	35
19=	EDS	0.7	35
24=	Nixdorf	0.6	30
24=	Kalamazoo	0.6	30
24=	DMG	0.6	30
24=	Data Logic	0.6	30
24=	BIS	0.6	30
24=	Hewlett-Packard	0.6	30
24=	Computer People	0.6	30
	Others	51.6	2,435
	Total Market	100.0	4,720

EXHIBIT V-42

Top Vendor Rankings and Market Shares, 1988
Processing Services
United Kingdom

Rank	Company	Market Share (Percent)	Estimated Revenues (£ Millions)
1	Hoskyns	7.1	40
2 =	GEIS	4.4	25
2 =	IBM	4.4	25
2 =	Centre File	4.4	25
2 =	Istel	4.4	25
6 =	Thorn	3.6	20
6 =	EDS	3.6	20
8	ADP	2.6	15
9 =	NMW	0.9	5
9 =	Sema	0.9	5
	Others	63.7	360
	Total	100.0	565

EXHIBIT V-43

Top Vendor Rankings and Market Shares, 1988
Network Services
United Kingdom

Rank	Company	Market Share (Percent)	Estimated Revenues (£ Millions)
1	Reuters	45.3	195
2	Telerate	5.8	25
3 =	Istel	3.5	15
3 =	GEIS	3.5	15
5	Dun & Bradstreet	2.3	10
	Others	39.6	170
	Total	100.0	430

EXHIBIT V-44

Top Vendor Rankings and Market Shares, 1988
Software Products
United Kingdom

Rank	Company	Market Share (Percent)	Estimated Revenues (£ Millions)
1	IBM	18.7	205
2	ICL	6.8	75
3	Computer Associates	3.2	35
4 =	Unisys	2.7	30
4 =	Reuters	2.7	30
6 =	Siemens	2.3	25
6 =	Digital	2.3	25
8 =	SD-Scicon	1.8	20
8 =	Pansophic	1.8	20
8 =	Bull	1.8	20
	Others	55.9	615
	Total	100.0	1,100

EXHIBIT V-45

Top Vendor Rankings and Market Shares, 1988
Professional Services
United Kingdom

Rank	Company	Market Share (Percent)	Estimated Revenues (£ Millions)
1 =	ICL	4.6	65
1 =	IBM	4.6	65
3	Sema	4.2	60
4	SD-Scicon	2.8	40
5 =	Logica	2.1	30
5 =	Computer People	2.1	30
7 =	Data Logic	1.8	25
7 =	Istel	1.8	25
7 =	Coopers & Lybrand	1.8	25
7 =	Hoskyns	1.8	25
	Others	72.4	1,030
	Total	100.0	1,420

EXHIBIT V-46

Top Vendor Rankings and Market Shares, 1988
Systems Integration
United Kingdom

Rank	Company	Market Share (Percent)	Estimated Revenues (£ Millions)
1	SD-Scicon	13.7	35
2 =	Andersen	11.8	30
2 =	IBM	11.8	30
2 =	Sema	11.8	30
5	Logica	9.8	25
6 =	ICL	3.9	10
6 =	Racal	3.9	10
6 =	Thorn	3.9	10
9	Unisys	2.0	5
10	Digital	2.0	5
	Others	25.4	65
	Total	100.0	255

EXHIBIT V-47

Top Vendor Rankings and Market Shares, 1988
Turnkey Systems
United Kingdom

Rank	Company	Market Share (Percent)	Estimated Revenues (£ Millions)
1	Prime	12.1	115
2	McDonnell Douglas	11.6	110
3	ICL	4.7	45
4 =	Mannesmann Kienzle	3.2	30
4 =	Nixdorf	3.2	30
6	Hoskyns	3.2	30
7	Kalamazoo	2.6	25
8 =	Olivetti	2.1	20
8 =	Intergraph	2.1	20
10	Unisys	1.5	15
	Others	53.7	510
	Total	100.0	950

D

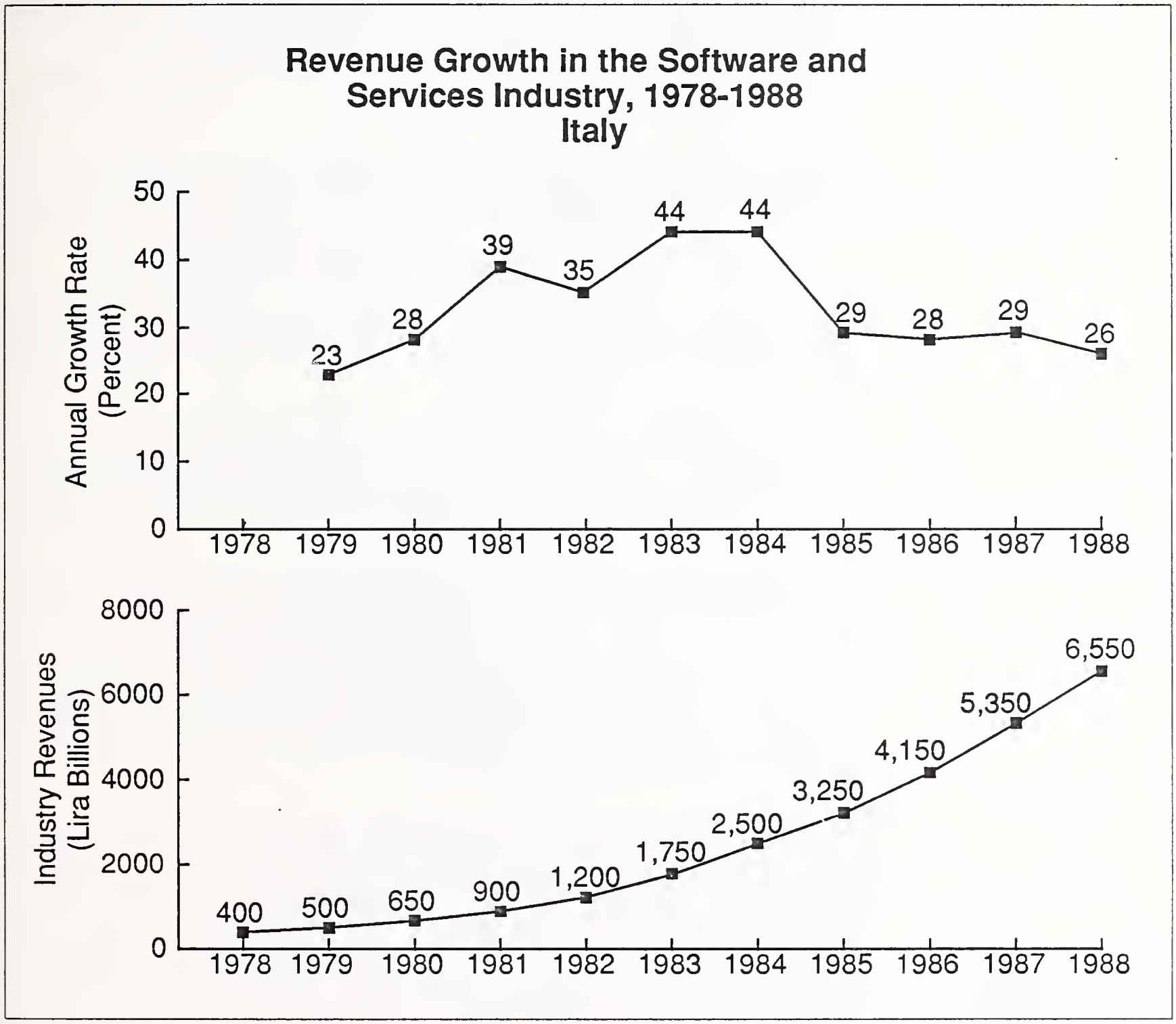
Italy—Market Commentary

1. Introduction

Italy has a population of 57 million and is a founder member of the EEC. Its software and services market is the fourth largest in Europe after France, West Germany and the United Kingdom, with a total size in 1988 of Lira 6,740 billion ($4.8 billion).

Exhibit V-48 illustrates the growth of the Italian software and services market during the past ten years since 1978. In the early 1980s, the market was growing by about 35% to 40% per annum, but by the late 1980s had slowed down somewhat to 25% to 30% per annum. INPUT forecasts that it should grow at about 20% on average over the five-year period to 1994.

EXHIBIT V-48



2. Economic Environment

Italy has a GDP per capita of Lira 20 million ($14,300) which, with the second largest population, makes it the third most important economy in Europe. The economy grew at 3.9% in 1988 and is projected to grow 2.5% in 1990. The inflation rate was 5.1% in 1988, rising to 6.5 % in 1989, and is projected for the early 1990s at 6.0%. Italy is running a significant current account deficit that, from just over Lira 7,000 billion ($5 billion) in 1988, is expected to reach Lira 15,000 billion ($11 billion) in 1989 and Lira 18,000 billion ($13 billion) in 1990.

The conventional wisdom in Europe has tended to be that a strong, stable government is good for the economy. Italy has had more changes in government since the war than any other country in Western Europe, but it has still experienced considerable growth and prosperity. The economy has grown at 20% in real terms, and for much of that time the government was in flux or nonexistent.

The state has a very important role in Italian industry. Four Italian companies—IRI, Fiat, ENI, and Montedison—are in the European top 500, and both IRI and ENI are state-owned. Geographically, Italy is divided into the industrial north, with a preponderance of small and medium-sized businesses, the administration and bureaucracy centre around Rome, and the poor south. A great deal of government and EEC-financed development is taking place in the south of Italy to equalize the great differences in regional wealth.

INPUT estimates that some 15% of the overall Italian software and services market is in the government sector, as Exhibit V-49 illustrates. With the involvement of the Italian state in most areas of the economy, the true proportion is considerable higher.

Manufacturing and business is centred in the north, around Milan, and government is in the centre of Italy, in Rome. In the Italian public sector, patronage and inefficiency have always been problems. However, INPUT discovered during its research in 1989 that the Italian government is opening up its public sector procurement tending to other EEC nations, including those for software and services. The Italian market is very pro-EEC.

Opinion polls show that the Italians are the most pro-European, but they are lagging behind other European countries in implementing the legislation for the Single European Act. Forced to liberalise the economy and public procurement, there is a very real dilemma in predicting how Italy's strong public sector will survive in a more competitive market. However, the strength and sheer number of small Italian businesses has always provided the economy with considerable strength and flexibility.

3. Software and Services Industry

The Italian market is forecast by INPUT to grow from Lira 8,200 billion ($5.8 billion) in 1989 to Lira 20,000 billion ($14.2 billion) by 1994. The average growth rate over this five-year period is forecast to be 20% per annum.

EXHIBIT V-49

Software and Services Industry Market Analysis, 1989 Italy

Industrial Sector	Market Size (Lira Billions)	Percent of Total
Manufacturing		
- Discrete	1,560	19.5
- Process	660	8.0
Distribution (Retail and Wholesale)	615	7.5
Transportation	370	4.5
Utilities	325	4.0
Banking and Finance	1,800	22.0
Insurance	650	8.0
Government		
- National	655	8.0
- Local	615	7.5
Services	655	8.0
Others	245	3.0
Total	8,150	100.0

Italy is the fourth largest national software and services market in Europe. Exhibit V-50 illustrates the breakdown of the Italian market by the six delivery modes, as defined by INPUT.

EXHIBIT V-50

Software and Services Market Forecast, 1989-1994 Italy

Subsector	Market Forecast (Lira Billions) 1988	1989	1989-1994 CAGR (Percent)	1994
Processing Services	1,075	1,180	8	1,750
Network Services	320	450	23	1,280
Software Products	2,460	3,050	21	7,840
Professional Services	2,050	2,525	21	6,530
Systems Integration	200	240	28	830
Turnkey Systems	635	735	19	1,760
Total	6,740	8,180	20	19,990

The market for turnkey systems in Italy is significantly smaller than in the rest of Europe. In Italy, turnkey systems accounted for some 9% of the market in 1989, compared with a 17% average for the whole of Europe. This is explained by the fact that Italian end users prefer bespoke total solutions to standard packaged solutions.

Exhibits V-51 to V-55 give detailed forecasts by individual delivery modes, as estimated by INPUT.

Processing services is forecast to grow by 8% per annum on average over the period from 1989 to 1994.

EXHIBIT V-51

Processing Services Market Forecast, 1989-1994 Italy

Subsector	Market Forecast (Lira Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Transaction, Utility and Other Services	960	1,040	6	1,400
Systems Operations	115	140	20	350
Total	1,075	1,180	8	1,750

EXHIBIT V-52

Network Services Market Forecast, 1989-1994 Italy

Subsector	Market Forecast (Lira Billions) 1988	1989	1989-1994 CAGR (Percent)	1994
Network Applications	70	100	31	380
Electronic Information Services	250	350	21	900
Total	320	450	23	1,280

EXHIBIT V-53

Software Products Market Forecast, 1989-1994 Italy

Subsector	Market Forecast (Lira Billions) 1988	1989	1989-1994 CAGR (Percent)	1994
Equipment Vendors				
Systems	1,165	1,430	18	3,280
Applications	325	420	24	1,220
Subtotal	1,490	1,850	19	4,500
Independents				
Systems	225	285	18	645
Applications	745	915	24	2,695
Subtotal	970	1,200	23	3,340
Total Market				
Systems	1,390	1,715	18	3,925
Applications	1,070	1,335	24	3,915
Total	2,460	3,050	21	7,840

Network services is estimated to have grown by some 40% between 1988 and 1989. This rate of growth is forecast to gradually decline to 16% per annum over the period to 1994. INPUT estimates that it should be 23% per annum over the five-year period to 1994.

Software products and professional services are forecast to grow at 21% per annum during the period from 1989 to 1994.

EXHIBIT V-54

Professional Services Market Forecast, 1989-1994 Italy

Subsector	Market Forecast (Lira Billions) 1988	1989	1989-1994 CAGR (Percent)	1994
IS Consultancy	280	345	24	1,010
Custom Software Development	1,590	1,955	20	4,860
Education and Training	150	185	24	545
Systems Operations	30	40	25	115
Total	2,050	2,525	21	6,530

EXHIBIT V-55

Turnkey Systems Market Forecast, 1989-1994 Italy

Subsector	Market Forecast (Lira Billions) 1988	1989	1989-1994 CAGR (Percent)	1994
System Equipment	360	405	14	790
Software and Other Charges	275	330	24	970
Total	635	735	19	1,760

Systems integration is currently a small market in Italy, and is growing at about 20%. However, this growth rate is forecast to accelerate to some 30% in the near future, and to average out to 24% per annum during the period from 1989 to 1994.

Turnkey systems are forecast to grow at some 19% during the period from 1989 to 1994.

4. Competitive Environment

U.S. vendors are strong in the Italian market, accounting for some 19% of total 1989 revenues. However, foreign European competition is small, only accounting for some 2% of total Italian end-user revenues. This European competition in Italy is principally from French vendors who have targeted the Italian market—often through acquisitions, rather than by setting up local subsidiaries.

Exhibit V-56 lists the top 30 independent Italian vendors' total revenues in 1988, as identified by INPUT. Enidata (ENI Group), Cerved (Italian Chambers of Commerce) and Datamont (Montedison) all have significant captive revenues, which are not shown in INPUT's other vendor exhibits in this report. Exhibit V-57 shows INPUT's estimates of the top 30 Italian vendors' noncaptive revenues, including those of equipment vendors.

IBM was the leading vendor, with Italian revenues of Lira 770 billion. Finsiel, the largest domestic Italian vendor, is owned 83% by the Italian State and 17% by Banca d'Italia. With 1988 revenues of Lira 660 billion, Finsiel controlled 10% of the overall Italian market, specialising in processing services and bespoke software development.

