MAY 1992

WORLDWIDE INFORMATION SERVICES FORECAST

1991-1996

INPUT®

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Worldwide Information Services Forecast, 1991-1996

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Abstract

This report provides a comprehensive look at the worldwide information services industry with growth rate projections for the period 1991 through 1996. Market size and opportunities are analyzed for the eight delivery modes used by INPUT: processing services, turnkey systems, applications software products, sustems operations, systems integration, professional services, network services, and systems software products.

The report provides forecasts of user expenditures for information services in 30 countries or geographic areas in North America, Europe (Western and Eastern), Asia and the Pacific, Latin America, and the Middle East and Africa. Leading information services vendors are identified in many of the countries.

For each country or geographic area, the report analyzes user expenditures for each of the eight delivery modes that INPUT uses in all information services market forecasts and analyses.

The report provides an overview of each market (regional or national), including the driving forces and inhibiting factors impacting the local information services industry. The report provides a number of considerations for market entry or expansion in each country or area, as well as a number of recommendations for increasing the marketing effectiveness of companies in foreign countries.

This report contains 338 pages, including 187 exhibits.

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I

Introduction

This is the third worldwide information services forecast published by INPUT. The first covered the period 1989-1994; this third version covers 1991-1996.

In 1991, the worldwide information services and software products market approached the $230 billion (U.S. dollars) level. This market continues to outgrow the rate of economic growth in essentially all geographic areas covered by this report. Strong growth and an increasingly international orientation to the information services market suggest that all vendors, large and small, need an appreciation for the worldwide market as well as for their current geographic areas of emphasis.

1991 performance was impacted by the general recessionary economic environment. It certainly reduced expenditures in North America and Europe and in 1992 will probably impact expenditures in the Asia/Pacific region as well.

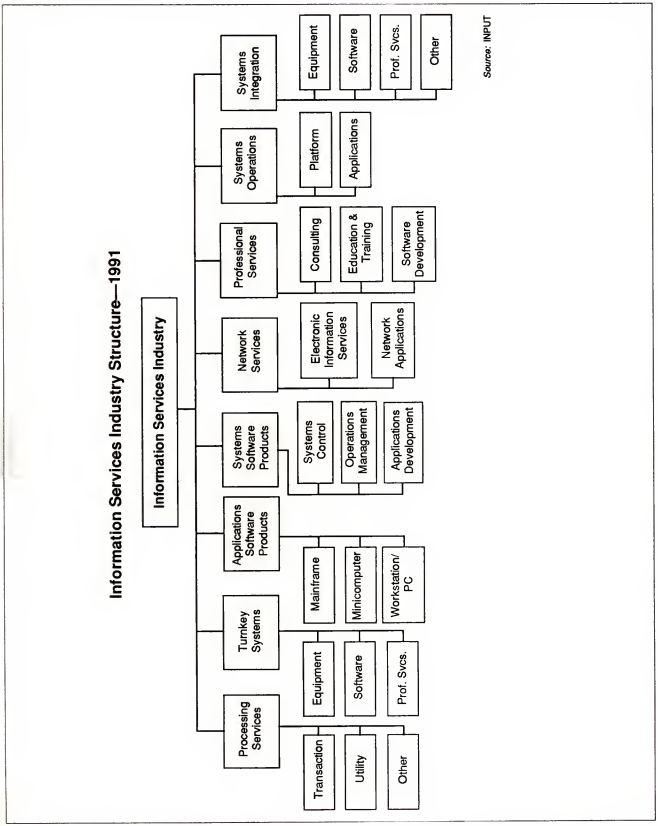
A
Purpose and Scope

The purpose of this report is to identify the global market for information services, key trends that are causing the market to grow, key national developments, and major obstacles to entry or expansion into a foreign market.

The research conducted for this report included extensive primary and secondary research. It draws upon INPUT's 16-year tradition of forecasting the U.S. and European information services markets and its new focus on, and ever-expanding coverage of, worldwide information services market opportunities.

The forecast and analysis contained in this report are based on INPUT's standard information services industry structure as presented in Exhibit I-1. Appendix A provides complete definitions of the delivery modes and submodes used by INPUT as well as other terms.

EXHIBIT I-1



In 1991 INPUT made one change in the information services industry structure. That was to redefine the submodes of the newest delivery mode, systems operations. Please refer to Appendix A for a more complete description. The new submodes are:

- Platform systems operations—where the vendor provides only data center operation and network operations services
- Applications systems operations—where the vendor assumes responsibility for applications management in addition to data center operations services. Applications management includes either or both applications maintenance and new systems development services on a long-term, contractual basis.

B
Methodology

Primary and secondary research was conducted for 30 countries and geographic areas of the world, including those in the following list.

- New direct interviews were conducted in Latin America including the first direct research in Chile.
- New direct interviews were conducted in numerous countries in the Asia/Pacific region.
- A more careful assessment was made of the Eastern European market as it undergoes major structural change.
- East and West Germany were combined in the 1990 report.
- Individual forecasts are provided for Greece, Portugal and Ireland for the first time.

The countries in which research has been performed for the worldwide forecast includes:

- Africa
- Australia
- Argentina
- Belgium
- Brazil
- Canada
- Chile
- Denmark
- Eastern Europe
- Finland
- France
- Germany
- Greece
- Hong Kong

- Ireland
- Italy
- Japan
- Korea (South)
- Mexico
- Middle East
- Netherlands
- New Zealand
- Norway
- Other Asia
- Other Latin America
- Other Western Europe
- Portugal
- Singapore
- Spain
- Sweden
- Switzerland
- Taiwan
- United Kingdom
- United States
- Venezuela

1. Research/Analysis Methodology

Research for the report included a review of published data to identify key national and regional activities and trends. The research process also included extensive primary research. Key elements of the research included the following:

- Research drawn from INPUT's U.S. and European market analysis programs

- An in-depth assessment of the Canadian market conducted in 1990

- New primary research from INPUT's affiliates in Japan and South Korea

- New direct interviews with active information services vendors in one or more countries outside Europe and North America

- An extensive review of background data about the economic and service environment in countries throughout the world

- Review and assessment of economic and business trends that could affect the growth of the information services business

- In addition to the primary research, the International Trade Administration (ITA) of the U.S. Department of Commerce was contacted, to obtain available information about information services markets in

countries throughout the world. Data from the ITA was used as a cross-reference for data derived from INPUT's research. ITA information was also used as a means of identifying patterns in development or difficulties in market entry.

During 1992, INPUT plans to conduct a full assessment of the Canadian market, expand its research in Eastern Europe, and perform additional research in Latin America, the Pacific Rim, and the Middle East, as required.

2. Forecasts and Inflation

In recognition of the volatility of inflation rates in many areas of the world, and to provide a basis for comparing market share and growth, forecasts have been prepared using current U.S. dollars.

To obtain specific data for local (non-U.S.) markets, currency conversion rates from Appendix C can be applied. Using local currency, information about projected growth in GDP, and changes in consumer prices, local market forecasts can be made.

Note that the availability of economic growth and inflation data varies considerably. Appendix D provides a compendium of economic assumptions used in INPUT market projections during 1991.

Note that some revenue data has been rounded for display in the exhibits. As a result, calculation of a CAGR (compound annual growth rate) based on exhibit revenue data could vary from the market data bases provided for the worldwide, regional and country or area markets. In addition, the numbers in the detailed forecast tables may not add due to rounding.

C
Report Structure

1. Report Organization

Following the Introduction, the report is organized into seven major parts.

- Chapter II is a worldwide summary.
- Chapter III is a regional summary for the Asia/Pacific area. For the purpose of the report, Asia/Pacific includes the geographic area from Japan to New Zealand, and from the Pacific Rim to Pakistan.
- Chapter IV is a regional summary for Europe. The European summary includes information derived from INPUT's annual research into the European information services market. This is supplemented by re-

search into other Western and Eastern European countries. For the purpose of this report, Eastern Europe includes the former countries of the USSR and countries considered part of the 'Eastern Bloc.'

- Chapter V is a regional summary for Latin America. For the purpose of this report, Latin America includes Mexico and the countries of Central America, South America, and the Caribbean.

- Chapter VI is a regional summary for the Middle East and Africa. The Middle East/Africa region includes all the countries of Africa, and countries generally considered part of the Middle East. For the purpose of this report, Turkey is considered part of the Middle East, and Greece is considered part of Europe. No individual country profiles have been developed to date for this region, which represents less than 1% of the worldwide information services market.

- Chapter VII is a regional summary for North America. The North American summary includes information derived from INPUT's annual research into the U.S. information services industry, combined with research on the Canadian market.

- Chapter VIII is comprised of a brief introduction followed by twenty-nine (29) sections. Each section represents a country or geographic area covered in the research.

  The country/geographic area sections generally include the following information:

  - Introduction
  - Key Technology Trends
  - Driving and Inhibiting Forces
  - Leading Vendors
  - Services Forecast
  - Market Entry/Expansion Considerations

- Chapter IX provides conclusions about the international market for information services, and recommendations for being successful in the international marketplace.

- Appendix A contains INPUT definitions.

- Appendix B contains the market forecast data base tables for the worldwide and regional forecasts. The country tables are in Chapter VIII with each country profile.

- Appendix C contains currency conversion factors.

- Appendix D contains economic assumptions.

2. Data Diskette

Included with the bound report is a diskette containing a file for each of the forecast tables in the worldwide information services forecast for 1991-1996.

The names of the files are provided in Exhibit I-2.

EXHIBIT I-2

Worldwide Information Services Forecast, 1991-1996 Data Diskette Contents

Description	File Name
Worldwide Files	
Worldwide Summary by Region	WWREG1.WK1
Worldwide Summary by Delivery Mode	WWDM1.WK1
Worldwide Processing Services	WWPROC1.WK1
Worldwide Turnkey Systems	WWTURN1.WK1
Worldwide Applications Software Products	WWAPPL1.WK1
Worldwide Systems Operations	WWSO1.WK1
Worldwide Systems Integration	WWSI1.WK1
Worldwide Professional Services	WWPROF1.WK1
Worldwide Network Services	WWNET1.WK1
Worldwide Systems Software Products	WWSYS1.WK1
Region Files	
Asia/Pacific by Delivery Mode	ASIA1.WK1
Europe by Delivery Mode	EUROPE1.WK1
Latin America by Delivery Mode	LATIN1.WK1
Middle East/Africa by Delivery Mode	MEAFR1.WK1
North America by Delivery Mode	NA1.WK1
Country Files	
Argentina	ARGENT1.WK1
Australia	AUSTRA1.WK1
Austria	AUSTRIA1.WK1
Belgium	BELGIUN1.WK1
Brazil	BRAZIL1.WK1
Canada	CANADA1.WK1

EXHIBIT I-2 (CON'T)

Worldwide Information Services Forecast, 1991-1996 Data Diskette Contents

Description	File Name
Country Files (Cont.)	
Denmark	DENMARK1.WK1
Eastern Europe	E-EUROP1.WK1
Finland	FINLAND1.WK1
France	FRANCE1.WK1
Germany	GERMANY1.wk1
Greece	GREECE1.WK1
Hong Kong	HNGKNG1.WK1
India	INDIA1.WK1
Ireland	IRELAND1.WK1
Italy	ITALY1.WK1
Japan	JAPAN1.WK1
Mexico	MEXICO1.WK1
Netherlands	NETHER1.WK1
New Zealand	NEWZEAL1.WK1
Norway	NORWAY1.WK1
Other Asia/Pacific	O-ASIA1.WK1
Other Latin America	O-LATIN1.WK1
Portugal	PORTUG1.Wk1
Singapore	SING1.WK1
South Korea	SKOREA1.WK1
Spain	SPAIN1.WK1
Switzerland	SWITZER1.WK1
Taiwan	TAIWAN1.WK1
United Kingdom	UK1.WK1
United States	US1.WK1
Venezuela	VENE1.WK1
Western Europe	W-EUROP1.WK1

The diskette is IBM PC-compatible and is formatted in low density. The files are in a standard Lotus 1-2-3 format and do not include any underlying formulas. Each file contains a print range labeled **"PRINT"** and is set up to print in condensed format on a laser printer.

Note that separate files have been provided for Ireland, Greece, and Portugal, which are included in the Other Europe profile; and for Western Europe, which excludes the Eastern Europe forecast.

D
Related Reports

Other INPUT reports related to the Worldwide Market Forecast include the following:

- *U.S. Application Solutions Market, 1991-1996*
- *U.S. Processing Services Market, 1991-1996*
- *U.S. Professional Services Market, 1991-1996*
- *U.S. Network Services Market, 1991-1996*
- *U.S. Systems Operations Market, 1991-1996*
- *U.S. Systems Integration Market, 1991-1996*
- *U.S. Systems Software Products Market, 1991-1996*
- *Canadian Services Market, 1990-1995*
- *Western European Application Solutions Market, 1991-1996*
- *Western European Processing Services Market, 1991-1996*
- *Western European Professional Services Market, 1991-1996*
- *Western European Network Services Market, 1991-1996*
- *Western European Systems Operations Market, 1991-1996*
- *Western European Systems Integration Market, 1991-1996*
- *Western European Systems Software Products Market, 1991-1996*

II

Worldwide Summary

A
Introduction

This chapter presents the worldwide information services forecast. It is a summation of the five regional summaries, each of which is a summation of the countries contained in that region.

Included are an overview of the global environment for the information services industry on a worldwide basis, identification and discussion of the forces driving and inhibiting the adoption of information technology that are common worldwide, and the worldwide forecast for information services by delivery mode and region.

Also included is a forecast of total spending for information systems that covers hardware, personnel and other expenditure categories that make up the typical information systems budget in organizations whether large or small. As the adoption of information technology shifts from the technology or hardware focus to a services focus, an ever-growing proportion of the entire information systems budget of organizations becomes subject to outsourcing with a vendor.

The true opportunity for information services is not the market for current offerings and expenditures, but the entire or almost the entire information systems budget of the corporation. The aggressive information services vendor must consider the entire potential spending on information systems as the long-term opportunity and the current information services market as the near-term opportunity.

In North America and Europe, INPUT believes there are revolutions in process in the information systems arena. *Downsizing, outsourcing, re-engineering and networking through open systems* will change the shape of information systems throughout the 1990s. Certainly, worldwide markets will be impacted.

B

Global Business Environment

The global business environment in general and the information services industry in particular was impacted by a spreading recessionary economy during 1991.

- The recession in the U.S. not only took hold of most of the economy, but proved to have staying power and to last into the beginning of 1992. False signals of an upturn simply increased the negative thinking of management in general.

- The recession in the United Kingdom proved to be quite severe and to spread to the continent, including Germany in latter 1991 as that country struggles to absorb East Germany.

- By year end, there were some signs of a slowdown in Japan, although in general that economy remains relatively strong.

With disruption in the major economies and the uncertainty in Eastern Europe and the former Soviet economy, investment levels in all areas have declined. This is reflected in INPUT's worldwide information services forecast, which is a full 2% lower than that published for the 1990-1995 period.

Where there is growth it tends to be in the Far East. The growth rates in the economies and as forecasted by INPUT in this worldwide report favor the Far Eastern markets to some degree. Certainly the markets outside Japan are small and less developed, suggesting that they could see greater growth than the markets of North America and Europe. Japan and South Korea continue to exhibit generally strong information services markets, although the forecasted growth is lower in these countries as well.

The general economic environment has also affected INPUT's market estimations due to exchange rate fluctuations. In general, markets in the countries of Europe are larger in 1991 than forecasted last year even though the growth rate slowed. The value of the U.S. dollar has declined throughout 1991, leading to larger foreign market sizes when expressed in U.S. currency. This is particularly true in Europe.

Inflationary pressures have in general not increased, in particular in the U.S. market where inflation remains very modest. It has also slowed in the volatile markets of Latin America.

The U.S. information services market makes up 50% of the worldwide total. Therefore, the direction of this market quickly impacts the overall results. Its growth remains constrained by the recession and grew only 10% in 1991; it is projected to grow only 10% in 1992 and 12% per year over the 1991-1996 period. The U.S. market outlook represents half of the decline in forecasted growth worldwide.

In smaller markets, the reaction to economic swings is quicker and larger, but does not show directly in the worldwide summary.

C
Driving Forces

The 1990 worldwide report from INPUT identified a number of driving forces within the information services industry that are impacting the market on a worldwide basis. Most have not changed in the past year, with the exception of the economic environment, which has worsened, as discussed above. These driving forces are shown in Exhibit II-1, and are discussed below.

EXHIBIT II-1

Worldwide Information Services Market Driving Forces

- Worldwide recessionary economy
- Information society
- Shifting information technology foundation
- Expanding role of general management
- Integrated solutions
- Industry-specific solutions
- Networking
- International standards
- Information services vendor capabilities

- *Worldwide recessionary environment*—As discussed in the prior section, the economies of the larger and leading users of information technology and services are either in a lingering recession or entering a possible recession. Investment has simply slowed.

- *Information society*—Developed and developing countries alike recognize that the use of information is necessary to be competitive in the modern world. The costs of leveraging information technology continue to decline and vendors successful in the larger markets continue to push into the emerging markets.

  For developed countries, information is increasingly a commodity. For newly developing countries, increased amounts of information are necessary for analysis to ensure maximum utilization of resources. Whether a country is developed or developing, information is necessary in building a modern society.

- *Shifting information technology foundation*—The advances in lowcost, high-power computers are bringing new energy to the market for related services and products. The use of UNIX, the introduction of client/server technology and the power of the desktop computer are causing a revolution called downsizing. The result is both opportunity and confusion. Combined with the economy, this change in technology for business systems has in many instances slowed investment as the new technology is assessed and new means of application considered.

  Long term, the new foundation holds great promise for improved return on investment from information technology, but new techniques of deployment must be learned. In general this shift is favorable for information services vendors who can learn effective use of this newer technology faster than the internal information systems functions of most organizations.

- *Expanding role of general management*—Throughout the 1980s the end user gained ever more comfort with and knowledge about information technology. The personal computer revolution, followed by LANs, E-mail and relational data base management technology, brought the true user closer to the technology and increased the demands for effective use.

  Additionally, general management increased the level of investigation questioning the return on the information technology investment of the 1970s and 1980s. Throughout the 1990s, general management is expected to play a significant role in new information technology decisions. The focus will shift from the technology to be used to expected benefit within the operation. This increases the opportunity for vendors who can prove their worth to the general manager, who is now the buyer.

- *Integrated solutions*—In developed and rapidly developing countries, there is increasing focus on the integration of systems. The integration can include large mainframes, office systems and corporate-wide networks. The skills required to achieve this integration often require even the large user organizations to seek support from information services vendors.

- *Industry-specific solutions*—Increasingly, there is a demand for software that meets the needs of a specific industry or user. As mini and personal computers are introduced into smaller organizations, there is increasing need for software that will meet a particular need, as opposed to generalized (spreadsheet-type) software. Throughout the 1990s the information services market will become more and more oriented toward solutions for specific industries and applications.

- *Networking*—National and local networks are increasingly necessary for the development of an organization and a country. Network-based systems and services are developing as a primary means of information delivery and interorganizational communications. The provider of networks will have to have worldwide capabilities or alliances.

  Open systems, another revolution in information technology and a factor favoring networking, is adding both to the confusion about the new technology foundation and to the opportunity to improve return on investment. However, as with many new information technology trends, open systems is promising more than it is currently delivering. It will take until well into the 1990s to see what is truly gained.

- *International standards*—Progress in the creation and adoption of worldwide information technology standards gained speed at the end of the 1980s. This will continue and standards will become an even greater factor in the worldwide information services industry throughout the 1990s. Standards greatly assist the user to gain a return on information technology investment. Vendors that help implement standards will be in significant demand.

- *Information services vendor capabilities*—By the end of the 1980s, a number of information services vendors had developed the critical size to change the way they do business and to provide broad, full-function services (systems integration and systems outsourcing). These vendors, both the major computer manufacturers searching for new markets and leading professional and processing services firms, had the financial and operational capability to assume long-term risk and to approach general management with the concept of outsourcing the information systems function.

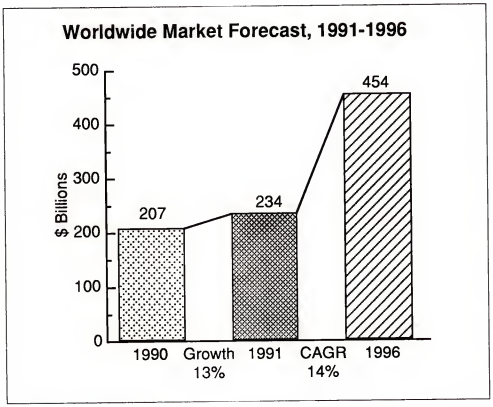
With the current economic concerns and the pressure on information systems to improve performance, the outsourcing trend was born. Over the next five years this will be the primary factor in growth in the overall size of the information services market, as a greater proportion of the total information systems spending of organizations is shifted from internal to external expenditures.

D
Information Services Market Forecast

1. Worldwide Summary

The worldwide market for information services and software products grew to $175 billion in 1989, reached $207 billion in 1990, and $234 billion for 1991. The projected growth over the next five years is 14% per year—a decrease from the 16% forecasted in 1990 and the 17% forecasted in 1989. By 1996 the market will reach over $450 billion, as shown in Exhibit II-2.

EXHIBIT II-2



With the growing trend to outsource major portions of the information systems function, the market opportunity for information services vendors has broadened to the entire information systems budget, both the proportion directly controlled by the internal information systems function (both corporate and in the business units) and that under the control of operational departments.

The true market potential is many times larger than the current $230 billion market for 1991. The continuing success of the outsourcing trend has the potential to increase the growth rate for information services or at least assure that the 14% CAGR is achieved overall. Exhibit II-3 provides INPUT's overall estimate of information technology spending. It of course excludes the investment required by information services vendors to provide their services.

EXHIBIT II-3

Worldwide Information Technology Expenditures 1991-1996

Expenditure Category	1991 ($B)	1996 ($B)	91-96 CAGR (%)	% Total 1991	% Total 1996
People	333	414	4	37	33
Hardware	176	196	2	20	15
Data Communications	28	54	14	3	4
Software Products & Turnkey Systems	100	185	13	11	14
Other Information Services	135	270	15	15	21
Equipment Services	38	53	7	4	4
Facilities and Overhead	94	120	5	10	9
Total	905	1,293	7	100	100

- On a worldwide basis, expenditure for information services and software products is approximately 26% of the total estimated information technology spending on a worldwide basis.
- In a market in which outsourcing accounts for ever greater proportions of the information systems function, the market potential for information services vendors is significant—perhaps as much as 4 to 5 times the current market size.
- Equipment services represents hardware maintenance. Other represents facilities and miscellaneous costs.