Olivetti, the Italian equipment vendor, specialising in PCs and minicomputers, was the third largest software and services vendor in 1988. During 1988, Olivetti reorganised into market-product groups—Olivetti Office, Olivetti Systems & Networks, Olivetti Information Services and Olivetti Technology—as have many other European equipment vendors.

Exhibits V-58 to V-63 list the top Italian vendors in each of INPUT's six delivery modes for 1988.

EXHIBIT V-56

Top Independent Vendor Rankings and Market Shares, 1988 (Total Revenues) Software and Services—Italy

Rank	Company	Estimated Revenues (Lira Billions)
1	Finsiel	770
2	Enidata	145
3	Reuters	100
4	Cerved	85
5	Database Informatica	75
6 =	Syntax	70
6 =	Cap Gemini Sogeti	70
6 =	GEIS	70
6 =	Datamont	70
10	Sicit	65
11	Sopin	60
12 =	Lombardia Informatica	55
12 =	Data Management	55
14	Andersen	50
15	Sarin	50
16	Computer Associates	45
17	Concept/CDS	45
18 =	ITP	40
18 =	Datamat	40
18 =	Sime	40
18 =	Sipe	40
18 =	Engineering	40
23 =	Datitalia	35
23 =	Progres	35
25 =	O Group	30
25 =	Eurosystem	30
25 =	Cedacrinord	30
25 =	Pirelli Informatica	30
29 =	Software Systemi	25
29 =	Ipacri	25

EXHIBIT V-57

Top Vendor Rankings and Market Shares, 1988
All Vendors (Noncaptive Revenues)
Software and Services—Italy

Rank	Company	Market Share (Percent)	Estimated Revenues (Lira Billions)
1	IBM	11.4	770
2	Finsiel	9.8	660
3	Olivetti	6.1	410
4	Bull	2.2	150
5	Reuters	1.5	100
6	Database Informatica	1.1	75
7 =	Unisys	1.0	70
7 =	GEIS	1.0	70
7 =	Cap Gemini Sogeti	1.0	70
7 =	Syntax	1.0	70
11	Sicit	1.0	65
12	Nixdorf	0.9	60
13	Sopin	0.8	55
14 =	Andersen	0.7	50
14 =	Data Management	0.7	50
16 =	Compuer Associates	0.7	45
16 =	Concept/CDS	0.7	45
18 =	Siemens	0.6	40
18 =	ITP	0.6	40
18 =	Sipe	0.6	40
18 =	Engineering	0.6	40
22 =	Digital	0.5	35
22 =	Prime	0.5	35
22 =	Endata	0.5	35
22 =	Cerved	0.5	35
22 =	Datamat	0.5	35
27 =	O Group	0.5	30
27 =	Progress	0.5	30
27 =	Mannesmann Kienzle	0.5	30
27 =	Eurosystem	0.5	30
	Others	51.5	3,470
	Total Market	100.0	6,740

EXHIBIT V-58

Top Vendor Rankings and Market Shares, 1988
Processing Services
Italy

Rank	Company	Market Share (Percent)	Estimated Revenues (Lira Billions)
1	Finsiel	29.8	320
2	IBM	5.6	60
3	GEIS	3.7	40
4 =	Olivetti	2.3	25
4 =	Sarin	2.3	25
6 =	Cedacrinord	1.9	20
6 =	CSI Piemonte	1.9	20
8	ENIDATA	1.4	15
9 =	Concept/EDS	0.9	10
9 =	Datitalia	0.9	10
	Others	49.3	530
	Total	100.0	1,075

EXHIBIT V-59

Top Vendor Rankings and Market Shares, 1988
Network Services
Italy

Rank	Company	Market Share (Percent)	Estimated Revenues (Lira Billions)
1	Reuters	21.9	70
2	GEIS	7.8	25
3	Telerate	4.7	15
4 =	Datamont	3.1	10
4 =	IBM	3.1	10
	Others	59.4	190
	Total	100.0	320

EXHIBIT V-60

Top Vendor Rankings and Market Shares, 1988
Software Products
Italy

Rank	Company	Market Share (Percent)	Estimated Revenues (Lira Billions)
1	IBM	19.1	470
2 =	Olivetti	2.9	70
2 =	Bull	2.9	70
4	Computer Associates	1.6	40
5 =	Data Management	1.2	30
5 =	Unisys	1.2	30
5 =	ITP	1.2	30
5 =	Siemens	1.2	30
5 =	Finsiel	1.2	30
10	Digital	0.6	15
	Others	66.9	1,645
	Total	100.0	2,460

EXHIBIT V-61

Top Vendor Rankings and Market Shares, 1988
Professional Services
Italy

Rank	Company	Market Share (Percent)	Estimated Revenues (Lira Billions)
1	Finsiel	15.6	320
2	Olivetti	9.3	190
3	IBM	7.3	150
4	Database Informatica	2.9	60
5 =	Cap Gemini Sogeti	2.4	50
5 =	Bull	2.4	50
7 =	Sipe	1.5	30
7 =	Concept/CDS	1.5	30
7 =	Cerved	1.5	30
7 =	Engineering	1.5	30
	Others	54.1	1,110
	Total	100.0	2,050

EXHIBIT V-62

Top Vendor Rankings and Market Shares, 1988
Systems Integration
Italy

Rank	Company	Market Share (Percent)	Estimated Revenues (Lira Billions)
1	Olivetti	25.0	60
2	Andersen	14.5	35
3	IBM	12.5	30
4	Cap Gemini Sogeti	8.3	20
5 =	Bull	4.2	10
5 =	Logica	4.2	10
7 =	Unisys	2.1	5
7 =	EDS	2.1	5
7 =	Ferranti	2.1	5
7 =	Siemens	2.1	5
	Others	22.9	55
	Total	100.0	240

EXHIBIT V-63

Top Vendor Rankings and Market Shares, 1988
Turnkey Systems
Italy

Rank	Company	Market Share (Percent)	Estimated Revenues (Lira Billions)
1 =	Olivetti	8.6	55
1 =	Nixdorf	8.6	55
3 =	Sopin	6.3	40
3 =	IBM	6.3	40
5	Prime	5.5	35
6	Mannesmann Kienzle	3.9	25
7	Elsi	3.2	20
8 =	Unisys	2.4	15
8 =	Intergraph	2.4	15
8 =	Hewlett-Packard	2.4	15
	Others	50.4	320
	Total	100.0	635

E

Sweden—Market Commentary

1. Introduction

Sweden has a population of 8.4 million and is a member of the European Free trade Association (EFTA). The software and services market is the sixth largest in Europe, with a total size of SK 9.2 billion ($1.4 billion) in 1988.

2. Economic Environment

Sweden is a rich country, with a Gross Domestic Product per capita of SK 140,000 ($21,400). The economy was growing at 2.3% in 1988, projected for 1990 at 1%. Inflation was around 7%, projected for 1990 at 6.5%. Sweden is running a current account deficit of SK 16 billion ($2.5 billion) that is expected to increase to nearly SK 25 billion ($4 billion) in 1990.

The political complexion of the government is left-of-centre Social Democratic, led by Ingvar Carlsson. But it has been suggested by the Prime Minister himself that, faced with some of the most critical challenges in her history, Sweden might need a more broad-based government to arrive at greater consensus.

Sweden has traditionally been a slow, cautious and stable country, a model socialist state with cradle-to-grave social benefits, and has been strictly neutral. Some critical decisions have to be faced, and some fast changes might be necessary. Sweden depends very much upon the relationship that it has established with the EEC, and the trends towards liberalisation within the EEC mean that major changes might be necessary, even supposing that the strict neutrality objection could be overcome sufficiently for Sweden to apply for membership.

The EEC may no longer wish to provide the Swedes with the benefits of free trade, unless Sweden supports the costs of EEC membership. The costs of the state welfare system are beginning to present a significant strain on the economy. Some Swedish companies have even suggested a change of nationality if these issues cannot be resolved.

The biggest Swedish companies that are in the European top 100 are Volvo, Electrolux and Saab-Scania, along with the Swedish-Swiss ABB Asea Brown Boveri.

3. Software and Services Industry

The Swedish services market is the largest Scandinavian software and services market. It accounts for some 33% of the total revenue generated by the four Scandinavian countries. Not being in the EEC itself, Sweden

is using its traditional links with Denmark (the only Scandinavian country in the EEC) to gain entry to EEC markets.

INPUT forecasts that the Swedish software and services market will grow from SK 10.8 billion ($1.6 billion) in 1989 to SK 24.3 billion ($3.7 billion) by 1994. The average growth rate over this five-year period will be 18% per annum. This is slightly less than the European average of 19%.

Exhibit V-64 gives a breakdown of the Swedish market by delivery mode. Like other Scandinavian countries, Sweden is especially strong in processing services. This represents some 24% of the Swedish market, as opposed to the European average of 16%.

EXHIBIT V-64

Software and Services Market Forecast, 1989-1994 Sweden

Subsector	Market Forecast (SK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Processing Services	2,400	2,580	6	3,500
Network Services	300	440	26	1,420
Software Products	2,275	2,830	20	7,060
Professional Services	2,535	3,040	19	7,290
Systems Integration	185	225	27	770
Turnkey Systems	1,455	1,655	21	4,220
Total	9,150	10,770	18	24,260

Exhibits V-65 to V-69 show INPUT's detailed forecasts by individual delivery modes for the Swedish market from 1989 to 1994.

EXHIBIT V-65

Processing Services Market Forecast, 1989-1994 Sweden

Subsector	Market Forecast (SK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Transaction, Utility and Other Services	2,250	2,400	5	3,100
Systems Operations	150	180	17	400
Total	2,400	2,580	6	3,500

EXHIBIT V-66

Network Services Market Forecast, 1989-1994 Sweden

Subsector	Market Forecast (SK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Network Applications	70	140	32	570
Electronic Information Services	230	300	23	850
Total	300	440	26	1,420

EXHIBIT V-67

Software Products
Market Forecast, 1989-1994
Sweden

Subsector	Market Forecast (SK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Equipment Vendors				
Systems	1,135	1,405	18	3,210
Applications	265	335	23	945
Subtotal	1,400	1,740	19	4,155
Independents				
Systems	240	295	18	680
Applications	635	795	23	2,225
Subtotal	875	1,090	22	2,905
Total Market				
Systems	1,375	1,700	18	3,890
Applications	900	1,130	23	3,170
Total	2,275	2,830	20	7,060

EXHIBIT V-68

Professional Services Market Forecast, 1989-1994 Sweden

Subsector	Market Forecast (SK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
IS Consultancy	320	390	20	975
Custom Software Development	1,835	2,200	19	5,245
Education and Training	370	435	19	1,040
Systems Operations	10	15	19	30
Total	2,535	3,040	19	7,290

EXHIBIT V-69

Turnkey Systems Market Forecast, 1989-1994 Sweden

Subsector	Market Forecast (SK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
System Equipment	830	910	16	1,900
Software and Other Charges	625	745	26	2,320
Total	1,455	1,655	21	4,220

4. Competitive Environment

The Swedish market is dominated by domestic and other Scandinavian vendors.

One of the largest domestic Swedish vendors, Datema, was bought in late 1987 by the Finnish company, Tietotehdas. However, this acquisition and the subsequent restructuring of Datema caused Tietotehdas serious financial problems in 1988, and total software and services revenues of Datema dropped from SK 470 million in 1987 to SK 210 million in 1988.

Finnish equipment vendor Nokia Data has significant revenues in Sweden. In early 1988, Nokia Data was formed from the merger of the Data Division of the Swedish equipment manufacturer, Ericsson, and Nokia Information Systems of Finland. Nokia also bought out Oy Dava A/B of Finland and EB-Ericsson of Norway.

As a result of these acquisitions, during 1988 Nokia became an important middle-sized European equipment vendor. It specialises in turnkey systems in Scandinavia and throughout Europe. In Sweden, it generates some SK 250 million.

Cap Gemini Sogeti bought Data Logic in 1988, and by doing so increased its Swedish revenues by a factor of three. (This is a different Data Logic from the Raytheon-owned company of the same name in the U.K.)

IBM bought a 10% share of Kalldata in June 1989, a SK 80 million company specialising in professional services and equipment distribution.

Esselte System bought up many of the shares of various joint ventures managed by SP Informatik in Denmark, giving it entry into the EEC.

Exhibit V-70 lists to the top ten Swedish software and services vendors, and Exhibits V-71 to V-76 list the top vendors for each of INPUT's six delivery modes.

There was considerable merger and acquisition activity in the Swedish market during 1988 and 1989. Edebe Promotions took over Rasab some 3 years ago, and renamed it Edebe Rasab. In mid-1989, it merged with WM Data. This new group could become the largest Swedish software and services vendor, with revenue in the range of SK 500 million. WM Data operates throughout Scandinavia.

Svenska Datacentralen acquired On Line A/B in 1988 and Pharmacia Data A/B in 1989. However, it in turn was taken over by Sapia, which now owns 100% of its shares. Sapia has also taken over ADB-Gruppen, the Swedish professional services vendor with revenues of some SK 70 million.

EXHIBIT V-70

Top Vendor Rankings and Market Shares, 1988
Software and Services
Sweden

Rank	Company	Market Share (Percent)	Estimated Revenues (SK Millions)
1	IBM	9.8	900
2	Programator	4.7	430
3	Cap Gemini Sogeti/Data Logic	3.9	360
4	Tietotehdas/Datema	3.6	330
5	Lantbruksdata	3.5	320
6	Nokia Data	2.7	250
7 =	Conor Information	2.4	220
7 =	Svenska Datacentralen	2.4	220
9	Computer Resources	2.2	200
10	Edebe Rasab	1.9	170
	Others	62.9	5,750
	Total	100.0	9,150

Nordic Team Service A/B was created in January 1989 out of the merging of Databolaget, Teamdata and Scandicson. Its revenues for 1989 are forecast at SK 135 million. This in turn is owned by Teamco of Norway and Pietovima of Finland.