2. Delivery Mode Forecast

Exhibit II-4 provides the worldwide forecast by the eight delivery modes used by INPUT to analyze the information services industry on a worldwide basis. This information differs from last year's worldwide forecast report as follows:

The growth rate projected for each of the delivery modes is smaller than for the 1990-1995 forecast, leading to the overall forecast of a 14% CAGR. Exhibit II-5 provides a comparison.

EXHIBIT II-4

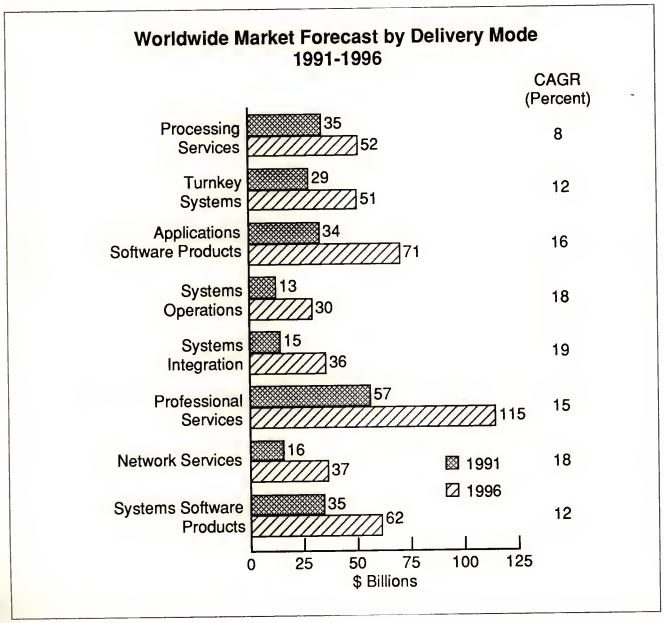


EXHIBIT II-5

Compound Growth Rate Comparison by Delivery Mode

Delivery Mode	1990-1995 CAGR (Percent)	1991-1996 CAGR (Percent)
Processing Services	10	8
Turnkey Systems	14	12
Applications Software Products	17	16
Systems Operations	16	18
Systems Integration	21	19
Professional Services	18	15
Network Services	20	18
Systems Software Products	15	12
Total	16	14

Systems integration, systems operations and network services remain the strongest delivery modes. They are also smaller in market size.

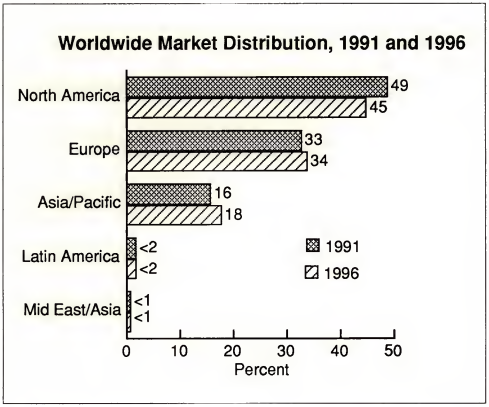
The growth rate for professional services declined the most—from 18% CAGR to 15% CAGR. It has suffered the greatest impact from the recession in the larger information services markets.

The decline in software products growth rates is tied in part to the shifting technology foundation and deferred expenditures.

3. Geographic Distribution

During the five-year period 1991 to 1996, the market share for major geographic areas will shift somewhat, as shown in Exhibit II-6. North America will remain by far the largest but is now below 50% of the total market and will decline from 49% to 45% of the total. The growth rates in Europe and the Asia/Pacific (in particular Japan) will drive the shift.

EXHIBIT II-6



The European market will increase its proportion of the total modestly. Should the Eastern European market explode, the European proportion has the potential of growing much larger.

Exhibit II-7 identifies the five largest countries and their market sizes. Together they represent 80% of the worldwide market, but will decline slightly by 1996 to 79%.

4. Regional Area Comparison

This section provides a comparison of the worldwide market by the five regional areas, first in total and then for each of the delivery modes. All of the charts are in U.S. $ billions.

EXHIBIT II-7

Worldwide Market Forecast—Leading Countries

Country	1991		1996	
	$ Billions	Total (Percent)	$ Billions	Total (Percent)
United States	111	47	197	43
Japan	31	13	70	15
France	18	8	36	8
Germany	14	6	30	7
United Kingdom	14	6	26	6
Other Countries	46	20	95	21
Total	234	100	454	100

- Exhibit II-8 provides the forecasts by regional area, while Exhibit II-9 presents a comparison of compound growth rate projections for 1990-1995 and 1991-1996 by region.

- Exhibits II-10 through II-17 provide the regional area comparisons by delivery mode.

The forecast for each of the regions except the very small Middle East/Africa region are lower than the last projection. The largest decline is in Europe, which dropped from a projected CAGR of 19% to 15% for 1991-1996. The spread of the recession from the U.K. to the continent is the major factor in this decline.

Processing services (Exhibit II-10)—Although it is one of the largest segments, processing services will experience growth below the industry overall average in each of the five regional areas. Although opportunities do exist in processing services, greater opportunities for these vendors are in systems operations and the outsourcing concept of the entire data center.

EXHIBIT II-8

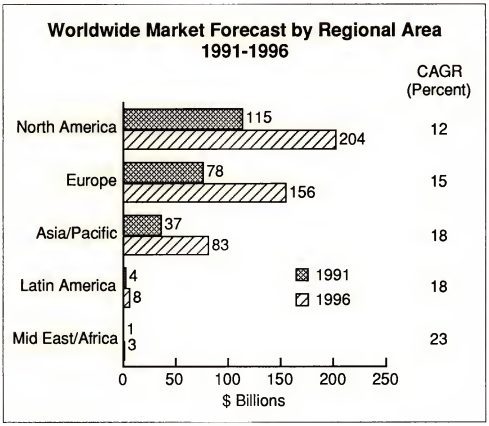
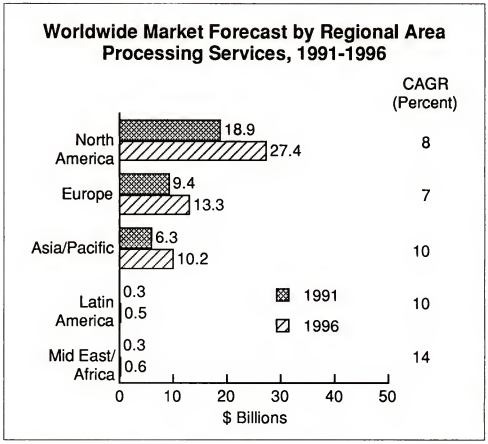


EXHIBIT II-9

Compound Growth Rate Comparison by Region and Worldwide

Region	1990-1995 CAGR (Percent)	1991-1996 CAGR (Percent)
Asia/Pacific	19	18
Europe	19	15
Latin America	19	18
Middle East/Africa	23	22
North America	13	12
Worldwide	16	14

EXHIBIT II-10



Turnkey systems (Exhibit II-11)—Turnkey systems, though currently a market of modest growth in North America, remains a very strong opportunity in the rest of the world. Client/server technology and ever more powerful personal computers will continue to drive this delivery mode into the 1990s.

Applications software products (Exhibit II-12)—On balance across the regions, this is one of the strongest delivery modes and offers significant opportunities.

- Only North America has reached a penetration of greater than 50%. Significant growth opportunities remain in Europe and Asia, particularly in Japan.

- The movement to client/server technology will favor this delivery mode by the mid-1990s.

Systems operations (Exhibit II-13)—An established market in North America and to some degree Japan, the systems operations concept remains relatively new and underutilized in the rest of the world.

- A few worldwide vendors will be pursuing this market in North America, Europe and Japan over the next five years and beyond.

EXHIBIT II-11

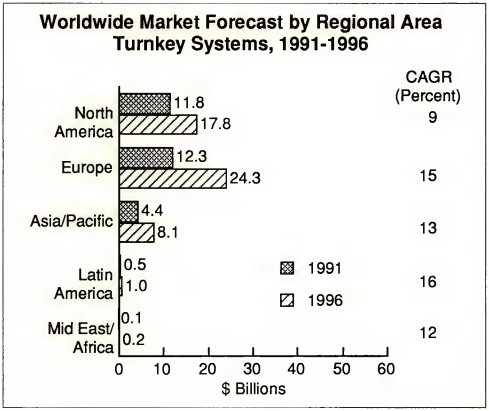


EXHIBIT II-12

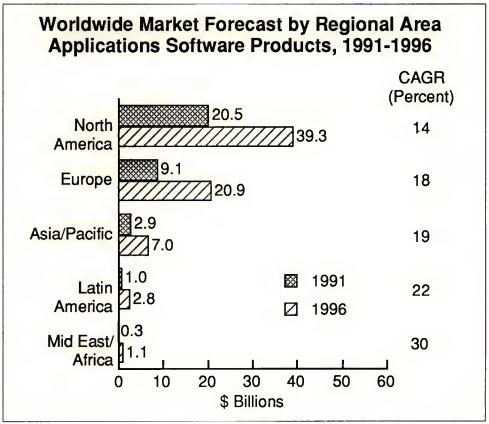
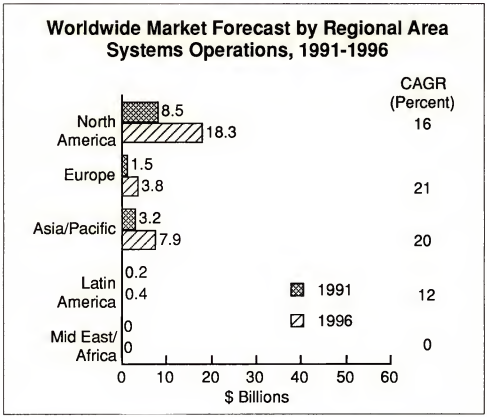


EXHIBIT II-13



- The opportunity in Europe is quite large—the current market size is only 17% of that in North America. The total information services market in Europe is over 60% the size of that in North America.

Systems integration (Exhibit II-14)—The strongest delivery mode, in terms of growth, in the three major regions—North America, Europe and Japan.

- The willingness and interest in the purchase of totally implemented information technology solutions is expected to grow throughout the 1990s.

- As general managers assume almost full control of information systems spending, they will more freely turn to proven information services vendors for deployment of total solutions while expecting high-quality services from those vendors for an affordable price.

Professional services (Exhibit II-15)—The largest sector overall, professional services is experiencing the most significant impacts from the current economic conditions.

- Growth in North America was less than 10% in 1991 and the outlook in Europe has been dropped from a 20% CAGR to just 16%.

EXHIBIT II-14

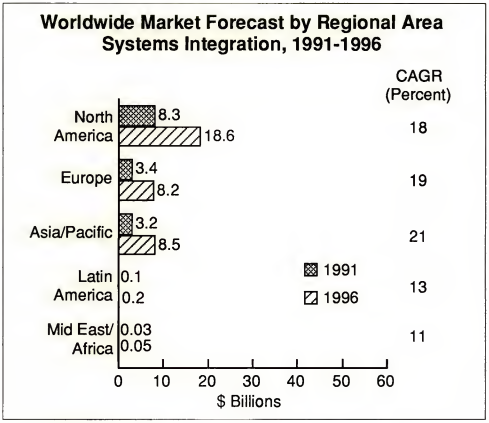
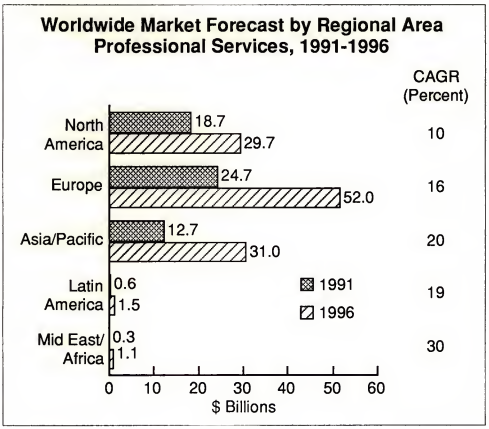


EXHIBIT II-15

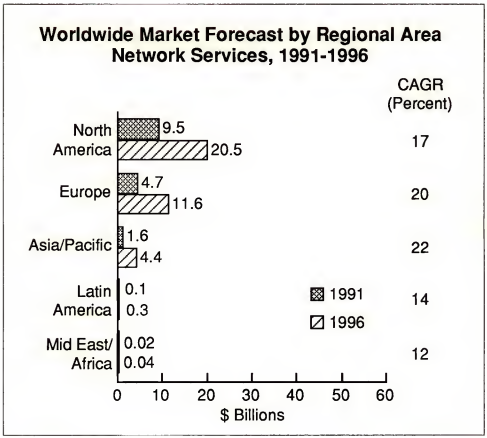


- These vendors are benefiting from the shift to systems integration-type purchases of services, but not without some cost and disruption. And for the smaller vendor, the near-term outlook is somewhat uncertain.

- Long term, this segment of the industry will remain critical and a bell wether of the health of the industry as a whole.

Network services (Exhibit II-16)—This sector truly has the most worldwide aspect in the information services industry. All of the established markets require network access on a worldwide basis.

EXHIBIT II-16



- Network applications and electronic information services will see strong growth over the next five years, although at a slower rate than previously predicted.

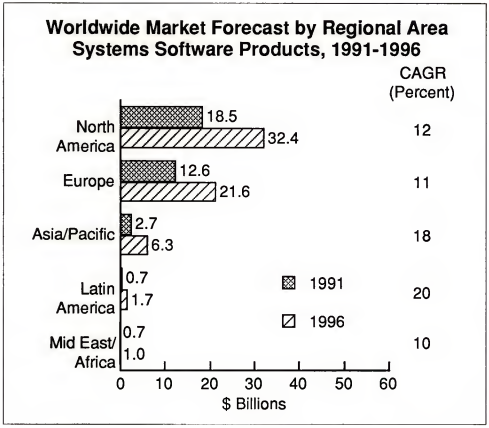
- It is taking time for Europe to develop Europe-wide networks and the same is true in the Far East. However, by the middle of the decade, significant progress will have been made, international standards will have progressed and worldwide network services offerings will become common.

Systems software products (Exhibit II-17)—The growth of systems software products by region is primarily tied to hardware sales and the need to interconnect processing facilities.

- It remains a market of strong potential with relative ease of international product sales, regardless of what country the product originates from. If the product complies with international standards and has functions of measurable value, a market for it will exist in all regions eventually.

- In the near term, the outlook in the major markets is for somewhat slower growth due to declining hardware sales and software product costs. As the use of client/server and more integrated networks grows, growth will improve.

EXHIBIT II-17



5. Leading Worldwide Information Services Vendors

The leading information services vendors and their worldwide information services industry revenues are listed in Exhibit II-18. Companies from all of the major markets (U.S., Europe, and Japan) are represented in the top vendor list.

EXHIBIT II-18

Leading Information Services Vendors
Worldwide Revenues and Market Share

Rank	Vendor (Country)	1989 Revenue ($ Billions)	Market Share (Percent)
1	IBM (U.S.)	13.5	6.4
2	EDS (U.S.)	2.9	1.4
3	DEC (U.S.)	2.8	1.3
4	NTT (Japan)	2.5	1.2
5	Reuters (U.K.)	2.5	1.2
6	Andersen Consulting (U.S.)	2.2	1.0
7	Siemens-Nixdorf (Germany)	1.8	0.9
8	CSC (U.S.)	1.7	0.8
8	CAP Gemini Sogeti (France)	1.7	0.8
9	Microsoft (U.S.)	1.4	0.7
10	Computer Associates (U.S.)	1.3	0.6
11	Oracle	1.1	0.5
12	Bull (France)	0.9	0.4
12	TRW (U.S.)	0.9	0.4
12	First Fin'l Mgmt. (U.S.)	0.9	0.4
13	AMEX (U.S.)	0.8	0.3
14	Nomura Research Inst. (Japan)	0.7	0.3
14	CSK (Japan)	0.7	0.3
15	Sema	0.6	0.3
15	Japan Research Inst. (Japan)	0.6	0.3
15	Hitachi Information Sys. (Japan)	0.6	0.3

6. Market Forecast Reconciliation

Exhibits II-19 and II-20 provide a reconciliation of the worldwide market forecast by region and delivery mode. The market sizes for 1990 and 1995 are compared from the 1990-1991 and this 1991-1996 report.

EXHIBIT II-19

Worldwide Information Services Industry
User Expenditure Forecast
1991 Data Base Reconciliation by Delivery Mode

Delivery Modes	1990 Market				1995 Market				90-95 CAGR per data 91 rpt (%)	90-95 CAGR per data 92 rpt (%)
	1990 Report (Fcst) ($M)	1991 Report (Actual) ($M)	Variance from 1991 Report ($M)	Variance from 1991 Report (%)	1990 Report (Fcst) ($M)	1991 Report (Fcst) ($M)	Variance from 1991 Report ($M)	Variance from 1991 Report (%)		
Sector Total	200,340	207,911	7,571	4	420,791	395,869	-24,922	-6	16	14
Processing Services	31,764	32,682	918	3	50,629	48,111	-2,518	-5	10	8
Turnkey Systems	24,713	25,919	1,206	5	46,955	45,887	-1,068	-2	14	12
Applications Software Products	29,258	29,340	82	0	64,776	60,807	-3,969	-6	17	16
Systems Operations	11,459	11,572	113	1	24,460	25,779	1,319	5	16	17
Systems Integration	12,175	13,015	840	7	31,610	29,801	-1,809	-6	21	18
Professional Services	47,401	50,422	3,021	6	108,803	99,780	-9,023	-8	18	15
Network Services	13,398	13,763	365	3	33,183	30,964	-2,219	-7	20	18
Systems Software Products	30,172	31,198	1,026	3	60,375	54,740	-5,635	-9	15	12

Columns may not add due to rounding

EXHIBIT II-20

Worldwide Information Services Industry
User Expenditure Forecast
1991 Data Base Reconciliation by Region

Delivery Modes	1990 Market				1995 Market				90-95 CAGR per data 91 rpt (%)	90-95 CAGR per data 92 rpt (%)
	1990 Report (Fcst) ($M)	1991 Report (Actual) ($M)	Variance from 1991 Report ($M)	Variance from 1991 Report (%)	1990 Report (Fcst) ($M)	1991 Report (Fcst) ($M)	Variance from 1991 Report ($M)	Variance from 1991 Report (%)		
Sector Total	200,342	207,929	7,587	4	420,790	395,870	-24,920	-6	16	14
Asia/Pacific	31,770	31,652	-118	0	75,658	70,670	-4,988	-7	19	17
Europe	60,762	68,440	7,678	13	142,535	135,505	-7,030	-5	19	15
Latin America	3,045	2,999	-46	-2	7,356	7,039	-317	-4	19	19
Middle East/Africa	929	920	-9	-1	2,645	2,515	-130	-5	23	22
North America	103,836	103,918	82	0	192,596	180,141	-12,455	-6	13	12

Columns may not add due to rounding

a. Region Reconciliation

The region of most significant difference is Europe. Growth rates for the next five-year period have been lowered significantly from those forecast in the last two worldwide reports. A significant downturn in the U.K. economy and slowdowns in other major European economies have led to a drop in overall growth rates from 19% CAGR to only 15% CAGR.

However, exchange rate fluctuations have hidden some of this reduction when the market forecasts are translated into U.S. dollars. Note that the 1990 market in Europe is 13% larger in this report because of the value of the dollar versus the major European currencies at the end of 1991. Yet with the reduced growth rate, the market forecast for 1995 is some 5% smaller.

It is important that these changes are noted when using the 1991 versus 1990 reports.

The changes in the other regions are less significant and reflect a modest decrease in market growth, as discussed previously in this chapter.

b. Delivery Mode Reconciliation

The impacts of currency exchange rates are lost in the analysis by delivery mode. On a delivery mode basis only the systems operations market shows a larger market size for 1995 in the 1991 report than in the 1990 report. Stronger growth and the exchange rates in Europe are the contributors.

The professional services market shows some of the exchange rate impact with an 8% larger market in 1990 and a 7% smaller market in 1995. The professional services market is quite large in Europe and is experiencing significantly reduced growth over the current period.

III

Regional Summary—Asia/Pacific

A
Regional Overview

The Asia/Pacific region continues to exhibit a strong overall economy and has escaped much of the recessionary environment of North America and Europe. Its progress toward becoming a superpower in the worldwide economy is only constrained by its excessive balance of trade surplus.

The Asia/Pacific region is one of the most diverse regions of the world. With the largest geographic area, the highest population, a seemingly tireless labor force, and abundant resources, the region has begun to emerge as a world economic leader.

It can be broken into three economic sectors:

- First Japan, which overpowers the rest of the region in terms of the size of its economy.
- Second, the "Four Tigers"—South Korea, Singapore, Taiwan and Hong Kong—have been consistently demonstrating the highest growth rates in the world. They and New Zealand and Australia represent the other major economies of the region.
- Third is the rest of the region, which ranges from the huge country of China to many underdeveloped countries such as Vietnam.

Although overall growth of development and trade has slowed over the past several years, there has been stabilization, and most economists believe that the rate of real economic growth in the Asia/Pacific area will continue to exceed the rest of the world by at least one percentage point for the next several years.

Most of these countries have strong national governments that continue to invest significant funds and energy in local development of services that favor local industry in general as well as the local information services industry. This internal development will continue to fuel the dynamic growth in the region.

There are a number of forces driving the development of information services in the Asia/Pacific area. There are also several factors that could cause their growth to be inhibited over the next several years.

1. Driving Forces

The forces driving development of information services are significant and long term in effect. They represent the level of emphasis placed by these countries, both government and industry, on the development of a strong information technology industry.

- *Technology value*—Recognition of the value of technology, in particular information technology, is a strength in this region. As a center for the manufacturing of technology products, Asian countries have come to recognize the direct relationship between investment in technology and national development.

- *Labor skill and energy*—Most newly developing Asian countries have placed significant and increasing focus on educating their populations, as evidenced by South Korea, Japan, and Singapore; much of the emphasis has been in the area of technology. In addition, these countries all benefit from longer work hours than the western regions. Workers in the Four Tiger countries work an average of 41% more hours per week.