EXHIBIT V-71

Top Vendor Rankings and Market Shares, 1988
Processing Services
Sweden

Rank	Company	Market Share (Percent)	Estimated Revenues (SK Millions)
1	Lantbruksdata	12.1	290
2	Svenska Data	6.7	160
3	Computer Resources	5.8	140
4	Edebe Rasab	4.4	105
5	Tietotehdas/Datema	4.2	100
6	Conor Information	3.5	85
7 =	IBM	2.9	70
7 =	Capella	2.9	70
9	GEIS	2.1	50
10	Programator	1.7	40
	Others	53.7	1,290
	Total	100.0	2,400

EXHIBIT V-72

Top Vendor Rankings and Market Shares, 1988
Network Services
Sweden

Rank	Company	Market Share (Percent)	Estimated Revenues (SK Millions)
1	Reuters	23.3	70
2	GEIS	10.0	30
3	Conor Information	6.7	20
4	IBM	5.0	15
5	Digital	3.3	10
	Others	51.7	155
	Total	100.0	300

EXHIBIT V-73

Top Vendor Rankings and Market Shares, 1988
Software Products
Sweden

Rank	Company	Market Share (Percent)	Estimated Revenues (SK Millions)
1	IBM	24.2	550
2 =	Unisys	3.1	70
2 =	Esselte	3.1	70
4 =	Tietotehdas/Datema	2.6	60
4 =	Bull	2.2	50
4 =	Digital	2.2	50
4 =	Nokia Data	2.2	50
4 =	Oracle	2.2	50
9	Reuters	1.3	30
10	Software AG	1.1	25
	Others	55.8	1,270
	Total	100.0	2,275

EXHIBIT V-74

Top Vendor Rankings and Market Shares, 1988
Professional Services
Sweden

Rank	Company	Market Share (Percent)	Estimated Revenues (SK Millions)
1	Programator	13.0	330
2	Cap Gemini Sogeti/Data Logic	10.6	270
3 =	IBM	6.7	170
3 =	Tietotehdas/Datema	6.7	170
5	Conor Information	3.3	85
6 =	Edebe Rasab	2.0	50
6 =	Unisys	2.0	50
8 =	Svenska Data	1.8	45
8 =	Digital	1.8	45
10	Computer Resources	1.2	30
	Others	50.9	1,290
	Total	100.0	2,535

EXHIBIT V-75

Top Vendor Rankings and Market Shares, 1988
Systems Integration
Sweden

Rank	Company	Market Share (Percent)	Estimated Revenues (SK Millions)
1	Cap Gemini Sogeti	29.7	55
2	IBM	21.6	40
3	Ericsson	16.2	30
4	Logica	5.4	10
5	EDS	5.4	10
	Others	21.7	40
	Total	100.0	185

EXHIBIT V-76

Top Vendor Rankings and Market Shares, 1988
Turnkey Systems
Sweden

Rank	Company	Market Share (Percent)	Estimated Revenues (SK Millions)
1	Nokia Data	11.7	170
2	Nixdorf	8.9	130
3	Norsk Data	5.5	80
4	IBM	3.4	50
5	Unisys	2.8	40
	Others	67.7	985
	Total	100.0	1,455

F

Denmark—Market Commentary

1. Introduction

Denmark has a population of 5.1 million and has been a member of the EEC since 1973. The software and services market is tenth largest in Europe, with a total size of DK 8.2 billion ($1.1 billion) in 1988.

2. Economic Environment

With a Gross Domestic Product per capita of DK 160,000 ($21,200), Denmark is one of the richest countries in the world, though it has a small population. Denmark's total GDP is only just in excess of $100 billion. Denmark was one of the best economic performers in the eighties, with one of the highest per-capita export figures. However, with such a small domestic market, exporting was very much a necessity, and was done at a cost.

More recently, Denmark has been having hard times with a large public sector and a foreign debt of DK 270 billion ($36 billion), about 40% of the total GDP. The Danish economy shrank 0.4% in 1988, and forecasts for 1990 barely exceed 1%. Inflation is close to 5%, and Denmark is running a current account deficit of DK 14 billion ($1.8 billion).

One of the critical problems affecting Danish prospects is that a quarter of its total exports have been based upon agriculture, which is beset by global trade policy problems and a reduction in budget within the EEC. Also, the Danish manufacturing base is small, and consists of small companies, which has meant low investment in research and development.

The Danes are definitely aware of the importance of solving these problems, and tackling the deficits. Denmark is very open to foreign trade, with very few restrictions, and so it is hoped that the small and medium-sized Danish firms will become fit and able to cope with competition, and therefore will benefit greatly from the evolution of a single European market with 320 million consumers. In order to achieve this, Prime Minister Poul Schlueter's nonsocialist minority coalition government will probably have to make reductions in Denmark's high indirect and direct taxes.

3. Software and Services Industry

The Danish market is forecast by INPUT to grow from DK 9.4 billion ($1.2 billion) in 1989 to DK 20.4 billion ($2.7 billion) by 1994. The average growth rate over this five-year period is expected to be 17% per annum.

The processing services market is very strong in Denmark. This is illustrated by Exhibit V-77, which shows the breakdown of the Danish software and services market by delivery mode. This sector represented some 30% of the total software and services market in Denmark in 1989, compared with an average of 16% throughout Europe. With the expected slow growth of the processing services market in general in Europe, by 1994 processing services are expected to decline to only 18% of the total software and services market in Denmark. This can be compared with the forecast of 8% for the whole of Europe in 1994 for this sector.

EXHIBIT V-77

Software and Services Market Forecast, 1989-1994 Denmark

Subsector	Market Forecast (DK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Processing Services	2,755	2,815	6	3,730
Network Services	260	370	27	1,210
Software Products	1,885	2,315	20	5,780
Professional Services	1,900	2,290	20	5,620
Systems Integration	140	170	24	500
Turnkey Systems	1,240	1,420	21	3,600
Total	8,180	9,380	17	20,440

Exhibits V-78 to V-82 give INPUT's detailed forecasts for individual delivery modes in the Danish software and services market for the period 1989 to 1994.

EXHIBIT V-78

Processing Services
Market Forecast, 1989-1994
Denmark

Subsector	Market Forecast (DK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Transaction, Utility and Other Services	2,700	2,750	5	3,575
Systems Operations	55	65	19	155
Total	2,755	2,815	6	3,730

EXHIBIT V-79

Network Services
Market Forecast, 1989-1994
Denmark

Subsector	Market Forecast (DK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Network Applications	60	120	32	490
Electronic Information Services	200	250	24	720
Total	260	370	27	1,210

EXHIBIT V-80

Software Products
Market Forecast, 1989-1994
Denmark

Subsector	Market Forecast (DK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Equipment Vendors				
Systems	955	1,165	18	2,660
Applications	215	270	23	765
Subtotal	1,170	1,435	19	3,425
Independents				
Systems	190	240	18	555
Applications	525	640	23	1,800
Subtotal	715	880	22	2,355
Total Market				
Systems	1,145	1,405	18	3,215
Applications	740	910	23	2,565
Total	1,885	2,315	20	5,780

EXHIBIT V-81

Professional Services Market Forecast, 1989-1994 Denmark

Subsector	Market Forecast (DK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
IS Consultancy	270	325	23	925
Custom Software Development	1,540	1,855	19	4,425
Education and Training	80	95	20	235
Systems Operations	10	15	22	35
Total	1,900	2,290	20	5,620

EXHIBIT V-82

Turnkey Systems Market Forecast, 1989-1994 Denmark

Subsector	Market Forecast (DK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
System Equipment	705	780	16	1,620
Software and Other Charges	535	640	25	1,980
Total	1,240	1,420	21	3,600

4. Competitive Environment

Exhibit V-83 lists the top ten software and services vendors in the Danish market for 1988.

EXHIBIT V-83

Top Vendor Rankings and Market Shares, 1988
Software and Services
Denmark

Rank	Company	Market Share (Percent)	Estimated Revenues (DK Millions)
1	Kommunedata	13.1	1,070
2	Datacentralen	12.4	1,010
3	IBM	9.5	780
4	PBS	7.3	600
5	Landbrugets	4.0	330
6	NCR	3.2	260
7	Nixdorf	3.1	250
8	JDC Data	3.0	245
9	Bording Data	2.2	180
10	Reuters	1.8	150
	Others	40.4	3,305
	Total	100.0	8,180

Four of the leading five Danish vendors are domestically owned. The two leading vendors, Kommunedata and Datacentralen, both provide services to the public sector. Kommunedata had revenues of some DK 1.1 billion in 1988, representing some 13% of the overall Danish software and services market. It provides central processing services for local government and is owned by the Danish local authorities.

Datacentralen, the second largest Danish vendor, had 1988 revenues of DK 1.0 billion. Its revenues accounted for some 12% of the Danish market and, together with Kommunedata, these two leading vendors accounted for 25% of the overall market.

Denmark still has strong links with the other three Scandinavian countries, even though they are not in the EEC. Being on the edge of Europe, Scandinavians see themselves in need of good communications, and in 1988, Scantel (formally STS) was created. This is a joint venture between four Scandinavian PTTs to offer an international VAN service.

Denmark has two PTTs and Danet, the joint venture between IBM and the Danish PTT not involved in Scantel. Danet launched its EDI service in 1988, followed by GEIS in 1989.

Swedish companies are seeking friendly mergers with Danish vendors and Danish vendors are gradually merging together to form larger and more competitive groupings. Danish vendors see opportunities to cooperate with other European vendors during the 1990s, as part of the European Commission's 1992 initiative and move to a Single European Market.

G

Norway—Market Commentary

1. Introduction

Norway has a population of 4.2 million and is a member of the European Free Trade Association (EFTA). The software and services market is the eleventh largest in Europe with a total size of NK 6.9 billion ($1.0 billion) in 1988.

2. Economic Environment

Norway's Gross Domestic Product per capita of NK 150,00 ($21,400) is higher than that of France, but prosperity has been based to a large extent upon oil and gas revenues from the North Sea. These revenues have cushioned an economy dependent on fishing and shipping from the problems that have affected competitors. The slump in the oil price caused Norway to have a very severe economic crisis in 1986, and there are only just beginning to be signs of a recovery. Growth is at 2%, inflation is slowly reducing from the near 7% of 1988, and there are signs that the balance of trade is returning to surplus, recovering from the record deficit of nearly NK 40 billion ($6 billion) in 1986.

Norway was due to join the EEC in 1973, but by a narrow margin in a national referendum, the people voted to stay out. The Norwegian Prime Minister Mrs. Gro Harlem Brundtland, presiding over a minority Labour government, surprisingly revived the private sector to bring about this recovery, but there are no clear signs that this recovery has been of electoral benefit.

In the elections that took place in September 1989, the Labour party share of the vote went from 41% to 34%, and there was a shift to the left. The electorate appears to resent the pain of the recovery, and the anti-EEC

feeling is still strong. In addition to the prospect of political instability, Norway's economic prospects are very much uncertain.

The biggest Norwegian companies in the European top 100 are the two state-owned energy companies, Statoil and Norsk Hydro.

3. Software and Services Industry

The Norwegian software and services market represents only some 2% of the West European market. INPUT forecasts that it should grow from NK 7.9 billion ($1.1 billion) in 1989 to NK 15.8 ($2.3 billion) by 1994. The average growth rate over this five-year period is estimated at 15% per annum, one of the slowest growths in Europe.

Exhibit V-84 gives a breakdown of the Norwegian market by delivery mode. Relative to the overall European software and services market, the Norwegian market is strong in processing services, as are other Scandinavian countries. Some 37% of the Norwegian market is accounted for by processing services, compared with the European average of 16%.

EXHIBIT V-84

Software and Services Market Forecast, 1989-1994 Norway

Subsector	Market Forecast (NK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Processing Services	2,780	2,950	5	3,800
Network Services	190	260	27	870
Software Products	1,485	1,835	19	4,390
Professional Services	1,485	1,755	17	3,860
Systems Integration	110	130	20	325
Turnkey Systems	890	1,010	21	2,575
Total	6,940	7,940	15	15,820

Exhibits V-85 to V-89 give the detailed forecasts for Norway for individual delivery modes for the period 1989 to 1994.

EXHIBIT V-85

Processing Services
Market Forecast, 1989-1994
Norway

Subsector	Market Forecast (NK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Transaction, Utility and Other Services	2,740	2,905	5	3,700
Systems Operations	40	45	17	100
Total	2,780	2,950	5	3,800

EXHIBIT V-86

Network Services
Market Forecast, 1989-1994
Norway

Subsector	Market Forecast (NK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Network Applications	50	80	34	350
Electronic Information Services	140	180	24	520
Total	190	260	27	870

EXHIBIT V-87

Software Products
Market Forecast, 1989-1994
Norway

Subsector	Market Forecast (NK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Equipment Vendors				
Systems	735	910	17	1,995
Applications	175	215	22	585
Subtotal	910	1,125	18	2,580
Independents				
Systems	155	195	17	420
Applications	420	515	22	1,390
Subtotal	575	710	21	1,810
Total Market				
Systems	890	1,105	17	2,415
Applications	595	730	22	1,975
Total	1,485	1,835	19	4,390

4. Competitive Environment

Exhibit V-90 lists the top ten Norwegian vendors of 1988, as identified by INPUT.

The Norwegian market continues to be dominated by a limited number of large domestic vendors. The largest vendor in the market is Kommunedata, with some NK 870 million revenues in 1988—13% of the total Norwegian market. Kommunedata is a co-operative of local government authorities and provides central processing services.

EXHIBIT V-88

Professional Services Market Forecast, 1989-1994 Norway

Subsector	Market Forecast (NK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
IS Consultancy	210	250	17	545
Custom Software Development	1,185	1,400	17	3,075
Education and Training	80	90	18	215
Systems Operations	10	15	15	25
Total	1,485	1,755	17	3,860

EXHIBIT V-89

Turnkey Systems Market Forecast, 1989-1994 Norway

Subsector	Market Forecast (NK Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
System Equipment	705	555	16	1,160
Software and Other Charges	535	455	25	1,415
Total	1,240	1,010	21	2,575

EXHIBIT V-90

Top Vendor Rankings and Market Shares, 1988
Software and Services
Norway

Rank	Company	Market Share (Percent)	Estimated Revenues (NK Millions)
1	Kommunedata	12.5	870
2	Scanvest Ring	8.6	600
3	Fellesdata	7.3	510
4	IBM	6.9	475
5	IDA	6.1	425
6	Norsk Data	5.2	360
7	Nordata/Vestdata	5.0	350
8	EDB	3.5	240
9	Rogalandsdata	2.5	170
10	Statens Datasentral	1.9	130
	Others	40.5	2,810
	Total	100.0	6,940

Fellsdata and IDA are second and third largest vendors, and also provide processing services. Both are nonprofit organisations set up to provide processing and professional services to banks.

IBM is a major vendor in the Norwegian software and services market, as is the only Norwegian equipment vendor, Norsk Data.

Norsk Data generated some NK 360 million from the Norwegian market in 1988. The prime delivery mode for its equipment is turnkey systems. Norsk Data experienced serious financial problems in 1988, caused by end users' demands for UNIX solutions. As did other European equipment vendors selling turnkey, it delayed its decision to port its large portfolio of applications to UNIX as long as possible, and as a consequence lost market share and incurred heavy porting costs.

During 1988, Nordata and Vestdata merged into Nordata/Vestdata to become the seventh largest Norwegian vendor.

H

Finland—Market Commentary

1. Introduction

Finland, with a population of 4.9 million, is also a member of the European Free Trade Association (EFTA). The software and services market is twelfth largest in Europe, with a total size of FM 3.4 billion ($0.8 billion) in 1988.

2. Economic Environment

Finland is a newly-rich country in Europe that has been growing at 2.8% per annum in the last decade, compared with a European average of 1.6%. Its GDP per capita of FM 92,500 ($21,400) ranks among the world's highest. The economy was growing at 5.2% in 1988, projected for 1990 at 2.5%, with inflation at 6%. Finland is running a current account deficit that is expected to increase from FM 13 billion ($3 billion) in 1988, through FM 15 billion ($4 billion) in 1989, to FM 20 billion ($5 billion) in 1990.

Finland was cushioned to some extent from the economic depression of the early eighties by its closeness to the Soviet Union, which provided oil and natural gas in exchange for manufactured goods. However, Russia's share of Finnish trade has reduced from 26% to 13% in favour of the EEC, which now accounts for 44% of Finland's trade. The term "Finlandised" to refer to the special relationship with Russia, is certainly more respectable in view of the economic success, and is perceived by many as a possible model for Eastern European countries emerging from many years of economic failure.

Despite glasnost, it is improbable that Finland could consider full membership in the EEC. An opening of East-West trade could also threaten Finland's secure markets in the Soviet Union. The attitude of the European Commission to countries like Finland that enjoy a special relationship, but that do not have to contribute to the structural funds and the EEC budget, will be critical to the future prospects of tackling an increasing trade deficit.