  In Japan there is a national concern about a shortage of software and computer engineers by the latter part of the decade. The government has adopted a policy to increase the education capacity within Japan to counter the projected shortage.

- *National development*—Asian countries have implemented extensive plans to develop their national infrastructures. Chief among their priorities is the ability to successfully compete in an economic environment controlled increasingly by electronic means. Nearly all of the countries in this region have aggressive national development programs designed to help them move away from being fundamentally agrarian societies.

2. Inhibiting Factors

Although the forces causing the growth of information services are great, there are a number of factors that could have a significant impact on the ability of the countries to continue their development.

- *Political stability*—Long-term political stability remains a concern in many of the stronger Asian countries, including South Korea, Taiwan and Hong Kong.
  - As evidenced by events in the PRC (People's Republic of China), changes in the political environment can happen quickly and cause significant disruption in development efforts.
  - The impact of 1997 on Hong Kong and questionable stability in the second-tier countries raise concerns about market opportunities.
- *Western protectionism*—Protectionism by many Western countries is a concern to many of the Asian countries. While Asia is a growing market for Asian products, the majority of products and services are destined for Western countries.
  - As economies (notably the U.S.) stagnate, national sentiment has been to take steps to limit imports of goods and services. Increased protectionism could affect the growth of Asian economies as it limits investment by Western-based companies.
  - The export balance of trade problems with Japan and South Korea are destined to eventually slow the growth of these economies, as their worldwide trading partners look internally or to other countries for replacement goods. The trade surplus problem between Japan and the U.S. cannot continue forever. It will have to be brought into balance by changes in behavior by both countries.
- *Inflation*—The economies of most Asian countries are tied to the economic health of the West. The recession in North America and Europe, although mild, may slow development in Asia/Pacific. It appears that the Japanese economy is slowing down as the West struggles to launch a recovery. Some slowdown is reflected in the 1991 INPUT forecast.
- *Domestic economic base*—Most Asian countries have a small economic base from which to derive investment resources. This small base restricts the speed at which they can grow.

B
Information Services Market Forecast

INPUT's 1991 analysis finds the conditions generally unchanged. The information services industry remains strong and is exhibiting much growth in some of the larger markets (Japan and South Korea) as well as small markets like India. Overall growth rates are somewhat below those projected in the 1990 INPUT worldwide forecast.

The information services market in the Asia/Pacific area grew to almost $32 billion in 1990. Between 1991 and 1996, the market is expected to grow from $37 billion to over $83 billion, as Exhibit III-1 shows, with an annual growth rate of 18%. This compares with a 19% CAGR projection for 1990-1995.

EXHIBIT III-1

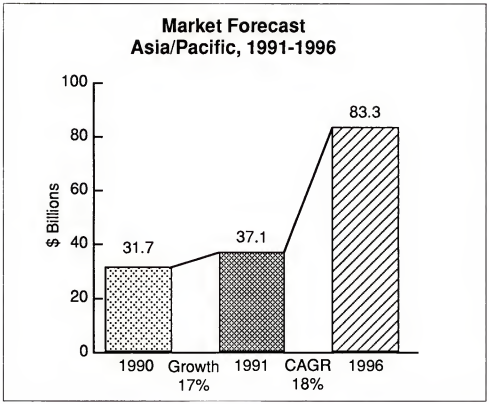
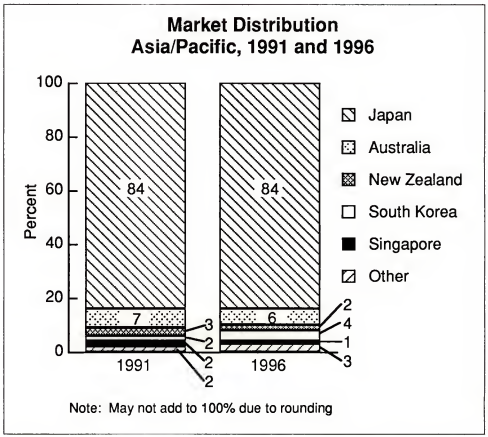


Exhibit III-2 provides the distribution of the market by country. Japan dominates the market with about 84%. Japan is the second largest market for information services in the world behind the United States. Its market is measurably larger than those of France and Germany and is growing faster.

The only significant change projected over the next five years is that the South Korean market will grow from 2% to almost 4%. Since there is only a modest local vendor community in South Korea (unlike Japan), opportunities exist for international companies within South Korea.

Unless methods are found to introduce technology faster in the less developed countries, they are in danger of sinking further into a 'have not' category. Though the markets are comparatively small, strategies that will contribute to national development of these countries could result in a strong market position.

EXHIBIT III-2



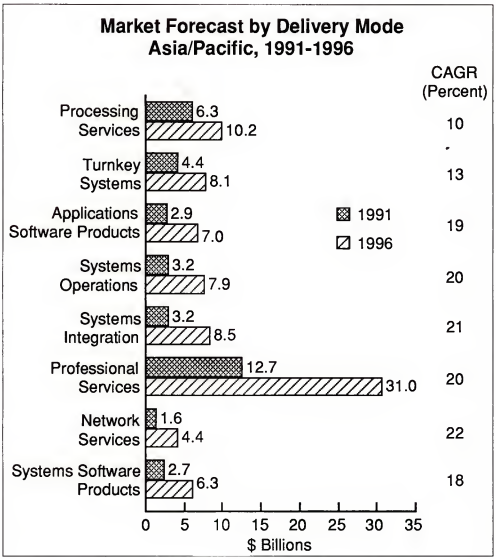
As shown in Exhibit III-3, growth rates in each of the delivery modes are expected to be strong for the next several years.

- *Processing services*—The market for processing services will exhibit the least growth in the region. A 10% annual growth rate will bring this market to $10 billion by the end of the forecast period. This forecast is down from last year's 12% CAGR.

- *Turnkey systems*—In the Asia/Pacific region, turnkey systems are expected to grow at a faster rate than in the U.S. (13% vs. 9%), reflecting the need for short-term solutions to meet growing needs, but the growth will be less than the Asia/Pacific market as a whole.

  Note should be made that the majority of the turnkey systems opportunities should be expected to be in the lower end mini- and micro-based systems, rather than in large systems. Overall, the market is expected to grow from an estimated $4.4 billion in 1991 to $8.1 billion by 1996.

EXHIBIT III-3



- *Applications software products*—The need for applications software products will make this one of the stronger delivery modes in the Asia/Pacific area, growing from $2.9 billion in 1991 to $7 billion in 1996—a 19% CAGR. Demand for industry/application-specific microcomputer software is expected to be the major driver. The use of purchased applications software products lags in this region behind the Western market. Language barriers are now being conquered and opportunities are significant.

- *Systems operations*—As a market, it is well established in Japan and is a recognized alternative in most of the major markets in the region. The strength in this market provides growth opportunities for processing services vendors.

- *Systems integration*—Requirements for systems integration are expected to be strong. The key market for integration services is Japan, though other market areas such as Australia and South Korea could be significant.

  - Note should be made that identifying a systems integration market in less developed and developing countries is difficult. There are few projects that would qualify as systems integration projects if high value is considered an identifying factor.

  - In the smaller developing countries, the separation between turnkey systems and systems integration is less clear than in a country such as Japan. Together, these markets represent a significant opportunity to provide fulfillment of information systems requirements.

- *Professional services*—Professional services is the largest and among the strongest delivery modes, with growth of 20%, from over $12 billion in 1991 to $31 billion by 1996. The requirement for professional services is very strong in Japan and the other larger markets where professional services skills remain somewhat scarce, in particular in medium-sized and smaller companies.

  More importantly in the smaller markets, professional services is the primary opportunity to establish market presence, whether as an international vendor or a local firm.

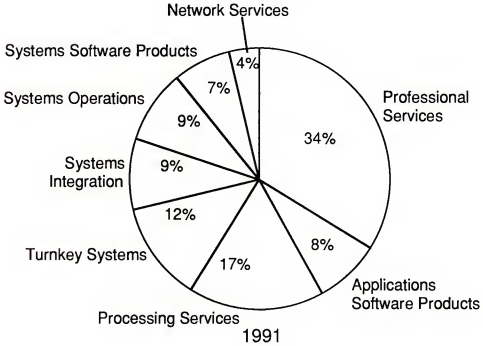
- *Network services*—Starting from a small base, the market for network services is expected to show substantial growth, driven by the increasing need for services such as electronic mail and EDI. The 22% CAGR will create a market exceeding $4 billion by 1996. Growth in some countries will be greater and the overall growth could easily exceed 22%, depending on national development priorities in the related telecommunications area. As these countries expand their roles in the world markets, the use of network services will become essential and will give significant opportunities to networking firms.

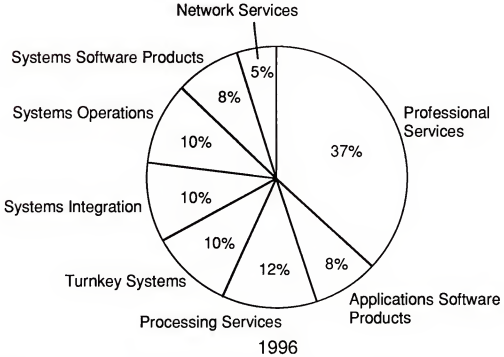
- *Systems software products*—The market for systems software products is strong, driven by the adoption of PCs/workstations and minicomputers. In addition, interest in CASE and other applications development tools creates significant opportunities for software product developers from Western countries.

Exhibit III-4 provides a comparison of the Asia/Pacific market by delivery mode for 1991 and 1996. Professional services will gain share in the overall market during the next five years while processing services and turnkey systems lose share. It must be noted that this analysis reflects the trends in Japan, which represents over 80% of the Asia/Pacific market for information services.

EXHIBIT III-4

Delivery Mode Analysis
Information Services Market—Asia/Pacific
1991 and 1996





C
Market Considerations

A number of significant considerations related to entering the market for information services in the Asia/Pacific area were identified in the 1990 report. They generally remain unchanged.

- *National infrastructure*—In many Asian countries, the national infrastructure is extremely limited, indicating that significant effort will be required before extensive use can be made of many technological advances. This is particularly relative to telecommunications.

- *Size of market*—Outside the Japanese market, each country's market for information services is modest compared to Western markets. This suggests that the costs of entry must be weighed carefully. The use of local agents is the most common approach to market entry.

- *Investment term*—Organizations interested in entering or expanding into the Asia/Pacific area should realize that a long wait may be required before there is a return on investment. All investments must be made with the long term in mind, yet growth opportunities suggest careful examination.

- *Organizational stability*—Organizations entering the Asian market must be able to demonstrate long-term stability. Experience with Western companies has indicated that these companies are not prepared to continue as committed players for an extended period. This is particularly true in the area of software services, where numerous organizations have entered the market, then failed to provide ongoing support.

- *Cultural diversity*—Organizations must recognize that there is great cultural diversity in the Far East. Individuals representing products and services must be able to deal successfully with a wide range of business styles, practices and customs.

- *Dynamic markets*—Asian markets are dynamic and will continue to grow for a long time. Organizations willing to make long-term investments could realize significant rewards.