The biggest company in Finland, and its sole representative in the European top 100 is Neste. There are significant barriers to foreigners buying Finnish companies, yet Finnish companies have recently been acquiring companies elsewhere in Europe in preparation for 1992.

3. Software and Services Industry

The Finnish software and services market is forecast by INPUT to grow from FM 4.1 billion ($0.9 billion) in 1989 to FM 9.3 billion ($2.1 billion) by 1994. The average growth rate over this five-year period will be 18% per annum.

As with other Scandinavian countries, the processing services sector is strong in Finland. Exhibit V-91 breaks down the Finnish market by delivery mode. Processing services represents 25% of the total Finnish software and services industry, some 9% higher than the average for the whole of Europe.

EXHIBIT V-91

Software and Services Market Forecast, 1989-1994 Finland

Subsector	Market Forecast (FM Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Processing Services	940	1,025	7	1,450
Network Services	110	160	26	510
Software Products	855	1,130	20	2,830
Professional Services	915	1,110	20	2,775
Systems Integration	40	50	28	175
Turnkey Systems	520	595	20	1,510
Total	3,380	4,070	18	9,250

Exhibits V-92 to V-96 give the detailed breakdown by delivery mode of the forecasts for Finland for the period 1989 to 1994.

4. Competitive Environment

Exhibit V-97 lists the top ten Finnish vendors in 1988.

The largest Finnish software and services vendor is the public sector company Tietotehdas. In 1988 it had total software and services in Finland of FM 430 million and controlled some 13% of total market revenues. It specialises in professional services for banking, insurance and engineering markets, and offers processing services for personnel

EXHIBIT V-92

Processing Services
Market Forecast, 1989-1994
Finland

Subsector	Market Forecast (FM Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Transaction, Utility and Other Services	870	940	6	1,250
Systems Operations	70	85	19	200
Total	940	1,025	7	1,450

EXHIBIT V-93

Network Services
Market Forecast, 1989-1994
Finland

Subsector	Market Forecast (FM Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Network Applications	30	60	28	210
Electronic Information Services	80	100	25	300
Total	110	160	26	510

EXHIBIT V-94

Software Products Market Forecast, 1989-1994 Finland

Subsector	Market Forecast (FM Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Equipment Vendors				
Systems	445	540	18	1,230
Applications	95	145	23	405
Subtotal	540	685	19	1,635
Independents				
Systems	90	115	18	265
Applications	225	330	23	930
Subtotal	315	445	22	1,195
Total Market				
Systems	535	655	18	1,495
Applications	320	475	23	1,335
Total	855	1,130	20	2,830

administration. In addition, it sells software products and distributes equipment. It exports data systems to Sweden and Denmark.

The second largest vendor is also Finnish-owned—Valtion Tietokoneskus (VTKK), the Finnish State Computer Centre. Its 1988 Finnish revenues were some FM 335 million, about 80% of which were derived from central government clients and the remainder from the private sector.

EXHIBIT V-95

Professional Services Market Forecast, 1989-1994 Finland

Subsector	Market Forecast (FM Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
IS Consultancy	130	160	21	415
Custom Software Development	725	875	20	2,180
Education and Training	50	60	19	145
Systems Operations	10	15	23	35
Total	915	1,110	20	2,775

EXHIBIT V-96

Turnkey Systems Market Forecast, 1989-1994 Finland

Subsector	Market Forecast (FM Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
System Equipment	300	325	16	680
Software and Other Charges	220	270	25	830
Total	520	595	20	1,510

EXHIBIT V-97

Top Vendor Rankings and Market Shares, 1988
Software and Services
Finland

Rank	Company	Market Share (Percent)	Estimated Revenues (FM Millions)
1	Tietotehdas	12.7	430
2	Valtion	9.9	335
3	Nokia Data	8.1	275
4	IBM	6.8	230
5	PG-Yhtiot	5.2	175
6	Paakaupunkiseudom	3.8	130
7	Elorg-Data	3.7	125
8	Valmet Data	3.3	110
9	Kunnallistieto	3.0	100
10	Unic	2.4	80
	Others	41.1	1,390
	Total	100.0	3,380

IBM and Digital are strong in software and services in Finland. Apart from Tietotehdas, nearly all Finnish vendors specialise in specific products or services.

There are close links between the Finnish and Swedish software and services markets. Both language and culture are similar. However, Finland lags behind Sweden technically by about four years. Finland also has close links with the USSR. However, exports of high-tech products to the Soviet Union are restricted.

I Netherlands—Market Commentary

1. Introduction

The Netherlands, with a population of 15 million, is also a founding member of the EEC. The software and services market is fifth largest in Europe, with a total size in 1988 of Dfl 5.0 billion ($2.3 billion).

2. Economic Environment

The Netherlands has the highest population density in Europe, and a Gross Domestic Product per capita of Dfl 33,500 ($15,400). It spends a higher proportion (over 25%) of its GDP on social services than any other country in the EEC. The economy grew at 2.6% in 1988 and was projected for 4.5% in 1989 and 3% in 1990. Inflation was less than 1% and was projected for 1990 at 1.8%. The Netherlands is running a current account surplus of around Dfl 10 billion ($5 billion).

The political complexion of the government has changed after the September elections. Elections were called after the ruling centre-right Christian Democrat-Liberal coalition led by Ruud Lubbers collapsed over the financing of an ambitious national plan to reduce pollution. As a result of the election, the Prime minister remains the same, but the incorporation of the Labour party with the Christian Democrats means that the new government is more centre-left as opposed to centre-right. State involvement in the economy is clearly very high, and despite some limited privatisation at the beginning of the year, the emphasis now is likely to be more on spending money, and less on cutting taxes and reducing the budget deficit.

The Dutch have a strong trading tradition, and a strong export-driven economy. They have been successful, for example, in making Rotterdam a major entrepot and thence the most important port in Western Europe. However, attempts to make the Netherlands the electronic gateway to Europe have had only very limited success.

The government has managed to control inflation by reaching a consensus with public sector workers, but there is some doubt whether this squeeze can be maintained indefinitely.

The biggest companies in the Netherlands are the two Anglo-Dutch giants Royal Dutch Shell and Unilever, and Philips. Other Dutch companies in the European top 100 are Akzo and Gasunie. As a traditionally outward-looking exporting country, the Netherlands is expected to benefit from the Single European Act, and Dutch strength in transport services is particularly significant.

3. Software and Services Industry

The Dutch software and services market is forecast by INPUT to grow from Dfl 5.9 billion ($2.7 billion) in 1989 to Dfl 13.5 billion ($6.2 billion) by 1994. INPUT estimates that the average annual growth rate over this five-year period should be 18%.

The Netherlands market represents about 5% of the overall West European software and services market. Exhibit V-98 gives the breakdown of the Netherlands market by delivery mode. Relative to the overall European software and services market, the professional services sector is particularly strong in the Netherlands, accounting for some 37% of the overall market, compared with an average of 30% for Western Europe as a whole.

EXHIBIT V-98

Software and Services Market Forecast, 1989-1994 Netherlands

Subsector	Market Forecast (Dfl Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Processing Services	800	860	6	1,090
Network Services	200	265	25	800
Software Products	1,390	1,730	19	4,150
Professional Services	1,850	2,185	19	5,195
Systems Integration	130	170	24	500
Turnkey Systems	615	700	20	1,725
Total	4,985	5,910	18	13,460

Although the Netherlands has managed to establish itself as the gateway to Europe for trade, it has not been able to put itself in the same key position for software and services. Like Belgium, it is too small to generate domestic vendors who can compete on a European scale.

The Dutch government has tried to attract foreign industry by setting very attractive corporate tax levels, even though personal tax levels are very high. This has succeeded in bringing many traders to Holland, including foreign software and services vendors.

The Netherlands software and services market has a high penetration by foreign vendors. INPUT estimates that some 22% of Dutch end-user revenues were controlled by U.S. vendors in 1989, and about 15% by other European vendors. Domestic vendors therefore control only about 63% of the market.

Dutch vendors do export their products and services, but generally by following the traders and brokers who have established themselves around the ports of Rotterdam and Amsterdam. These two ports serve the hinterland of West Germany and so Dutch software and services have links to Germany. Also, in the free trade area of the Benelux, Dutch vendors are strong in the Belgian market. However, as the Belgian market is about half the size of that of the Netherlands, Belgian vendors are concerned over an influx of Dutch competition.

The Dutch are still trying to emulate their success in the computer software and services trade in the area of network services. Teleports are being developed, but as yet are not successful.

Many U.S. network vendors have taken advantage of low Dutch taxes and have established major computing centres in the Netherlands. GEIS, EDS and IBM all have major processing and network computing centres in the country.

Exhibits V-99 to V-103 give the forecasts for individual delivery modes for the Netherlands for the period 1989 to 1994.

4. Competitive Environment

Exhibit V-104 lists the top ten Dutch software and services vendors as estimated by INPUT for 1988.

The largest Dutch vendor is the domestic professional services company, Volmac. In 1988, Volmac generated some Dfl 490 million in the Netherlands. Volmac also operates in Belgium. IBM was the second largest software and services vendor, with some Dfl 370 million, followed by Cap Gemini Sogeti.

The Netherlands is Cap Gemini Sogeti's second largest market. It did have two wholly owned subsidiaries in the Netherlands—Cap Gemini Nederlands and Pandata. In 1989, these two separately operated companies merged. In total, they had generated Dfl 240 million from the Dutch market in 1988.

Other major software and services vendors in the Netherlands market are Raet and Philips, fourth and fifth largest vendors respectively. Raet delivers a wide range of products and services to the Dutch and the

EXHIBIT V-99

Processing Services
Market Forecast, 1989-1994
Netherlands

Subsector	Market Forecast (Dfl Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Transaction, Utility and Other Services	750	800	3	950
Systems Operations	50	60	20	140
Total	800	860	6	1,090

EXHIBIT V-100

Network Services
Market Forecast, 1989-1994
Netherlands

Subsector	Market Forecast (Dfl Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Network Applications	60	85	30	310
Electronic Information Services	140	180	22	490
Total	200	265	25	800

Belgian markets, such as processing services, professional services and turnkey systems.

EXHIBIT V-101

Software Products Market Forecast, 1989-1994 Netherlands

Subsector	Market Forecast (Dfl Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Equipment Vendors				
Systems	675	830	17	1,810
Applications	165	215	22	580
Subtotal	840	1,045	18	2,390
Independents				
Systems	135	170	17	375
Applications	415	515	22	1,385
Subtotal	550	685	21	1,760
Total Market				
Systems	810	1,000	17	2,185
Applications	580	730	22	1,965
Total	1,390	1,730	19	4,150

Merger and acquisition activity in the Dutch market has not been at a high level. However, Datex, the fifth largest Dutch vendor, was acquired by Getronics Service, the third-party maintenance vendor (previously named Geveke) in late 1988.

Also in 1988, Raet bought Central Beheer Automatisening, which had revenues of some Dfl 90 million from the insurance market. As a result, Raet's 1989 revenues were significantly boosted.

Exhibits V-105 to V-110 show INPUT's estimates of the top vendors for individual delivery modes for the Dutch market in 1988.

EXHIBIT V-102

Professional Services Market Forecast, 1989-1994 Netherlands

Subsector	Market Forecast (Dfl Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
IS Consultancy	230	275	22	740
Custom Software Development	1,400	1,650	18	3,775
Education and Training	200	235	21	605
Systems Operations	20	25	24	75
Total	1,850	2,185	19	5,195

EXHIBIT V-103

Turnkey Systems Market Forecast, 1989-1994 Netherlands

Subsector	Market Forecast (Dfl Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
System Equipment	350	385	15	775
Software and Other Charges	265	315	25	950
Total	615	700	20	1,725

EXHIBIT V-104

Top Vendor Rankings and Market Shares, 1988
Software and Services
Netherlands

Rank	Company	Market Share (Percent)	Estimated Revenues (Dfl Millions)
1	Volmac	9.9	490
2	IBM	7.4	370
3	Cap Gemini Sogeti	4.8	240
4	Raet	4.5	225
5	Datex	3.0	150
6	CMG	2.4	120
7	Unisys	2.3	115
8	BSO	2.2	110
9	Multihouse	2.0	100
10	Computer Centrum Nederland	1.8	90
	Others	59.7	2,975
	Total	100.0	4,985

EXHIBIT V-105

Top Vendor Rankings and Market Shares, 1988
Processing Services
Netherlands

Rank	Company	Market Share (Percent)	Estimated Revenues (Dfl Millions)
1	Raet	8.7	70
2	EDS	5.6	45
3	Computer Centrum Nederland	4.4	35
4	GEIS	3.8	30
5	IBM	3.1	25
	Others	74.4	595
	Total	100.0	800

EXHIBIT V-106

Top Vendor Rankings and Market Shares, 1988
Network Services
Netherlands

Rank	Company	Market Share (Percent)	Estimated Revenues (Dfl Millions)
1	Reuters	20.0	40
2	Telekurs	12.5	25
3	GEIS	10.0	20
4 =	Raet	5.0	10
4 =	Telerate	5.0	10
	Others	47.5	95
	Total	100.0	200

EXHIBIT V-107

Top Vendor Rankings and Market Shares, 1988
Software Products
Netherlands

Rank	Company	Market Share (Percent)	Estimated Revenues (Dfl Millions)
1	IBM	16.6	230
2	Unisys	3.6	50
3	ICS	2.9	40
4	Volmac	1.8	25
5 =	Bull	1.4	20
5 =	Digital	1.4	20
5 =	Akzo	1.4	20
8 =	L&T Informatica	1.1	15
8 =	Oracle	1.1	15
8 =	Software AG	1.1	15
	Others	67.6	940
	Total	100.0	1,390

EXHIBIT V-108

Top Vendor Rankings and Market Shares, 1988
Professional Services
Netherlands

Rank	Company	Market Share (Percent)	Estimated Revenues (Dfl Millions)
1	Volmac	24.9	460
2	Cap Gemini Sogeti	9.7	180
3	Datex	7.0	130
4	Raet	5.7	105
5	CMG	5.4	100
6	IBM	3.8	70
7	SD-Scicon	2.4	45
8=	Unisys	1.6	30
8=	Computer Centrum Nederland	1.6	30
10	CSC	1.4	25
	Others	36.5	675
	Total	100.0	1,850

EXHIBIT V-109

Top Vendor Rankings and Market Shares, 1988
Systems Integration
Netherlands

Rank	Company	Market Share (Percent)	Estimated Revenues (Dfl Millions)
1	Cap Gemini Sogeti	30.7	40
2 =	Philips	15.4	20
2 =	IBM	15.4	20
4 =	Siemens	7.7	10
4 =	Logica	7.7	10
	Others	23.1	30
	Total	100.0	130

EXHIBIT V-110

Top Vendor Rankings and Market Shares, 1988
Turnkey Systems
Netherlands

Rank	Company	Market Share (Percent)	Estimated Revenues (Dfl Millions)
1	Nixdorf	9.7	60
2	Multihouse	8.1	50
3	Intergraph	7.3	45
4	Alpha Computer	5.7	35
5	Prime	4.9	30
6	Unisys	4.1	25
7	Raet	3.3	20
8	Philips	3.3	20
9	IBM	2.4	15
10	McDonnell Douglas	2.4	15
	Others	48.8	300
	Total	100.0	615

J
Belgium—Market Commentary

1. Introduction

Belgium has a population of 10 million and is a founding member of the EEC. Belgium is also part of Benelux, which as a customs union was one of the foundations of the EEC.

Benelux is now one of the most integrated parts of Western Europe, and no physical frontier controls exist between the three members—Belgium, the Netherlands, and Luxembourg. Luxembourg has a population of only 380,000, and because of its small size, for marketing purposes it is generally included as part of Belgium. The software and services market then, is the ninth largest in Europe, with a total size of BF 49 billion ($1.2 billion) in 1988.

2. Economic Environment

Belgium is richer than the average European country, with a Gross Domestic Product per capita of BF 610,000 ($15,100). However, with a small domestic market, and the fact that the country is bilingual (Flemish Dutch and Belgian French), Belgium tends to be more of a crossroads and battleground for others than a power in its own right. The Belgian economy is undoubtedly fitter now than it was in the early 1980s. It was growing at 4.2% in 1988, projected for 1990 at 2.6%. Inflation was at 1.1% in 1989, projected for the early 1990s at 3.5%. Belgium and Luxembourg are running a current account surplus of around BF 120 billion ($3 billion) that is expected to decrease only slightly.

Prime minister Wilfried Martens is head of Belgium's eighth coalition government, which has provided considerable stability over the last year, and also an ambitious programme of structural and constitutional reform. The country is seriously divided between its Walloon and Flemish populations, and a federal system has been proposed as a logical compromise. However, many are concerned that the country could politically disintegrate.

Belgium has traditionally been a high wage (although also highly productive) economy, and has to face up to a huge public sector debt of 120% of the Gross National Product. But significant recent improvements in economic performance and a tradition of successful exporting of semi-finished products mean that many Belgians are confident about the future.

Belgian companies in the European top 100 are Petrofina, Societé Generale de Belgique and Solvay et Cie. The unsuccessful attempt by Carlo De Benedetti to take over Societe Generale has certainly woken up this sleeping giant, which controls probably at least 20% of the Belgian economy. There are many successful and dynamic small and medium-sized companies, especially in the north, and French companies have been making many acquisitions in the French-speaking south. The impact of the Single European Act, and the shift of power away from national capitals to Brussels, will undoubtedly provide much impetus to the Belgian economy. This will especially stimulate the area of professional services, as more companies seek representation.

After the decline of a once-dominant steel industry, Luxembourg has prospered as a kind of fiscal paradise, with low tax, banking secrecy, duty-free shopping, etcetera. However, there is some fear that the approach of the Single European Market will remove Luxembourg's competitive advantage. Alternatively, other members of the EEC who are going through liberalisation of capital controls will be unhappy about Luxembourg's presence and potential assistance to tax avoiders, and will wish to legislate.

3. Software and Services Industry

INPUT forecasts that the Belgian software and services industry will grow from BF 58 billion ($1.4 billion) in 1989 to BF 136 billion ($3.4 billion) by 1994. This represents an average growth rate over this five-year period of 19%.

Exhibit V-111 shows the breakdown of the Belgium software and services industry by delivery mode. The Belgian market is strong in bespoke software development. Professional services represented some 34% of the Belgian market in 1989, compared with 30% for the whole of Europe. The growth of the market is expected to be very similar to that of the European market as a whole, and this picture is not expected to change significantly over the next five years.

EXHIBIT V-111

Software and Services Market Forecast, 1989-1994 Belgium

Subsector	Market Forecast (BF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Processing Services	7,800	8,290	5	10,750
Network Services	2,000	2,770	25	8,300
Software Products	15,040	18,465	19	44,500
Professional Services	16,420	19,620	20	48,615
Systems Integration	2,020	2,550	24	7,500
Turnkey Systems	5,630	6,490	20	16,495
Total	48,910	58,185	19	136,160

The location of the European Commission in Brussels and Luxembourg is helping to sustain growth in the Belgian and Luxembourg markets.

The Commission is developing central electronic information services for the 12 EEC member states. The Commission's host service, ECHO, is located in Luxembourg and aims to provide 900 databases and 90 host services. The Commission is also developing a community-wide international videotex service to link itself with the relevant government departments of the 12 member states.

Exhibits V-112 to V-116 give the detailed forecasts for individual delivery modes in the Belgian market for the period 1989 to 1994.

4. Competitive Environment

Exhibit V-117 lists the top ten vendors in the Belgian market in 1988.

During 1988, the two largest domestic vendors, CIG and Intersys, merged to form CIG-Intersys. In 1988, CIG-Intersys generated some BF 4.1 billion from the Belgian market, or some 8% of total Belgian software and services end-user revenues.

In 1989, it was announced that Computer Sciences Corporation of the U.S. was to acquire CIG-Intersys. This would make Computer Sciences the largest independent vendor in the Belgian market. The acquisition was made due to the belief by Computer Sciences that the Belgian market will be stimulated by the 1992 initiative of the European Commission. This acquisition will more than double Computer Sciences' revenues in Europe.

There is concern within the domestic market that Belgium is too small to generate competitive European vendors on its own. It is expected that there will be further domestic acquisitions by foreign vendors. Both Dutch and French vendors have a strong presence in Belgium.

IBM was the second largest Belgian vendor in 1988, with a revenue of BF 3.5 billion. During 1988, the largest European independent vendor, Cap Gemini Sogeti from France, acquired Sesa Group. It merged its Belgian operation with the Belgian subsidiary of Sesa to create Cap Gemini-Sesa and so became the third largest independent vendor in Belgium. In 1988, Cap Gemini-Sesa had Belgian revenues of BF 1.2 billion.

The only Belgian vendor which was still domestically owned in 1989 in the top ten ranking for 1988 was Informabel. As with CIG-Intersys, Informabel's main delivery mode is processing services.

The largest Dutch vendor in the Belgian market was Volmac, specialising in professional services. It ranked eighth with revenues of BF 1.0 billion. Cap Gemini-Sesa and Volmac are the two leading professional service vendors in Belgium.

EXHIBIT V-112

Processing Services
Market Forecast, 1989-1994
Belgium

Subsector	Market Forecast (BF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Transaction, Utility and Other Services	7,000	7,350	3	8,600
Systems Operations	800	940	18	2,150
Total	7,800	8,290	5	10,750

EXHIBIT V-113

Network Services
Market Forecast, 1989-1994
Belgium

Subsector	Market Forecast (BF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Network Applications	540	870	30	3,200
Electronic Information Services	1,460	1,900	22	5,100
Total	2,000	2,770	25	8,300

EXHIBIT V-114

Software Products
Market Forecast, 1989-1994
Belgium

Subsector	Market Forecast (BF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Equipment Vendors				
Systems	7,215	8,855	17	19,355
Applications	1,815	2,230	23	6,190
Subtotal	9,030	11,085	18	25,545
Independents				
Systems	1,410	1,745	17	3,885
Applications	4,600	5,635	22	15,070
Subtotal	6,010	7,380	21	18,955
Total Market				
Systems	8,625	10,600	17	23,240
Applications	6,415	7,865	22	21,260
Total	15,040	18,465	19	44,500

EXHIBIT V-115

Professional Services Market Forecast, 1989-1994 Belgium

Subsector	Market Forecast (BF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
IS Consultancy	2,190	2,690	24	7,890
Custom Software Development	12,830	15,260	19	36,420
Education and Training	1,300	1,540	21	3,990
Systems Operations	100	130	20	315
Total	16,420	19,620	20	48,615

EXHIBIT V-116

Turnkey Systems Market Forecast, 1989-1994 Belgium

Subsector	Market Forecast (BF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
System Equipment	3,210	3,570	16	7,420
Software and Other Charges	2,420	2,920	25	9,075
Total	5,630	6,490	20	16,495

EXHIBIT V-117

Top Vendor Rankings and Market Shares, 1988
Software and Services
Belgium

Rank	Company	Market Share (Percent)	Estimated Revenues (BF Millions)
1	CIG-Intersys	8.4	4,100
2	IBM	7.2	3,500
3	Informabel	2.7	1,300
4	Cap Gemini Sogeti/Sesa	2.5	1,200
5	GEIS	2.4	1,150
6=	Unisys	2.2	1,100
6=	Reuters	2.0	1,000
8	Volmac	2.0	1,000
9	Administra	1.8	900
10	Sema/Sobemap	1.7	850
	Others	67.1	32,810
	Total	100.0	48,910

K

Switzerland—Market Commentary

1. Introduction

Switzerland has a population of 6.7 million and is a member of the European Free Trade Association (EFTA). The software and services market is the seventh largest in Europe with a total size of SF 2.2 billion ($1.3 billion) in 1988.

2. Economic Environment

With a relatively small population, Switzerland's Gross Domestic Product per capita at SF 47,000 ($27,650) makes it the richest industrially developed nation per capita. The economy is growing at 3.2%, projected for 1990 at 2.5%. Inflation was at 1.9% in 1988 and is projected for 1990 at 2.5%. Switzerland is running a current account surplus of around SF 10 billion ($6 billion), and has an unemployment rate of under 1%.

Switzerland is a confederation that has been governed by the same four-party coalition for thirty years. It is a crossroads for German, French and Italian cultures, and has strong links with West Germany and Austria. It has traditionally been stable and prosperous, but the Swiss franc, which has been one of the strongest currencies in the world, has recently been persistently declining in value. There is some concern that the government needs to introduce more dynamic change than has been usual, in the face of the Single European Act. The government faces some difficult choices. The need to integrate with Western Europe is offset by the traditional reasons for the country's prosperity—political neutrality, and a different banking system.

The biggest company in Switzerland is Nestle, which has caused an upset by opening its stock to foreign ownership. Other large companies in the European top 100 are the Swedish-Swiss merger of ABB Asea Brown Boveri, Ciba-Geigy, Migros, and Sandoz. Swiss companies are strong in banking, pharmaceuticals and manufacturing, especially machine tools.

3. Software and Services Industry

The Swiss software and services market is forecast by INPUT to grow from SF 2.6 billion ($1.5 billion) in 1989 to SF 6.0 billion ($3.5 billion) by 1994. INPUT estimates that the average growth rate over this five-year period will be 18% per annum, slightly lower than the European average of 19%.

Exhibit V-118 illustrates the breakdown of the Swiss market by delivery mode. With two-thirds of Switzerland speaking German, it is not surprising to find that the breakdown of the Swiss market is similar to that of the West German market; the Swiss market is strong in software products and turnkey systems. These two delivery modes accounted for 53% of the overall Swiss software and services market in 1989, compared with 45% for the whole of Europe.

Exhibits V-119 to V-123 give the detailed forecasts for individual delivery modes for the Swiss market from 1989 to 1994.

4. Competitive Environment

Exhibit V-124 lists the top ten vendors in the Swiss market for 1988.

The Swiss market is a combination of medium-to-small domestic vendors, plus U.S., West German and French vendors.

The exception to this is Telekurs. This domestically-owned company is a major European electronic information services vendor, selling on-line financial information, trading systems and related professional services.

EXHIBIT V-118

Software and Services Market Forecast, 1989-1994 Switzerland

Subsector	Market Forecast (SF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Processing Services	340	365	7	510
Network Services	90	140	25	420
Software Products	655	805	18	1,850
Professional Services	540	640	19	1,520
Systems Integration	50	65	28	220
Turnkey Systems	515	585	20	1,470
Total	2,190	2,600	18	5,990

Telekurs is owned by an association of Swiss banks to which it also provides processing services. It sells its electronic information services throughout European banking centres and also is responsible for the Swiss computer centre where all payment transfers between Swiss banks are executed.

Telekurs had some SF 210 million revenues in Switzerland in 1988 and so represented some 10% of the total market. Major U.S. equipment vendors like IBM, Digital and Unisys are all important in the Swiss software and services market.

Cap Gemini Sogeti has had a subsidiary in Switzerland for some 20 years and generated some SF 40 million from this market in 1988.

EXHIBIT V-119

Processing Services Market Forecast, 1989-1994 Switzerland

Subsector	Market Forecast (SF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Transaction, Utility and Other Services	320	340	6	450
Systems Operations	20	25	20	60
Total	340	365	7	510

EXHIBIT V-120

Network Services Market Forecast, 1989-1994 Switzerland

Subsector	Market Forecast (SF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Network Applications	10	20	41	110
Electronic Information Services	80	120	21	310
Total	90	140	25	420

EXHIBIT V-121

Software Products
Market Forecast, 1989-1994
Switzerland

Subsector	Market Forecast (SF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Equipment Vendors				
Systems	375	450	16	945
Applications	60	80	22	215
Subtotal	435	530	17	1,160
Independents				
Systems	70	90	16	190
Applications	150	185	22	500
Subtotal	220	275	20	690
Total Market				
Systems	445	540	16	1,135
Applications	210	265	22	715
Total	655	805	18	1,850

EXHIBIT V-122

Professional Services Market Forecast, 1989-1994 Switzerland

Subsector	Market Forecast (SF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
IS Consultancy	68	78	20	200
Custom Software Development	370	440	18	1,010
Education and Training	100	120	21	305
Systems Operations	2	2	16	5
Total	540	640	19	1,520

EXHIBIT V-123

Turnkey Systems Market Forecast, 1989-1994 Switzerland

Subsector	Market Forecast (SF Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
System Equipment	295	325	16	665
Software and Other Charges	220	260	25	805
Total	515	585	20	1,470

EXHIBIT V-124

Top Vendor Rankings and Market Shares, 1988 Software and Services Switzerland

Rank	Company	Market Share (Percent)	Estimated Revenues (SF Millions)
1	Telekurs	9.6	210
2	IBM	5.5	120
3	Unisys	4.6	100
4	Nixdorf	2.7	60
5	Fides	2.5	55
6	Cap Gemini Sogeti	1.8	40
7=	Mannesmann Kienzle	1.6	35
7=	Digital	1.6	35
9	Bull	1.2	25
10	Andersen	0.9	20
	Others	68.0	1,490
	Total	100.0	2,190

L

Austria—Market Commentary

1. Introduction

Austria has a population of 7.6 million and is a member of the European Free Trade Association (EFTA). The total software and services market is relatively small—Sch 9.1 billion ($0.7 billion) in 1988.

2. Economic Environment

Austria has a Gross Domestic Product per capita of Sch 227,000 ($16,700), which is more than the European average. The economy grew at 4.2% in 1988, projected for 1990 at 2.5%. Inflation was at 2%, projected for 1990 at 3.5%. Austria is running a current account deficit, expected to vary between Sch 7 and 11 billion ($500 million and $800 million).

The Austrian economy underwent a 'miracle' in the mid-1970s under the Socialist government of Bruno Kreisky, who was Chancellor from 1970

to 1983. The economic recovery was driven by state spending and large budget and trade deficits, but at the same time maintaining industrial peace and a strong currency. The political complexion of the government is now more complex, with a Socialist-Conservative coalition under Socialist chancellor Franz Vranitsky, and controversial Conservative president Kurt Waldheim.

The existing arrangement is coalition rather than consensus, although a reduction of state involvement in economy is agreed. This is being pursued by some privatisation, and austerity measures are reducing the budget deficit. The key question facing Austria is whether or not to join the EEC, and what impact this might have on a politically neutral country that has been a bridge between East and West Europe. The Austrian economy is very dependent on that of West Germany, and events in Berlin are obviously very relevant to Austria.

By far the biggest company in Austria is OAIG, the state-owned holding company which accounts for more than 20% of the total national industrial investment, 17% of national exports, and 15% of jobs in manufacturing. OAIG is going through a restructuring process to become more efficient and more international.

3. Software and Services Industry

The Austrian market is forecast by INPUT to grow from Sch 10.7 billion ($0.8 billion) in 1989 to Sch 24.1 billion ($1.8 billion) by 1994. The average growth rate over this five-year period will be 18% per annum.