- *Technology transfer*—Asian countries are keenly interested in opportunities to develop the skills of their indigenous population. Organizations willing to transfer some portion of their technology (i.e., software support) through training programs will be better received than those that are not.

- *Competition*—There is a high degree of competition from other countries and from those Asian countries that have already begun to develop their own information services capabilities. These countries tend to favor local vendors; thus, keen competition should be expected.

- *Nationalism*—Although all of the markets are open to international companies, there remains a strong sense of nationalism in most if not all countries in the Asia/Pacific region. This tendency also favors the use of a local agent.

The local vendors tend to be native to each country and do not in general have a presence in more than their own country. The major U.S.-based firms are active in most of these markets and others use local representatives. European vendors are also active on a country-by-country basis.

For leading vendor information, the reader is referred to the country profiles.

IV

Regional Summary—Europe

A
Regional Overview

For the past decade or more, the European software and services industry has experienced extraordinary growth, averaging over 20% per year. Today, in spite of the threat of financial recession, there is little sign of any saturation in demand for IS solutions in all forms. Growth is expected to recover from 13% in 1991 to an average 15% per annum over the next five years. Key trends are shown in Exhibit IV-1.

The complexity of market conditions and of IS solutions is bringing nearly all the vendors, and even some of their major clients, together in a whole range of alliances. Joint venture start-ups, minority stakes, marketing or relationship agreements, distribution rights, lobbying groups, standards consortia, conventional OEM, VAR and agency agreements are all creating new opportunities for winning and retaining clients.

EXHIBIT IV-1

Key Industry Trends
Software and Services—Europe

- Acquisitions and partnerships
- Outsourcing favored
- Downsizing makes big impact
- "Super-league" gap widens

Economic recession is now being felt in most European countries, though many consider it to be short term. Tighter client budgets have resulted in cutbacks at the strategic end of the market—consultancy, education and training, and new systems development. But for systems management and operations vendors, the recession can be good news, encouraging clients to reconsider outsourcing in order to fix and control costs.

Alongside the growing realization at board level of the critical role of IS in business, is awareness that in many cases it is feasible to buy in or outsource functions traditionally managed in-house. The value for money of new platforms is also boosting demand for downsizing and more ready-made software and service solutions. Driving these market changes is the widespread adoption in Europe of open systems standards for both commercial and technical applications, in search of greater and cheaper choice.

The gap between the revenues of the leading global or pan-European software and services vendors and those of the smaller vendors is still widening. It is becoming more difficult for vendors to achieve "super-league" status. By virtue of their sheer size and geographic spread, the major equipment vendors have a very dominant role in the software and services market. The pan-European coverage of U.S. vendors has been matched by very few independent European software and services vendors. Cap Gemini Sogeti has had the most notable success, as a member of the "super-league."

B
Information Services Market Forecast

1. Total Information Services Industry

INPUT estimates that the overall computer software and services market in Europe was $68 billion in 1990. As Exhibit IV-2 illustrates, the overall market is expected to grow from $77 billion in 1991 to $155 billion in 1996, despite the current short-term recession fears in the industry.

This forecast represents a compound annual growth rate (CAGR) of 15%.

Exhibit IV-3 provides the distribution of the Euoropean market by major country. France remains the largest market, with almost one-quarter of the expenditures. Little change is anticipated in the distribution over the next five years. By 1996, the Eastern European market will have reached measurable size (in relation to the total). Please refer to the Eastern Europe country profile in Chapter VIII.

EXHIBIT IV-2

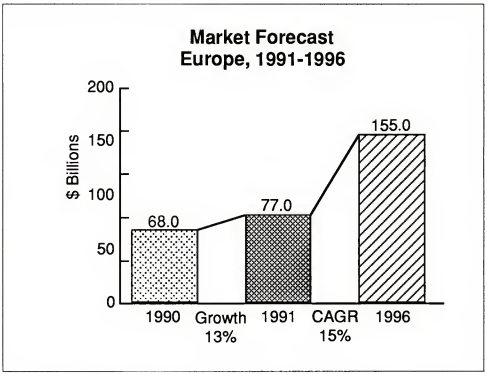
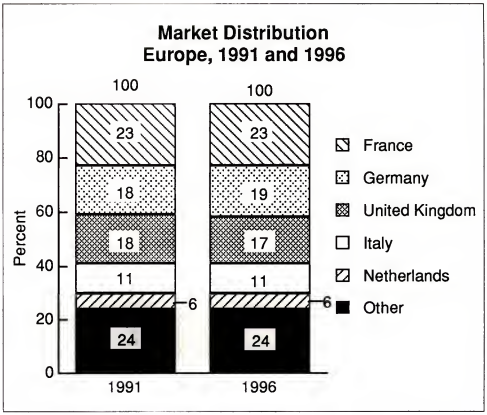


EXHIBIT IV-3



France continues to dominate the European market. In 1991, France accounted for one-quarter of all software and services user expenditure in Europe.

Little difference is apparent in the overall growth rates for each country, but this hides very significant differences in the business mix traditional to each country. For example, the professional services sector in France represents nearly 40% of the French market for all software and services, while packaged application solutions—turnkey systems plus applications software products—is only 23% of the market. In Germany, this pattern is reversed, with professional services holding only 22% of the total compared to packaged solutions with 35% of the total German market. German organizations prefer to buy complete solutions or to develop them using in-house staff.

The large size of the French market has led to the French being the most dominant European vendors as they vie with U.S. vendors for market share. Eight of the top 30 vendors are French, and eleven are U.S. in origin.

The four Scandinavian countries accounted for some 10% of the total in 1991. They exhibit the slowest rate of growth, principally due to the high proportion of processing services in these countries.

The Netherlands, Belgium and Luxembourg (Benelux) account for 8% of the European total, with a good forecast growth rate of 15% per annum from 1991 to 1996.

Among the remaining six countries, Spain has the fastest growing market at 18%.

2. Information Services Industry by Delivery Mode

Exhibit VI-4 provides the European forecast by delivery mode. Exhibit IV-5 provides the distribution of the market by delivery mode for 1991 and 1996, the end of the forecast period.

Because of the much larger size of the processing and professional services sectors than their counterparts (systems operations and systems integration), only modest changes result in the distribution. This is in spite of growth rates for the newer delivery modes being measurably higher.

Processing services —Compared to other software and associated service markets, processing services have been the least affected by the continued general business recession. Small business failures have been reducing the client base for many vendors. But this has been largely counteracted by an increase in outsourcing as organizations seek further cost reductions in their IS (information systems) expenditures.

EXHIBIT IV-4

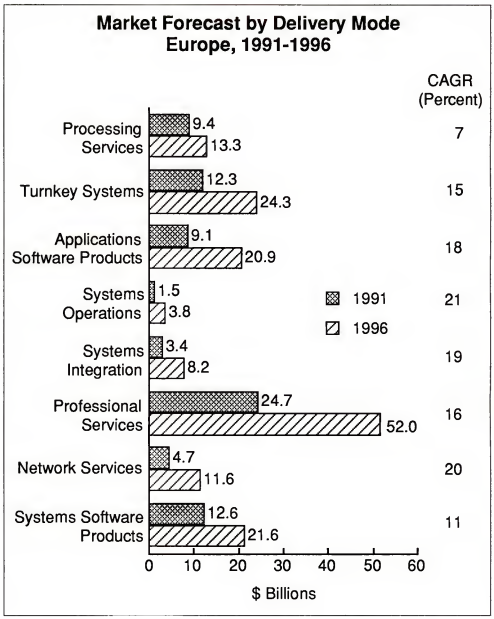
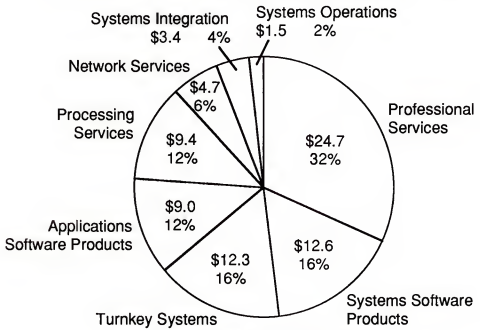
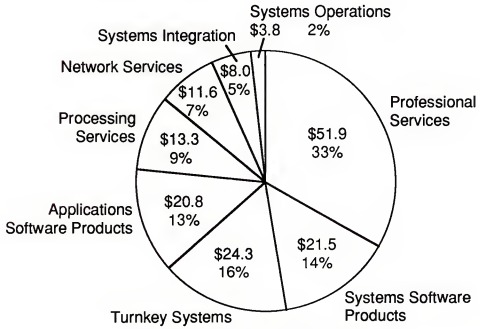


EXHIBIT IV-5

Delivery Mode Analysis
Information Services Market—Europe, 1991-1996



1991 Total Market = $77.5 Billion



1996 Total Market = $155.0 Billion

Note: Totals may not add due to rounding.

Specialized applications continue to evolve to offer vendors some important opportunities. These will likely lead to growth at an annual average rate of 7%, which will take the market to over $13 billion by 1996 in Europe, as shown in Exhibit IV-4. Key opportunities for processing services vendors lie in developing critical applications skills in areas such as payroll and credit card processing, and offering specialized services like disaster recovery support.

Despite this relatively lower rate of growth, the processing services sector is still a substantial business area and is set to offer significant growth over the next five years.

Economic recession in most European countries is leading to high levels of business failure. This is losing many processing services vendors significant numbers of their smaller clients as they go out of business. However, recession also feeds the trend to outsource more IS activities as companies review the financial savings to be gained from buying in services rather than using in-house resources. There are many more potential clients now ready to listen to a sound financial case for using external processing services.

The general business and technological environment has changed considerably since the early 1980s, when processing services suffered in competition with low-cost minis and personal computers. Now the emphasis has changed from the ability to offer purely computer technical expertise to an emphasis on the applications being run. In consequence, vendors that have built up knowledge and experience of specialist areas like payroll processing have prospered as the demand for specific applications transaction processing services has continued. In contrast, utility processing, the provision of basic processing facilities, has declined. Other specialist services like disaster recovery have, however, represented an area of significant opportunity.

In order to exploit the trend to outsourcing, processing services vendors can continue to develop their applications skills to develop and further support applications-based services. Alternatively, they can seek to leverage their experience and knowledge into associated markets. For example, their technical skills can form the basis of a professional services business, applications run on a processing center can be developed as software products, and their management skills can be translated into the systems operations area.

Turnkey systems —Exhibit IV-4 shows the forecast for the European turnkey systems sector. It is anticipated that the improving cost/performance of new equipment platforms will depress the equipment proportion of turnkey systems overall. The increasing power of workstations/PCs in particular will have the overall effect of driving this sector of the market at the highest rate.

An important influence on the turnkey systems market is the impact of UNIX. Polarization of the minicomputer market around the de facto standards of IBM AS/400, Digital VMS and UNIX has made the latter a must for virtually all equipment vendors. The user appeal of UNIX is being increased by the introduction of more advanced facilities and acceptance of open systems concepts. Increasing availability of UNIX-based applications supports this trend.

The customization element of turnkey systems is forecast to grow. This is being driven by the need for delivering specific client benefits, albeit based upon a standard applications product. Strong demand is also expected for additional professional services such as consultancy and education and training, vital to secure successful implementation of the system in the user environment.