Exhibit V-125 gives a breakdown of the Austrian software and services market by delivery mode for the period 1988 to 1994. Relative to the overall European software and services market and like the market of its larger neighbour West Germany, the Austrian market is particularly strong in software products and turnkey systems. In 1989, as in Switzerland, these two delivery modes represented 53% of the Austrian market, compared with only 47% for the whole of Europe.

Exhibits V-126 to V-130 give the detailed breakdown of individual delivery modes for the Austrian market for the period 1989 to 1994.

4. Competitive Environment

Exhibit V-131 lists the top vendors in the Austrian market in 1988.

The Austrian market is small and centred on Vienna. Being German-speaking, many of the larger West German vendors are involved in it. Equipment vendors continue to be important, both U.S. and West German.

EXHIBIT V-125

Software and Services Market Forecast, 1989-1994 Austria

Subsector	Market Forecast (Sch Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Processing Services	1,640	1,770	6	2,330
Network Services	340	510	25	1,580
Software Products	2,765	3,360	18	7,730
Professional Services	2,130	2,495	19	5,970
Systems Integration	185	255	26	800
Turnkey Systems	2,000	2,280	20	5,730
Total	9,060	10,670	18	24,140

IBM is the largest software and services vendor in Austria, with revenues of some Sch 920 million in 1988. Nixdorf has revenues in Austria of some Sch 450 million and Mannesmann Kienzle Sch 270 million. These three equipment vendors on their own account for about 18% of the total Austrian market.

The largest Austrian vendor, Dataservice, had software and services revenues in Austria of Sch 220 million in 1988. It was founded by the Commercial Bank in 1966. It specialises in processing services and development of bespoke software for IBM mainframes. A significant proportion of its total revenues comes from acting as a distributor for PCs.

Management Data, the second largest Austrian-owned vendor, generated Sch 165 million from software and services in Austria. It too is owned by a major Austrian financial institution, Creditanstalt-Bankverein. Some 25% of its total revenues are from export markets through its international banking software. Most of its revenues are generated from selling PC solutions to domestic customers.

EXHIBIT V-126

Processing Services Market Forecast, 1989-1994 Austria

Subsector	Market Forecast (Sch Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Transaction, Utility and Other Services	1,580	1,700	5	2,170
Systems Operations	60	70	18	160
Total	1,640	1,770	6	2,330

EXHIBIT V-127

Network Services Market Forecast, 1989-1994 Austria

Subsector	Market Forecast (Sch Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Network Applications	40	60	47	410
Electronic Information Services	300	450	21	1,170
Total	340	510	25	1,580

EXHIBIT V-128

Software Products
Market Forecast, 1989-1994
Austria

Subsector	Market Forecast (Sch Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Equipment Vendors				
Systems	1,560	1,890	16	3,940
Applications	260	315	23	880
Subtotal	1,820	2,205	17	4,820
Independents				
Systems	305	365	17	795
Applications	640	790	22	2,115
Subtotal	945	1,155	20	2,910
Total Market				
Systems	1,865	2,255	16	4,735
Applications	900	1,105	22	2,995
Total	2,765	3,360	18	7,730

With West German influence well-established in Austria, there has been little merger and acquisition activity in the run towards 1992 and the development of a Single European Market in the EEC. Austria's natural route into the EEC is via West Germany.

EXHIBIT V-129

Professional Services Market Forecast, 1989-1994 Austria

Subsector	Market Forecast (Sch Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
IS Consultancy	270	320	21	830
Custom Software Development	1,540	1,800	18	4,130
Education and Training	300	350	22	950
Systems Operations	20	25	19	60
Total	2,130	2,495	19	5,970

EXHIBIT V-130

Turnkey Systems Market Forecast, 1989-1994 Austria

Subsector	Market Forecast (Sch Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
System Equipment	1,140	1,255	16	2,580
Software and Other Charges	860	1,025	25	3,150
Total	2,000	2,280	20	5,730

EXHIBIT V-131

Top Vendor Rankings and Market Shares, 1988
Software and Services
Austria

Rank	Company	Market Share (Percent)	Estimated Revenues (Sch Millions)
1	IBM	10.2	920
2	Nixdorf	5.0	450
3	Mannesmann Kienzle	3.0	270
4	Data-Service	2.4	220
5	GRZ Linz	2.4	215
6	Beko	2.2	200
7=	GEIS	1.8	165
7=	Management Data	1.8	165
9	Voest-Alpine	1.5	135
10	Unisys	1.4	130
	Others	68.3	6,190
	Total	100.0	9,060

M

Spain—Market Commentary

1. Introduction

Spain has a population of 39 million and, with Portugal, is the latest addition to the EEC, having been a member since 1986. The Spanish software and services market is the fastest-growing in Europe, worth Pta 149 billion ($1.2 billion) in 1988, making it the eighth largest European software and services market.

2. Economic Environment

Spain has been a relatively poor country in Europe with a GDP per capita of Pta 1,055,000 ($8,700) but has lately been experiencing sustained growth after the recession of the early eighties, and record rates of foreign investment. The economy grew at 5% in 1989, projected to decline to 3.5% in 1990. Inflation, which was one of the highest in Europe, has been reduced to 4.8% in 1988, and is projected to be 5.5% by the early 1990s. Unemployment still remains one of the highest in Europe, at over

20%. Spain is running into balance-of-trade difficulties, with a current account deficit of Pta 360 billion ($3 billion), projected to increase to over Pta 1,500 billion ($12 billion) by 1990. There are clear indications that the Spanish economy, like the British, has been overheating.

The Spanish centre party UCD—which had governed the country since the first free elections after the death of General Franco—totally collapsed in the 1982 general election, allowing the Spanish Socialist Workers' Party to take power under Felipe Gonzalez. Despite its very leftist title, this government has conducted a very centre-right economic policy. Apart from the very controversial nationalisation of Spain's largest commercial conglomerate, Rumasa, little or no nationalisation has taken place, and many parts of Rumasa were sold back into the private sector.

A weak and divided political opposition both on the left and on the right had kept the Socialist Workers' Party in power, but in the most recent elections (October 1989), as a result of gains by a more united left, it lost its overall majority by just one seat. In view of the unpopular measures facing the government in order to deflate the economy—although it is unlikely that an issue can be found to unite all the opposition parties—the government has less room for manoeuvre than before.

It is important to recognize that Spain is not a homogeneous country, and over one quarter of the population speaks a different native language than the national language, Castilian Spanish: either Catalan Spanish, Galician Spanish or Basque. These regions tend to favour Europe as a means of becoming more independent from the central government, and although not strictly a federal country, Spain is a monarchy with a series of autonomies. The most powerful autonomous economy outside of the capital, Madrid, is that of Catalonia, centred around Barcelona, which has a regional government of centre-right nationalists called Convergencia i Unio.

Spain has a predominance of small and medium companies, especially outside of the capital. The two biggest regional companies in the European top 100 are INI and Repsol, both of which are state-owned. Many structural changes are taking place in Spain in order to meet the challenge of the Single European Act. A significant amount of money is being spent on infrastructure and the banks are being encouraged by the government to merge in order to compete with the larger French, West German and British banks. The financial sector and the agricultural sector face 1992 with some confidence; the prospects for manufacturing are less certain.

3. Software and Services Industry

Although the Spanish software and services market was the eighth largest in 1988, by 1989 INPUT estimates that it had overtaken Denmark

to become the seventh largest and that by 1994 it should be the fifth largest. INPUT forecasts that the Spanish market will enjoy the highest average growth rate in West Europe over the period 1989 to 1994 at 22% per annum. Over this period, this market should have overtaken both the Swedish and the Swiss software and services markets in size.

INPUT forecasts that the Spanish market should grow from Pta 184 billion ($1.5 billion) in 1989 to Pta 488 billion ($4.0 billion) by 1994. Exhibit V-132 shows the breakdown of the Spanish market by delivery mode.

EXHIBIT V-132

Software and Services Market Forecast, 1989-1994 Spain

Subsector	Market Forecast (Pta Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Processing Services	24,000	27,300	13	49,500
Network Services	4,850	9,700	29	35,100
Software Products	42,950	53,850	22	145,100
Professional Services	42,400	52,950	23	151,500
Systems Integration	4,850	6,500	27	21,500
Turnkey Systems	29,800	33,900	20	85,400
Total	148,850	184,200	22	488,100

As with Italy, the Spanish software and services market is split geographically, with the government sector in one part of the country and the business sector in the other. Government, banking and multinational corporations are located in the centre of the country in Madrid. Business tends to be in the east, centred around Barcelona.

Major state-owned and equipment vendors are also located in Madrid. Domestic vendors, which tend to be numerous and small, are in and around Barcelona.

EXHIBIT V-133

Processing Services Market Forecast, 1989-1994 Spain

Subsector	Market Forecast (Pta Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Transaction, Utility and Other Services	22,500	25,500	12	45,000
Systems Operations	1,500	1,800	20	4,500
Total	24,000	27,300	13	49,500

EXHIBIT V-134

Network Services Market Forecast, 1989-1994 Spain

Subsector	Market Forecast (Pta Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Network Applications	1,150	2,400	40	13,100
Electronic Information Services	3,700	7,300	25	22,000
Total	4,850	9,700	29	35,100

French vendors have seen the Spanish market as an easy target, being significantly less advanced than France and dominated historically by a few major U.S. equipment vendors like IBM and NCR. Many larger French vendors have expanded into Spain by buying up domestic Spanish vendors.

Exhibits V-133 to V-137 give the detailed breakdowns of the Spanish software and services market for the period 1989 to 1994 by individual delivery mode.

EXHIBIT V-135

Software Products
Market Forecast, 1989-1994
Spain

Subsector	Market Forecast (Pta Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Equipment Vendors				
Systems	22,650	28,450	20	70,750
Applications	5,100	6,550	25	20,000
Subtotal	27,750	35,000	21	90,750
Independents				
Systems	4,400	5,500	20	13,650
Applications	10,800	13,350	25	40,700
Subtotal	15,200	18,850	24	54,350
Total Market				
Systems	27,050	33,950	20	84,400
Applications	15,900	19,900	25	60,700
Total	42,950	53,850	22	145,100

EXHIBIT V-136

Professional Services Market Forecast, 1989-1994 Spain

Subsector	Market Forecast (Pta Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
IS Consultancy	5,700	7,250	25	22,100
Custom Software Development	31,300	38,800	23	109,200
Education and Training	4,400	5,600	25	17,000
Systems Operations	1,000	1,300	20	3,200
Total	42,400	52,950	23	151,500

EXHIBIT V-137

Turnkey Systems Market Forecast, 1989-1994 Spain

Subsector	Market Forecast (Pta Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
System Equipment	16,950	18,650	16	38,400
Software and Other Charges	12,850	15,250	25	47,000
Total	29,800	33,900	20	85,400

4. Competitive Environment

Exhibit V-138 lists the top ten vendors in the Spanish market in 1988.

EXHIBIT V-138

Top Vendor Rankings and Market Shares, 1988
Software and Services
Spain

Rank	Company	Market Share (Percent)	Estimated Revenues (Pta Millions)
1	IBM	11.5	17,200
2	Nixdorf	7.8	11,600
3	ENTEL	4.4	6,600
4	CISI/CCS	3.4	5,100
5	Logic Control	3.2	4,700
6	Unisys	3.1	4,600
7	Andersen	3.0	4,500
8	Iberimatica	2.4	3,500
9	Sema	2.3	3,400
10	Eria	2.1	3,150
	Others	56.8	84,500
	Total	100.0	148,850

IBM is the largest software and services vendor in Spain, with revenues in 1988 of some Pta 17 billion, or 12% of the total Spanish software and services market.

The largest domestic vendor is ENTEL, which is partly owned by the state telephone company, Telefonica. ENTEL in turn owns 35% of Ibermatica, the leading Spanish professional services and software products vendor.

Of the French vendors involved in the Spanish market, CCS the second largest independent, is owned by CISI. Sema Group owns Sema Metra Iberica, and GSI has a Spanish subsidiary, GSI Seresco. Compagnie Generale d'Informatique owns CGI Informatica.

INPUT estimates that the Spanish software and services market has the highest penetration by foreign vendors of all European markets. Thirty-six percent of Spanish end-user revenues are judged to controlled by U.S. vendors and some 28% by non-Spanish European vendors, leaving only some 36% of the market for domestic Spanish vendors.

N

Rest of Europe—Market Commentary

1. Introduction

The market designated as the rest of Europe was a software and services market of $390 million in 1989, and consists of three member countries of the EEC: Eire (Southern Ireland), Greece, and Portugal. Greece and Portugal have populations of 10 million, whilst Ireland has only 3.5 million.

2. Economic Environment

Portugal has a GDP per capita of $4,100 and is experiencing relatively high growth of between 3% and 4%. It has high inflation—in excess of 12%—and a growing trade deficit.

Ireland has a GDP per capita of $8,900, and is experiencing high growth at 4%, expected to reduce to 2%. It has moderate inflation at 4%, and a balance-of-trade surplus. The main problem in Ireland is a very high, very stubborn unemployment rate of nearly 20%. With a high standard of education, the fate of many Irish is to emigrate to Europe and the United States.

Greece has a GDP per capita of $5,300, and is growing at around 3%. It has an inflation rate of nearly 14%, and a growing balance-of-trade deficit. It is also experiencing political instability as a result of the fall from power of Pasok under Mr. Papandreu.

3. Software and Services Industry

The size of the software and services industries in 1989 in these three countries is estimated to be $220 million in Ireland, $110 million in Portugal, and $60 million in Greece, as illustrated in Exhibit V-139. Overall, these markets are expected to grow by an average of 21% per annum over the period 1989-1994.

By 1994, the individual country markets are forecast to be $690 million for Ireland, $340 million for Portugal and $170 million for Greece.

EXHIBIT V-139

Software and Services Market Forecast, 1989-1994 Rest of Europe

Subsector	Market Forecast ($ Millions) 1988	1989	1989-1994 CAGR (Percent)	1994
Processing Services	60	65	12	115
Network Services	15	20	27	75
Software Products	120	145	21	370
Professional Services	100	125	22	340
Systems Integration	10	15	24	55
Turnkey Systems	85	100	20	245
Total	390	470	21	1,200

A

Appendix: Definition of Terms

A

Appendix: Definition of Terms

A

Revenue

- *Captive Computer Services Revenue* - Revenue received from users who are part of the same parent corporation as the vendors.

- *Noncaptive Computer Services Revenue* - Revenue received for computer services provided from users who are not part of the same parent corporation as the vendor.

- *Other Revenue* - Revenue derived from lines of business other than those defined above.

- *Total Company Revenue* - Revenue received from total computer services and other sources of revenue.

- *Total Computer Software and Services Revenue* - Revenue received from services provided by vendors that perform data processing using the vendors' computers (processing services), assist users to perform such functions on their own computers (software products and/or professional services), provide a combination of hardware and software integrated into a total system (turnkey systems), include consulting, education and training, programming analysis, and facilities management (professional services), provide for systems design, integration and installation (systems integration), or offer network, enhanced management services, electronic mail, electronic data interchange, or electronic information services (network services).

B

Service Modes

- *Processing Services*

  - Transaction Services: uses vendor equipment and software at vendor site or customer site, may be interactive or remote-batch-oriented.

- Utility Services: access to basic software tools enabling users to develop their own problem solutions (language compilers,assemblers, DBMS, sorts, scientific library routines, etc).

- Other Services: carry-in batch processing, computer output microfilm services (COM), data entry services, disaster recovery/backup services.

- Facilities Management (Systems Operations): vendor provides a complete operating information system for customer including equipment, software, personnel and facilities.