The largest single country market for turnkey systems in Europe is Germany (30% of the total), followed by the United Kingdom (22% of the total). The appeal of the turnkey systems delivery mode varies between different European countries, notably with Italian users preferring custom solutions. These attitudes are likely to change as the cost penalty for an entirely custom-built system increases.

Applications software products —The applications software product market is forecast to grow at an 18% CAGR from 1991 to 1996. It is clear that a much greater opportunity exists for smaller systems, in respect to both relative size and relative growth rates. This forecast is clearly based on an expectation of continued downsizing by users, who are choosing smaller systems—AS/400s instead of 3090s for example—and a continued trend towards distributed processing systems. The increasing costs and shortages of skilled programmers and the increasing need for speedier applications implementation reinforce the rationale for selecting applications software products in preference to the luxury of custom-written systems. The lower cost profile of smaller systems accelerates this trend.

A number of other factors are of significance in supporting the different growth expectations for different types of equipment platforms. These include:

- Strong growth in manufacturing applications software products is a significant contributor to the minicomputer sector.
- The continued drive towards open systems standards is creating a more stable environment for applications software product development on minicomputer and workstation/PC platforms.
- Increasing use of graphical user interfaces is widening the market potential for applications software products on powerful, low-cost systems.

A factor of particular relevance in Europe is the increasing use of kernel software, or reusable software modules that allow vendors to prepare different versions of applications. These modules can be produced for disparate country environments or different industry sectors. This type of approach significantly reduces the investment needed to offer applications software products within the diverse national environments of Europe.

Within Europe the largest individual country market is France, which accounts for approximately one-quarter of the entire applications software products market. The U.K. is the second largest market, representing about one-fifth of the total. Germany has a relatively low market share (17%) in comparison to the size of its economy. This can largely be attributed to the German preference for the turnkey system delivery mode for application solutions. Over the next five years, high growth is expected for applications software products in both the Italian and Spanish markets.

Systems operations—Systems operations began to expand during the past year into a broadly accepted buying mode within the IS industry.

The overall market for systems operations is growing at 21% per annum across Europe and is forecast to reach $3.8 billion by 1996. Although this market is dominated mainly by national firms serving their individual local markets, we are starting to see the development of groups with pan-European capability in the form of:

- CGS and Debis Systemhaus, leaders in the U.K. and Germany, respectively

- EDS, with its takeover of SD-Scicon, whose French subsidiary GFI is a leader in France

INPUT estimates that there are some 450 systems operations contracts currently being undertaken throughout Europe, with an average value of around $3 million per annum. The top four industry sectors contributing to the systems operations market in Europe are: process manufacturing, national government, discrete manufacturing, and local government. Together they account for almost 75% of the user expenditures.

Systems operations vendors will have a major opportunity window throughout the early 1990s to assist companies in making these very important and expensive changes. In some cases, the need is for the vendor to provide systems operations to facilitate change; in others, the client wishes to concentrate its scarce management resources on its core business and in consequence is keen to gain the cost reduction and other benefits of outsourcing the information systems function.

Except for the presence of EDS, IBM and Digital (potentially) in all countries, the majority of vendors are competing within their local markets with their national rivals. However, the market potentially available to all these vendors, whether national or multinational, is much larger than the current actual market. The biggest competitor to the SO vendor remains the in-house IS solution. The challenge to systems operations vendors is to convert as much as possible of this currently in-house market into viable SO contracts.

Systems integration —Although INPUT estimates that the European systems integration market will be worth $8.2 billion by 1996, as shown in Exhibit IV-4, there is a significant slowdown in overall market growth compared to previous years. A major cause of this slowdown is the recession—or threat of recession—being experienced in the major European countries, which is leading to the postponement of major projects. The regions expected to show the highest growth over the next few years are Southern Europe, particularly Spain and Italy, and eventually Eastern Europe.

The market growth forecast for the systems integration delivery mode has been revised downwards significantly this year. There are two factors contributing to this. Firstly, the inflation forecast for the period 1991 to 1996 is typically 2% lower in each country than was forecast for the period 1990 to 1995. Secondly, the current economic climate is leading to the postponement of a number of large projects, decreasing the rate of market growth.

Nearly three-quarters of the entire European market for systems integration services is accounted for by the three major country economies of France, Germany and the United Kingdom. Germany is forecast to overtake the United Kingdom as the largest national systems integration market in Europe during the forecast period. Growth in Germany will continue to be strong over the next few years, fueled by the redevelopment of the infrastructure and facilities in the eastern part of the country. On the other hand, growth in the U.K. is forecast to be relatively depressed—the economic recession is still leading to the postponement of a significant number of major projects.

INPUT also forecasts that the major growth in the systems integration market will increasingly come from the medium-sized project sector rather than from very large projects.

Industry market analysis of the European systems integration business shows that the government sector remains a very important source of systems integration contacts. However, this now represents the lowest growth area of the entire market, whereas the civil government and com-

mercial sectors represent much higher growth opportunities. An important factor in the civil government sector will be the opening up of public procurement under EEC "1992" legislation. Office automation projects continue to be important in both the defense and civil government sectors.

Professional services—The professional services market is the largest sector of the computer software and services business in Europe. It accounted for over 30% of the total European market in 1991, valued by INPUT at nearly $25 billion, and approximately $3 billion more than the applications and systems software products sectors combined.

The European professional services market is highly fragmented. The new market leader, Cap Gemini Sogeti, holds less than a 5% market share. Acquisitions and partnerships abound, but only a few companies can yet boast a pan-European presence, and most of those are either French or American. The continued growth of the market and the pressure of economic recession on user spending is stimulating fiercer competition, resulting in new business strategies among both traditional suppliers and the newer entries. Three different types of strategy are visible:

- Early exploitation of new software technologies, standards and procedures to increase productivity
- Broadening of existing client services to increase revenues
- New services aimed at longer term relationships and gaining better access to board rooms and business decision makers in order to win new clients

The European professional services market is forecast to grow at an average 16% per year from nearly $25 billion in 1991 to $52 billion in user expenditure by 1996. (See Exhibit IV-4.)

The market supports service companies from many different origins. The greatest threats to traditional vendors, who usually specialize in developing software solutions for niche industry markets, come from larger management consultancies and international equipment vendors.

Two areas have been badly hit by the effects of recession: the activities that precede and follow the actual specification, writing, testing and installation of software. That is, the initial consulting services helping the client assess and choose options; and the education and training of managers, users and IS staff essential to the success of any project. Predictions for both consulting and training now fall well below previous forecasts.

France is by far the largest European market for professional services. Nearly equal to the combined value of both Germany and the United Kingdom, the French market is home to many of Europe's leading vendors, most notably Cap Gemini Sogeti.

Pressure for improvements in productivity and quality has led most vendors to rapidly adopt technical strategies encompassing the latest software tools and methodologies, such as relational data bases, 4GLs, CASE tools and project management procedures. With some clients cutting budgets and more competitors crowding into the market, vendors have become more cost conscious. They are looking to new software technology not only to help them win business, but also to restore higher profit margins.

Software maintenance—revising and fixing software already in use—is a very minor part of the service offered by most professional services vendors. Yet INPUT finds that IS departments are spending between 50% and 80% of their total budget on software maintenance. As competition increases for attractive new development projects (the mainstay of most professional services business), more vendors are now turning their attention to this untapped opportunity.

Network services—The network services sector, although offering many high-growth market opportunities, operates within a potentially chaotic and confused environment as national and international vendors stake out their positions in newly deregulated markets. At the same time, the business environment is becoming more competitive. Consequently, the application of networked electronic intelligence becomes increasingly important as a strategic business tool. These factors are creating a market that will continue to grow at around 20% per annum to reach an annual value of nearly $12 billion by 1996.

One of the most important aspects in an analysis of the network services market is to define its component sectors as precisely as possible. In INPUT's definition, network services are comprised of two principal subsectors: network applications and electronic information services.

- Electronic information services (EI) are on-line data bases and news services.

- Network applications includes value-added network services that are network transport services supplied in addition to the provision of basic network transmission facilities, as well as services such as electronic data interchange and electronic mail.

The strong impetus toward deregulation of national telecommunications monopolies in Europe has led to the opening up of many new network services. However, the immature state of development of that technology and of liberalization conspire to create a potentially chaotic and confused environment for both users and vendors.

Systems software products—After a decade of high growth, the systems software products sector is now slowing as a result of the decline of the computer equipment market. This is largely caused by downsizing—the selection of lower cost minicomputers and workstation platforms to replace larger equipment configurations.

- UNIX-based open system software is forecast to grow rapidly—from $0.7 billion in 1991 to $2.8 billion in 1996, a CAGR of 32% per annum.

- An expected increase in the practice of software product bundling by equipment vendors, as a response to increasingly competitive market conditions, will depress future growth in this market. It is forecast to achieve only an 11% compound average growth rate over the next five years. Nevertheless, this growth will generate a systems software products market worth over $21 billion in 1996.

A potential inhibiting factor in the systems software product market is the existence of multiple de facto standards. Products are introduced faster than standards bodies can function, resulting in user confusion. This in turn has led to delayed product acceptance by both vendors and users. However, open systems standards, notably UNIX, are having a profound impact on the market and are achieving significant growth, albeit at the expense of other systems software products.

C
Market Considerations

The top ten vendors of software and services in Europe are listed in Exhibit IV-6. Of the top 30 vendors, eleven are U.S., six French, four German, three U.K. and two Italian. The U.S. vendors are well positioned for new pan-European business compared to the vast majority of European vendors, who tend to have a national base and limited international operations.

All the major equipment vendors have implemented significant reorganizations in Europe during 1990/91 in order to emphasize their capabilities as software and service providers and increase the profit contribution from these activities. Hardware prices and revenues have generally fallen faster than vendors can reduce their overhead costs. Restructuring of these businesses is a very high priority for equipment vendors, and the future of some players is still very questionable.

EXHIBIT IV-6

Leading Vendors in Software and Services Europe, 1990

Vendor	Country of Origin	Estimated Sector Revenues ($ Millions)
IBM	U.S.	4,900
Siemens-Nixdorf	Germany	1,690
CAP Gemini Sogeti	France	1,650
Reuters	U.K.	1,430
Digital	U.S.	1,220
Bull	France	795
Unisys	U.S.	720
Andersen Consulting	U.S.	705
Microsoft	U.S.	655
Sema Group	France	640

- Reuters is a very strong market leader in providing electronic information services and the turnkey systems to support them on the customer's premises. Primarily professional services vendors, Cap Gemini Sogeti and Andersen Consulting have both grown their already large operations in Europe at a great pace, but using rather different business strategies.

- CGS has increased its business largely by acquiring market leaders around Europe. Its most significant deal in 1991 was the 36% equity investment by Daimler-Benz group in holding company Sogeti, and the resulting joint venture about to be launched in Germany with Debis Systemhaus, the Daimler-Benz subsidiary. To attain its global ambitions, CGS will need several more similar alliances. Sogeti has also assembled a portfolio of management consulting companies, known as Gemini Consulting, to deepen its resources when offering a full range of services.

- Andersen Consulting grew by over 40% in 1990, for the fifth year in a row, and expects similar growth in 1991. Its successful strategy of organic growth, difficult to avoid in a partnership, has been fuelled by valuable account management by senior partners and by an aggressive graduate recruitment and in-house training program. Germany, Spain and the U.K. are its primary European markets.