• *Professional Services* - Management consulting activity related to EDP systems consulting, production of custom software, education and training, and systems operations of client-owned computers (formerly identified as facilities management) where the vendor provides human resources to operate and manage the client facility.

• *Systems Integration* - delivery of large, multidisciplinary, multivendor systems, incorporating some or all of these functions: systems design, programming, integration, equipment, networks, installation and acceptance. Systems can encompass multiple product delivery modes.

• *Software Products*

- Systems software and/or applications software packages purchased by users.

· Systems Software Products

Systems Control Software: operating systems, communications monitors, network control, library control, windowing, access control, security, etc.

Data Center Management Software: capacity management, scheduling, job accounting, performance monitors, tape management, utilities, downtime repair monitoring management, etc.

Application Development Tools Software: application generators, assemblers, compilers, 4GLs, automated documentation, languages, translators, database management systems, data dictionaries.

· Applications Software Products

Cross-Industry Applications Software: used by clients in many or all vertical markets (i.e., payroll, word processing, spreadsheets, accounts receivable).

Industry-Specific Applications Software: unique to a specific vertical market and sold into that market only (i.e., demand deposit accounting, MRP II, hospital patient tracking).

- *Network Services*

  - Network Management and Enhanced Services: network management functions, network transmission facilities, augmented with computerized switching and features such as packet switching, electronic mail, store-and-forward message switching, terminal interface and error detection and correction.

  - Network Applications

    · Electronic Data Interchange (EDI): application-to-application electronic communication, based on established business document standards.

    · E-Mail: a range of services that transmits documents consisting of text and graphic material to be read by a person—with the quality of document being high.

    · All other application services in which the network is the principal part of the service, e.g., electronic funds transfer and some videotex services.

- *Electronic Information Services*

  - Databases that provide specific information via terminal-based inquiry such as stock prices, legal precedents, economic indicators, airline schedules, etc.

  - News services that offer current information, either general or for a specific category; i.e., financial or political

  - Other services that provide interactive access to data bases and offer the inquirer the capability to send as well as receive information for such purposes as home shopping, home banking, travel reservations, etc.

- *Turnkey Systems* - an integration of systems software, packaged or customized applications software, CPU, equipment, and peripherals. These systems are developed to meet a specific set of user requirements. The value added by the vendor is primarily in the software, either packaged or custom developed. Most CAD/CAM systems and many small business systems are turnkey systems. This does not include specialized hardware systems such as word processors, cash registers, and process control systems.

C

Other Considerations

When questions arise about the proper place to count certain user expenditures, INPUT addresses them from the user viewpoint. Expenditures are then categorised according to what users perceive they are buying.

B

Appendix: Related INPUT Reports

B

Appendix: Related INPUT Reports

- *Applications Software Opportunities--Western Europe, 1988-1993*
- *Toward the Fifth Generation—European Market Opportunities, 1988-1993*
- *Network Services—Western European Market Opportunities, 1988-1993*
- *Commercial Systems Integration—Western Europe, 1988-1993*
- *Turnkey Systems Opportunities—Western Europe, 1989-1994*
- *Western Europe Electronic Information Services, 1989-1994*
- *Professional Services Opportunities—Western Europe, 1989-1994*
- *The Challenge of the Single European Market—1992 and Beyond*
- *Information Services Market Forecast, 1989-1994 (U.S.A.)*

C

Appendix: Detailed Forecast Data, Local Currencies

Software and Services Market Forecast in Local Currency by Market Segment, 1989-1994 France

Subsector	1988 (FF Millions)	1988-1989 Growth (Percent)	FF Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	11,010	3	11,320	11,940	12,520	13,090	13,620	14,050	4
Network Services	3,340	32	4,400	5,700	7,080	8,900	11,000	12,900	24
Software Products	18,230	23	22,380	27,140	32,700	39,150	46,600	54,810	20
Professional Services	24,640	22	30,060	36,720	44,860	53,960	64,900	78,070	21
Systems Integration	2,150	26	2,700	3,600	4,600	5,800	7,300	9,200	28
Turnkey Systems	7,020	16	8,140	9,530	11,280	13,510	16,380	20,060	20
Total	66,390	19	79,000	94,630	113,040	134,410	159,800	189,090	19

Software and Services Market Forecast in Local Currency by Market Segment, 1989-1994 West Germany

Subsector	1988 (DM Millions)	1988-1989 Growth (Percent)	DM Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	2,660	5	2,805	2,960	3,120	3,260	3,390	3,520	5
Network Services	590	44	850	1,140	1,460	1,900	2,270	2,800	27
Software Products	4,140	22	5,070	6,080	7,240	8,580	10,140	11,880	19
Professional Services	3,400	19	4,040	4,795	5,685	6,785	8,090	9,650	19
Systems Integration	690	28	880	1,150	1,450	1,840	2,270	2,800	26
Turnkey Systems	4,150	12	4,645	5,385	6,290	7,430	8,885	10,780	18
Total	15,630	17	18,290	21,510	25,245	29,795	35,045	41,430	18

EXHIBIT C-3

Software and Services Market Forecast in Local Currency by Market Segment, 1989-1994 United Kingdom

Subsector	1988 (£ Millions)	1988-1989 Growth (Percent)	£ Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	565	10	620	675	735	800	860	920	8
Network Services	430	31	565	750	900	1,070	1,200	1,510	22
Software Products	1,100	24	1,360	1,640	1,970	2,350	2,800	3,270	20
Professional Services	1,420	23	1,750	2,140	2,615	3,100	3,670	4,350	20
Systems Integration	255	25	320	400	500	620	775	950	24
Turnkey Systems	950	13	1,075	1,260	1,485	1,775	2,160	2,640	20
Total	4,720	21	5,690	6,865	8,205	9,715	11,465	13,640	19

Software and Services Market Forecast in Local Currency by Market Segment, 1989-1994 Italy

Subsector	1988 (Lira Billions)	1988-1989 Growth (Percent)	Lira Billions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	1,075	10	1,180	1,290	1,400	1,510	1,630	1,750	8
Network Services	320	41	450	600	790	890	1,100	1,280	23
Software Products	2,460	24	3,050	3,720	4,510	5,440	6,540	7,840	21
Professional Services	2,050	23	2,525	3,105	3,835	4,575	5,465	6,530	21
Systems Integration	200	20	240	330	420	530	670	830	24
Turnkey Systems	635	16	735	855	1,010	1,205	1,450	1,760	19
Total	6,740	21	8,180	9,900	11,965	14,150	16,855	19,990	20

EXHIBIT C-5

Software and Services Market Forecast in Local Currency by Market Segment, 1989-1994 Sweden

Subsector	1988 (SK Millions)	1988-1989 Growth (Percent)	SK Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	2,400	8	2,580	2,430	2,950	3,150	3,320	3,500	6
Network Services	300	47	440	590	740	900	1,170	1,420	26
Software Products	2,275	24	2,830	3,420	4,150	4,970	5,940	7,060	20
Professional Services	2,535	20	3,040	3,630	4,330	5,150	6,130	7,290	19
Systems Integration	185	22	225	300	390	490	620	770	27
Turnkey Systems	1,455	14	1,655	2,000	2,340	2,810	3,430	4,220	21
Total	9,150	18	10,770	12,370	14,900	17,470	20,610	24,260	18

EXHIBIT C-6

Software and Services Market Forecast in Local Currency by Market Segment, 1989-1994 Denmark

Subsector	1988 (DK Millions)	1988-1989 Growth (Percent)	DK Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	2,755	2	2,815	3,005	3,190	3,380	3,560	3,730	6
Network Services	260	42	370	500	630	780	1,000	1,210	27
Software Products	1,885	23	2,315	2,805	3,390	4,075	4,870	5,780	20
Professional Services	1,900	21	2,290	2,760	3,340	3,975	4,725	5,620	20
Systems Integration	140	21	170	210	260	323	405	500	24
Turnkey Systems	1,240	15	1,420	1,670	1,995	2,400	2,925	3,600	21
Total	8,180	15	9,380	10,950	12,805	14,933	17,485	20,440	17

EXHIBIT C-7

Software and Services Market Forecast in Local Currency by Market Segment, 1989-1994 Norway

Subsector	1988 (NK Millions)	1988-1989 Growth (Percent)	NK Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	2,780	6	2,950	3,125	3,290	3,460	3,630	3,800	5
Network Services	190	37	260	355	445	550	700	870	27
Software Products	1,485	24	1,835	2,197	2,620	3,125	3,705	4,390	19
Professional Services	1,485	18	1,755	2,070	2,440	2,840	3,310	3,860	17
Systems Integration	110	18	130	155	180	220	265	325	20
Turnkey Systems	890	13	1,010	1,195	1,425	1,715	2,090	2,575	21
Total	6,940	14	7,940	9,097	10,400	11,910	13,700	15,820	15

Software and Services Market Forecast in Local Currency by Market Segment, 1989-1994 Finland

Subsector	1988 (FM Millions)	1988-1989 Growth (Percent)	FM Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	940	9	1,025	1,110	1,190	1,280	1,365	1,450	7
Network Services	110	45	160	220	280	340	420	510	26
Software Products	855	32	1,130	1,370	1,655	1,995	2,385	2,830	20
Professional Services	915	21	1,110	1,350	1,650	1,965	2,335	2,775	20
Systems Integration	40	25	50	65	85	110	140	175	28
Turnkey Systems	520	14	595	700	835	1,005	1,225	1,510	20
Total	3,380	20	4,070	4,815	5,695	6,695	7,870	9,250	18

EXHIBIT C-9

Software and Services Market Forecast in Local Currency by Market Segment, 1989-1994 Netherlands

Subsector	1988 (Dfl Millions)	1988-1989 Growth (Percent)	Dfl Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	800	8	860	920	970	1,000	1,040	1,090	6
Network Services	200	33	265	360	450	555	675	800	25
Software Products	1,390	24	1,730	2,080	2,450	2,965	3,515	4,150	19
Professional Services	1,850	18	2,185	2,600	3,085	3,670	4,365	5,195	19
Systems Integration	130	31	170	220	280	345	420	500	24
Turnkey Systems	615	14	700	825	980	1,175	1,420	1,725	20
Total	4,985	19	5,910	7,005	8,215	9,710	11,435	13,460	18

Software and Services Market Forecast in Local Currency by Market Segment, 1989-1994 Belgium

Subsector	1988 (BF Millions)	1988-1989 Growth (Percent)	BF Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	7,800	6	8,290	8,845	9,375	9,880	10,340	10,750	5
Network Services	2,000	39	2,770	3,700	4,710	5,700	6,940	8,300	25
Software Products	15,040	23	18,465	22,200	26,600	31,740	37,650	44,500	19
Professional Services	16,420	19	19,620	23,820	28,930	34,385	40,880	48,615	20
Systems Integration	2,020	26	2,550	3,260	4,110	5,100	6,230	7,500	24
Turnkey Systems	5,630	15	6,490	7,670	9,145	10,990	13,400	16,495	20
Total	48,910	19	58,185	69,495	82,870	97,795	115,440	136,160	19

Software and Services Market Forecast in Local Currency by Market Segment, 1989-1994 Switzerland

Subsector	1988 (SF Millions)	1988-1989 Growth (Percent)	SF Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	340	7	365	400	430	450	480	510	7
Network Services	90	56	140	175	240	285	325	420	25
Software Products	655	23	805	960	1,140	1,345	1,585	1,850	18
Professional Services	540	19	640	765	915	1,080	1,285	1,520	19
Systems Integration	50	31	65	85	110	140	180	220	28
Turnkey Systems	515	14	585	690	825	995	1,205	1,470	20
Total	2,190	19	2,600	3,075	3,660	4,295	5,060	5,990	18

Software and Services Market Forecast in Local Currency by Market Segment, 1989-1994 Austria

Subsector	1988 (Sch Millions)	1988-1989 Growth (Percent)	Sch Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	1,640	8	1,770	1,890	2,000	2,110	2,220	2,330	6
Network Services	340	50	510	650	895	1,080	1,230	1,580	25
Software Products	2,765	22	3,360	4,010	4,758	5,600	6,620	7,730	18
Professional Services	2,130	17	2,495	2,965	3,520	4,190	5,005	5,970	19
Systems Integration	185	38	255	330	420	520	640	800	26
Turnkey Systems	2,000	14	2,280	2,690	3,210	3,870	4,705	5,730	20
Total	9,060	18	10,670	12,535	14,803	17,370	20,420	24,140	18

EXHIBIT C-13

Software and Services Market Forecast in Local Currency by Market Segment, 1989-1994 Spain

Subsector	1988 (Pta Millions)	1988-1989 Growth (Percent)	Pta Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	24,000	14	27,300	31,350	35,650	40,200	44,900	49,500	13
Network Services	4,850	100	9,700	14,300	17,550	22,000	27,950	35,100	29
Software Products	42,950	25	53,850	66,450	81,750	99,800	121,000	145,100	22
Professional Services	42,400	25	52,950	65,900	82,100	100,700	123,500	151,500	23
Systems Integration	4,850	34	6,500	8,700	11,100	14,100	17,600	21,500	27
Turnkey Systems	29,800	14	33,900	40,050	47,800	57,600	70,000	85,400	20
Total	148,850	24	184,200	226,750	275,950	334,400	404,950	488,100	22

Software and Services Market Forecast in Local Currency by Market Segment, 1989-1994 Rest of Europe

Subsector	1988 ($ Millions)	1988-1989 Growth (Percent)	$ Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	60	8	65	75	85	95	105	115	12
Network Services	15	33	20	32	45	52	60	75	27
Software Products	120	21	145	175	215	260	315	370	21
Professional Services	100	25	125	155	190	230	280	340	22
Systems Integration	10	50	15	20	25	35	45	55	24
Turnkey Systems	85	18	100	115	135	165	200	245	20
Total	390	21	470	572	695	837	1,005	1,200	21

D

Appendix: Detailed Forecast Data, ECUs

EXHIBIT D-1

Software and Services Market Forecast in ECUs by Market Segment, 1989-1994 France

Subsector	1988 (ECU Millions)	1988-1989 Growth (Percent)	ECU Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	1,571	3	1,615	1,703	1,786	1,867	1,943	2,004	4
Network Services	476	32	628	813	1,010	1,270	1,569	1,840	24
Software Products	2,601	23	3,193	3,872	4,665	5,585	6,648	7,819	20
Professional Services	3,515	22	4,288	5,238	6,399	7,698	9,258	11,137	21
Systems Integration	307	26	385	514	656	827	1,041	1,312	28
Turnkey Systems	1,001	16	1,161	1,359	1,609	1,927	2,337	2,862	20
Total	9,471	19	11,270	13,499	16,125	19,174	22,796	26,974	19

Software and Services Market Forecast in ECUs by Market Segment, 1989-1994 West Germany

Subsector	1988 (ECU Millions)	1988-1989 Growth (Percent)	ECU Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	1,285	5	1,355	1,430	1,507	1,575	1,638	1,700	5
Network Services	285	44	411	551	705	918	1,097	1,353	27
Software Products	2,000	22	2,449	2,937	3,498	4,145	4,899	5,739	19
Professional Services	1,643	19	1,952	2,316	2,746	3,278	3,908	4,662	19
Systems Integration	333	28	425	556	700	889	1,097	1,353	26
Turnkey Systems	2,005	12	2,244	2,601	3,039	3,589	4,292	5,208	18
Total	7,551	17	8,836	10,391	12,195	14,394	16,931	20,015	18

Software and Services Market Forecast in ECUs by Market Segment, 1989-1994 United Kingdom

Subsector	1988 (ECU Millions)	1988-1989 Growth (Percent)	ECU Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	843	10	925	1,007	1,097	1,194	1,284	1,373	8
Network Services	642	31	843	1,119	1,343	1,597	1,791	2,254	22
Software Products	1,642	24	2,030	2,448	2,940	3,507	4,179	4,881	20
Professional Services	2,119	23	2,612	3,194	3,903	4,627	5,478	6,493	20
Systems Integration	381	25	478	597	746	925	1,157	1,418	24
Turnkey Systems	1,418	13	1,604	1,881	2,216	2,649	3,224	3,940	20
Total	7,045	21	8,492	10,246	12,245	14,499	17,113	20,359	19

Software and Services Market Forecast in ECUs by Market Segment, 1989-1994 Italy

Subsector	1988 (ECU Millions)	1988-1989 Growth (Percent)	ECU Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	719	10	789	863	936	1,010	1,090	1,171	8
Network Services	214	41	301	401	528	595	736	856	23
Software Products	1,645	24	2,040	2,488	3,017	3,639	4,375	5,244	21
Professional Services	1,371	23	1,689	2,077	2,565	3,060	3,656	4,368	21
Systems Integration	134	20	161	221	281	355	448	555	24
Turnkey Systems	425	16	492	572	676	806	970	1,177	19
Total	4,508	21	5,472	6,622	8,003	9,465	11,275	13,371	20

EXHIBIT D-5

Software and Services Market Forecast in ECUs by Market Segment, 1989-1994 Sweden

Subsector	1988 (ECU Millions)	1988-1989 Growth (Percent)	ECU Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	341	8	366	345	419	447	472	497	6
Network Services	43	47	63	84	105	128	166	202	26
Software Products	323	24	402	486	589	706	844	1,003	20
Professional Services	360	20	432	516	615	732	871	1,036	19
Systems Integration	26	22	32	43	55	70	88	109	27
Turnkey Systems	207	14	235	284	332	399	487	599	21
Total	1,300	18	1,530	1,758	2,115	2,482	2,928	3,446	18

Software and Services Market Forecast in ECUs by Market Segment, 1989-1994 Denmark

Subsector	1988 (ECU Millions)	1988-1989 Growth (Percent)	ECU Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	342	2	349	373	396	419	442	463	6
Network Services	32	42	46	62	78	97	124	150	27
Software Products	234	23	287	348	421	506	604	717	20
Professional Services	236	21	284	342	414	493	586	697	20
Systems Integration	17	21	21	26	32	40	50	62	24
Turnkey Systems	154	15	176	207	248	298	363	447	21
Total	1,015	15	1,163	1,358	1,589	1,853	2,169	2,536	17

Software and Services Market Forecast in ECUs by Market Segment, 1989-1994 Norway

Subsector	1988 (ECU Millions)	1988-1989 Growth (Percent)	ECU Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	369	6	392	415	437	459	482	505	5
Network Services	25	37	35	47	59	73	93	116	29
Software Products	197	24	244	292	348	415	492	583	19
Professional Services	197	18	233	275	324	377	440	513	17
Systems Integration	15	18	17	21	24	29	35	43	24
Turnkey Systems	118	13	134	159	189	228	278	342	21
Total	921	14	1,055	1,209	1,381	1,581	1,820	2,102	15

Software and Services Market Forecast in ECUs by Market Segment, 1989-1994 Finland

Subsector	1988 (ECU Millions)	1988-1989 Growth (Percent)	ECU Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	202	9	220	239	256	275	294	312	7
Network Services	24	45	34	47	60	73	90	110	26
Software Products	184	32	243	295	356	429	513	609	20
Professional Services	197	21	239	290	355	423	502	597	20
Systems Integration	9	25	11	14	18	24	30	38	28
Turnkey Systems	112	14	128	151	180	216	263	325	20
Total	728	20	875	1,036	1,225	1,440	1,692	1,991	18

Software and Services Market Forecast in ECUs by Market Segment, 1989-1994 Netherlands

Subsector	1988 (ECU Millions)	1988-1989 Growth (Percent)	ECU Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	342	8	368	393	415	427	444	466	6
Network Services	85	33	113	154	192	237	288	342	25
Software Products	594	24	739	889	1,047	1,267	1,502	1,774	19
Professional Services	791	18	934	1,111	1,318	1,568	1,865	2,220	19
Systems Integration	56	31	73	94	120	147	179	214	24
Turnkey Systems	263	14	299	353	419	502	607	737	20
Total	2,131	19	2,526	2,994	3,511	4,148	4,885	5,753	18

Software and Services Market Forecast in ECUs by Market Segment, 1989-1994 Belgium

Subsector	1988 (ECU Millions)	1988-1989 Growth (Percent)	ECU Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	179	6	191	203	216	227	238	247	5
Network Services	46	39	64	85	108	131	160	191	25
Software Products	346	23	424	510	611	730	866	1,023	19
Professional Services	377	19	451	548	665	790	940	1,118	20
Systems Integration	46	26	59	75	94	117	143	172	24
Turnkey Systems	129	15	149	176	210	253	308	379	20
Total	1,123	19	1,338	1,597	1,904	2,248	2,655	3,130	19

Software and Services Market Forecast in ECUs by Market Segment, 1989-1994 Switzerland

Subsector	1988 (ECU Millions)	1988-1989 Growth (Percent)	ECU Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	186	7	199	219	235	246	262	279	7
Network Services	49	56	77	96	131	156	178	230	25
Software Products	358	23	440	525	623	735	866	1,011	18
Professional Services	295	19	350	418	500	590	702	831	19
Systems Integration	27	31	35	46	60	77	98	120	28
Turnkey Systems	281	14	320	377	451	544	658	803	20
Total	1,196	19	1,421	1,681	2,000	2,348	2,764	3,274	18

EXHIBIT D-12

Software and Services Market Forecast in ECUs by Market Segment, 1989-1994 Austria

Subsector	1988 (ECU Millions)	1988-1989 Growth (Percent)	ECU Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	112	8	121	129	137	144	152	159	6
Network Services	23	50	35	44	61	74	84	108	25
Software Products	189	22	230	274	325	383	453	529	18
Professional Services	146	17	171	203	241	287	342	408	19
Systems Integration	13	38	17	23	29	36	44	55	26
Turnkey Systems	137	14	156	184	220	265	322	392	20
Total	620	18	730	857	1,013	1,189	1,397	1,651	18

Software and Services Market Forecast in ECUs by Market Segment, 1989-1994 Spain

Subsector	1988 (ECU Millions)	1988-1989 Growth (Percent)	ECU Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	186	14	212	243	276	312	348	384	13
Network Services	38	100	75	111	136	171	217	272	29
Software Products	333	25	417	515	634	774	938	1,125	22
Professional Services	329	25	410	511	636	781	957	1,174	23
Systems Integration	38	34	50	67	86	109	136	167	27
Turnkey Systems	231	14	263	310	371	447	543	662	20
Total	1,154	24	1,428	1,758	2,139	2,592	3,139	3,784	22

EXHIBIT D-14

Software and Services Market Forecast in ECUs by Market Segment, 1989-1994 Rest of Europe

Subsector	1988 (ECU Millions)	1988-1989 Growth (Percent)	ECU Millions						1989-1994 CAGR (Percent)
			1989	1990	1991	1992	1993	1994	
Processing Services	56	8	60	70	79	88	98	107	12
Network Services	14	33	19	30	42	48	56	70	27
Software Products	112	21	135	163	200	242	293	344	21
Professional Services	93	25	116	144	177	214	260	316	22
Systems Integration	9	50	14	18	23	33	42	51	24
Turnkey Systems	79	18	93	107	125	153	186	228	20
Total	363	21	437	532	646	778	935	1,116	21

E

Appendix: Reconciliation

Appendix: Reconciliation

The estimation of end-user revenues for each European country for the year 1988 was revised during 1989 by INPUT. These changes in individual country market sizes can be compared with INPUT's December 1988 report, *The Western European Market for Computer Software and Services, 1988-1993.*

The reasons for these revisions are as follows:

- Additional research during the compilation of this report, *The Western European Market for Computer Software and Services, 1989-1994.* This has led to increasing the estimation of the sizes of:

  - Processing services markets in Denmark and Norway
  - Professional services markets in the Netherlands and Spain

- Detailed research into the network services market during the compilation of the report *Western Europe Electronic Information Services, 1989-1994.* This has led to increasing the estimation of the size of the network services markets in nearly all European countries.

- Detailed research into the turnkey systems market during the compilation of the report *Turnkey Systems Opportunities—Western Europe, 1989-1994.* This has led to revising the estimation of the size of individual countries' turnkey systems markets. The difference between the 1988 and 1989 estimated sizes of individual country turnkey systems markets has been re-allocated to:

  - Software products
  - Professional services

The reason for this is that throughout Europe total solutions consisting of equipment, standard application software and customization are sold where the independent vendor takes title to the equipment from the equipment vendor, and where the title remains with the equipment vendor. Where the independent takes title, INPUT defines this as turnkey systems. Where the independent does not take title, INPUT defines this as a component sale of software products and related professional services.

In many European countries, the component sale of these total solutions is also referred to as turnkey systems. During INPUT's research, this factor has been quantified and forecasts adjusted correspondingly.

- Rounding off to the nearest 5 to 10 million currency units

The effect of the individual factors for each European country is shown in Exhibit E-1.

1988 Western European Computer Software and Services Market, Reconciliation between 1988 and 1989 Reports

Country	Currency	Western Europe 1988 Total Software and Services Market		Reconciliation for 1988							
				Total 1988 Difference 1989-1988 Annual Reports	Annual Report Changes		Network Report Changes	Turnkey Report Changes			Rounding Off Effects
		1988 Annual Report	1989 Annual Report		Processing Services	Profes-sional Services	Network Services	Software Products	Profes-sional Services	Turnkey Systems	
France	FF million	62,799	64,240	+1,441			+1,436	+2,555	+1,278	-3,833	-5
West Germany	DM million	14,598	14,940	+342			+324	-603	-302	+905	-18
United Kingdom	£ million	4,257	4,465	+208			+212	-97	-48	+145	+4
Italy	Lira billion	6,336	6,540	+204			+190	+525	+263	-788	-14
Sweden	SK million	8,858	8,965	+107			+99	+115	+58	-173	-8
Denmark	DK million	7,167	8,040	+873	+750		+128	+81	+41	-122	+5
Norway	NK million	5,496	6,830	+1,334	+1,260		+77	+108	+54	-162	+3
Finland	FM million	3,355	3,340	-15			+37	+80	+40	-120	+52
Netherlands	Dfl million	4,563	4,855	+292		+245	+44	+203	+101	-304	-3
Belgium	BF million	46,629	46,890	+261			+278	+2,648	+1,324	-3,972	+17
Switzerland	SF million	2,143	2,140	-3			-16	-57	-28	+85	-13
Austria	Sch million	8,695	8,875	+180			+173	-155	-78	+233	-7
Spain	Pta million	135,149	144,000	+8,851		+6,000	+2,666	-183	-91	+274	-185
Rest of Europe	$ million	382	380	-2			-10	-2	-1	+3	-8

F

Appendix: Analysis of Research Sample

F

Appendix: Analysis of Research Sample

Interviews were conducted amongst a wide cross-section of computer software and services vendors in Western Europe, with the specific objective of obtaining quantitative data on their financial performance and the sources of their revenues. Exhibit F-1 shows an analysis of the research sample by country.

EXHIBIT F-1

Analysis Of Research Sample

Country	Number of Vendors Interviewed
West Germany	70
France	60
Italy	60
United Kingdom	50
Sweden	35
Norway	30
Denmark	12
Finland	18
Netherlands	40
Belgium	35
Switzerland	30
Spain	40
Austria	25
Total	505

G

Appendix: 1989 Exchange Rates, Inflation Assumptions and West European Economic Data

G 1989 Exchange Rates, Inflation Assumptions and West European Economic Data

EXHIBIT G-1

U.S. Dollar and ECU Exchange Rates, 1989

Country	Currency	U.S. Dollar Exchange Rate	ECU Exchange Rate
France	FF	6.55	7.01
West Germany	DM	1.93	2.07
United Kingdom	£	0.61	0.67
Italy	Lira	1,409.00	1,495.00
Sweden	SK	6.55	7.04
Denmark	DK	7.53	8.06
Norway	NK	7.00	7.53
Finland	FM	4.32	4.65
Netherlands	Dfl	2.18	2.34
Belgium	BF	40.50	43.50
Switzerland	SF	1.70	1.83
Austria	Sch	13.60	14.62
Spain	Pta	121.00	129.00
Rest of Europe	$		0.93

Source: IMF (average rates for second quarter 1989).

EXHIBIT G-2

Inflation Rates, 1988-1994

Country	Consumer Prices (Percent)			
	1988	1989	1990	1990-1994
France	2.7	3.6	3.3	3.9
West Germany	1.2	3.0	2.5	2.3
United Kingdom	4.9	7.8	6.0	5.6
Italy	5.1	6.5	6.0	6.0
Sweden	5.8	7.0	6.7	6.0
Denmark	4.6	5.0	6.0	6.0
Norway	6.7	4.5	4.0	4.0
Finland	5.0	6.0	6.0	6.0
Netherlands	0.6	1.1	2.5	2.1
Belgium	1.2	2.9	3.5	3.5
Switzerland	1.9	2.8	2.5	2.3
Austria	2.0	2.8	3.0	3.0
Spain	4.8	6.5	5.5	5.5
Rest of Europe				
- Ireland	2.1	3.6	4.0	4.8
- Portugal	9.7	12.0	10.0	10.0
- Greece	13.5	13.0	12.5	12.0
EEC	3.3	4.9	4.4	4.3

EXHIBIT G-3

GNP Growth Rates, 1988-1990

Country	Consumer Prices (Percent)		
	Actual 1988	Estimate 1989	Forecast 1990
Austria	4.2	3.0	2.0
Belgium	3.8	3.0	2.5
Denmark	-0.2	0.5	1.5
Finland	5.2	3.5	2.5
France	3.4	3.0	2.7
Germany	3.4	3.2	2.8
Greece	3.7	2.5	2.0
Ireland	1.0	4.0	3.0
Italy	3.9	3.0	2.3
Netherlands	2.6	3.2	3.0
Norway	2.0	3.0	2.0
Portugal	4.2	3.3	3.0
Spain	5.0	4.3	3.5
Sweden	2.1	1.8	1.0
Switzerland	3.0	2.3	2.0
United Kingdom	4.5	2.5	2.5
EEC	3.7	3.0	2.7

Source: Barclays Bank, September 1989.

EXHIBIT G-4

Western European Country Economic Data, 1983-1988

Country	1988 Population (Million)	Population Growth (Percent P.A. 1983-1988)	1988 Provisional GDP ($ Billions)	GDP per Capita (Dollars)
Austria	7.6	0.2	127	16,700
Belgium	9.9	0.1	149	15,100
Denmark	5.1	0.1	108	21,200
Finland	4.9	0.4	105	21,400
France	55.9	0.4	947	16,900
Germany	61.4	0.0	1,201	19,600
Greece	10.0	0.3	53	5,300
Ireland	3.5	0.2	31	8,900
Italy	57.4	0.2	828	14,400
Netherlands	14.8	0.6	228	15,400
Norway	4.2	0.4	90	21,400
Portugal	10.3	0.5	42	4,100
Spain	39.0	0.4	340	8,700
Sweden	8.4	0.3	179	21,300
Switzerland	6.7	0.5	185	27,600
United Kingdom	57.0	0.3	813	14,300
EEC	324.8	0.3	4,745	14,600

Source: OECD Main Economic Indicators—November 1989.