- Microsoft has more influence on the market than its revenues suggest, if only because its products are sold through practically every other vendor in the market.

- Sema Group is one of the eight major French vendors that appear in the list of the 30 top vendors in Europe.

The 1990s will undoubtedly see still more consolidation and concentration in the European computer software and services industry. As the technology and the market demand ever broader mixes of special skills, partnerships and mergers will continue to reshape and polarize the industry into those offering multinational capability and those who are leaders in their own specialist niches.

V

Regional Summary—Latin America

A
Regional Overview

Latin America can be broken into two categories of countries. Argentina, Brazil, Mexico, Venezuela and Chile are the more developed economies. The remainder remain relatively undeveloped.

Countries in Latin America can be divided into two groups.

- The first group includes Argentina, Brazil, Mexico, Panama, Uruguay, Chile and Venezuela, which have the highest per capita GNP in the area and some record of economic development and growth.

- The second group includes the remainder of the countries of the area, which have low income per capita and generally unstable governmental and political environments.

The same can be said about the information services market. Each of the five developing countries has established information services industries with locally based companies and representation by the leading computer manufacturers. They offer real market opportunities, although not without significant challenge; the second category offers less opportunity.

The economic climate in Latin America continues to suffer from inflation and poor development. During 1989 and 1990, some improvements were recorded in Argentina, Brazil, and Mexico regarding stability and international trade. There was further improvement in 1991, although occasional signs of governmental instability continue to occur.

Burdened by high debt and a low economic base, prospects for the area over the next several years are cautiously optimistic. A number of countries are continuing to address their debt problems with austerity programs, and a number have begun to structure policies intended to stimulate investment. In addition, there is a general trend toward more open trade regulation, making importation of information technology products somewhat easier.

Overall, though positive changes are expected in Latin America, they will come slowly throughout the decade. Modest growth will be achieved in a number of countries if the world economy remains stable, although that is currently being hampered by the general recessionary economies of the major industrialized countries in Europe, North America and Japan. Severe downturns in the world economy would have quite adverse effects on many of the Latin American countries and slow their development of successful information services markets.

However, there are information services opportunities, and in general the IS market outgrows the local economy, as has been the experience in more developed countries. Long term, there could prove to be major opportunities in the larger countries, given their populations and potential industrialization. These will primarily be software and professional services.

1. Driving Forces

Although the technological base is relatively small in the majority of the countries, there are a number of forces beginning to cause change. Many of them represent opportunities for information services vendors.

- *Training/Education*—The low level of education has been identified in most countries as a key contributor to the lack of industrial development. As a result, many countries have instituted national education and training programs, with emphasis on the use of technology. This is a significant and long-term opportunity for professional services companies to provide information technology training.

- *Public sector spending*—As economic stability develops, public sector spending should increase and offer opportunity to local and international vendors. The majority of spending for information technology comes from the public sector, and increased government spending for development will have a stimulating effect. These countries have high-growth populations and a number of government-run social programs that can benefit from systems integration services.

- *Technology incentives*—A number of countries have instituted incentives to stimulate the use of computers. This is expected to result in more acquisitions of mini and microcomputers. Many countries are working to place computers in schools at all levels.

- *Economic stability*—Although economic progress is slow, each year of increasing stability suggests a better market for investment by international information services companies. If the trend continues, the larger markets could experience growth well above that being experienced in Europe and the U.S.

2. Inhibiting Factors

There are also a number of significant inhibiting factors in the Latin American information services markets.

- *Stalled economies*—Many of the smaller economies in Latin America are stalled, showing only limited growth. There has been only minor growth stimulus. Without some level of economic stability and controlled inflation, these markets will remain unattractive.

- *High duties/protectionism*—Many countries continue to impose high duties on the importation of technology products and services. Progress is being made by some countries, including new "informatic" laws that provide copy right protection and other laws that reduce tariffs. In general, information technology will benefit from a general trend toward freer trade, but more progress is required.

- *Far East competition*—Though the U.S. continues to dominate the high end of the equipment business, competition from Taiwan and Japan is being increasingly felt. Some countries have closer ties with Japan (Brazil) and Europe (Argentina) than the U.S. (Mexico), relative to information technology products and services.

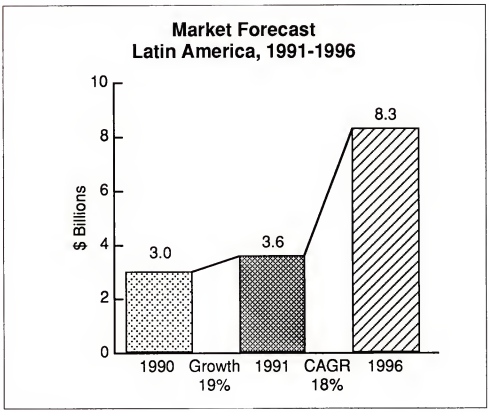
- *Software piracy*—Few countries in Latin America have passed laws related to software protection, which makes the practice of copying common. Changes in Brazil and elsewhere are starting to bring local copyright practices in line with international practice. If effective, these changes will greatly improve the attractiveness of Latin America to software products vendors.

B
Information Services Market Forecast

When compared to the world total, the market for information services in Latin America remains small. As noted in the worldwide summary, it represents less than 2% of the worldwide market. The expenditure on information services relative to the gross national product is many times lower than in the U.S. or in European countries.

The total market is expected to grow at an annual rate of 18%, from $3.6 billion in 1991 to $8.3 billion in 1991, as shown in Exhibit V-1. This growth rate compares to 19% projected for 1990-1995. The reduction is generally tied to the recessionary environment throughout the world economy.

EXHIBIT V-1



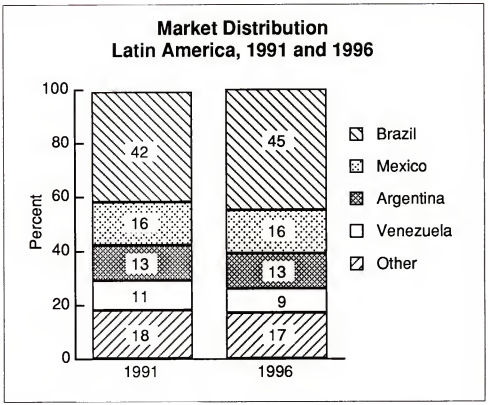
This growth rate, however, is almost twice that in the U.S. and rivals those of Europe and Japan. Although the market is small, economic stabilization should generate a market of adequate size and real interest throughout the 1990s.

Latin America could become a significant fast-growth market by the middle of the decade if the economic situation is finally brought into reasonable balance.

Governments in the key countries (Argentina, Brazil, Mexico and Venezuela) recognize the value of technology, but have been burdened with conflicting financial priorities and have been unable to make necessary investments. Efforts to stabilize the economy are paying dividends and permitting governments of the larger countries to remove regulation and tariffs. INPUT expects the positive direction to continue.

Within the region, the market distribution is not expected to change significantly over the five-year period. Brazil, which currently has an estimated 41% of the market as Exhibit V-2 shows, will maintain its lead.

EXHIBIT V-2



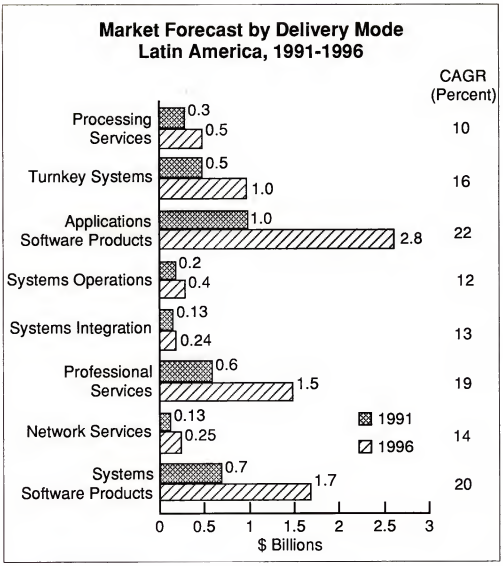
Of note in the distribution figures is that the 'other' category represents less than 20% of the market, but nearly 90% of the countries (including the Caribbean). Little is expected to change over the next five years. The only other market that is or will become of attractive size is that of Chile.

A review of the projections by delivery mode in the Latin American market reflects a somewhat different picture than is found in the U.S. or other regions, as illustrated by Exhibit V-3.

- *Processing services*—Processing services are less than 10% of the market and are expected to grow only about half as fast as the market in total. Given the economic attractiveness of processing services for specialized applications, there could be some improvement in this situation as the general use of computing increases.

- *Turnkey systems*—Although a small market ($0.4 billion in 1990), turnkey systems are expected to grow at a rate of 16% to $1.0 billion in 1996. The increasing availability of powerful personal computers and full-feature PC- and LAN-based applications provides the tools to grow this market at an even greater rate. In the underdeveloped markets, turnkey solutions in native languages should become very affordable as the economies improve.

EXHIBIT V-3



- *Applications software products*—The market for applications software products is a bright spot in Latin America. It represents the largest delivery mode, at $1 billion—almost 30%—and should see the strongest growth (22% CAGR) to reach $2.8 billion in 1996. With an inadequate base of computer professionals, the easiest alternative is to turn to packaged solutions. Of course, they must operate in the language of the country, not English.

- *Systems operations*—Systems operations represents a modest market and opportunity, although it is almost as large as processing services. There are not enough large companies that require the broad, full-service approach represented by systems operations. A market of $0.2 billion should reach $0.4 billion by 1996. In general, the same vendors provide processing and systems operations services, which are less clearly differentiated than in the larger markets of Europe and North America.

- *Systems integration*—The market for systems integration services is expected to remain small for some time. Most countries do not have a large enough industrial base to support a systems integration market, and buyers and vendors may lack the sophistication required to manage the systems integration relationship. The preference for traditional professional services will remain for some time.

- *Professional services*—Growth in professional services is expected to be strong, at a 19% CAGR. The lack of adequately skilled computer professionals places a premium on the services of locally based and internationally affiliated professional services firms. If they can continue the development of qualified staff, there is reason to believe their growth rates can exceed the projected 19% growth rate. A market of $0.6 billion should reach $1.5 billion in 1996. In many ways, professional services firms offer the best opportunity for these economies to gain through the use of information technology. There is inadequate time and resource to develop skills internally in the immediate term, suggesting that the government and major industrial firms must turn to the outside, to either locally or internationally based firms.

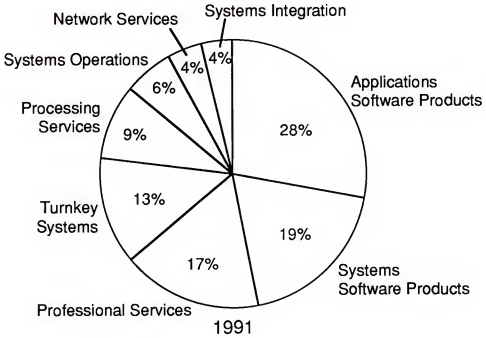
- *Network services*—The market for network services is small and is expected to remain so. The region continues to suffer from a significant lack of telecommunications infrastructure, a problem that will not be rectified for a number of years, even though some countries have launched major improvement programs (e.g., Argentina). Network services are expected to grow from $130 million in 1991 to $250 million in 1996, a growth rate of 14%.

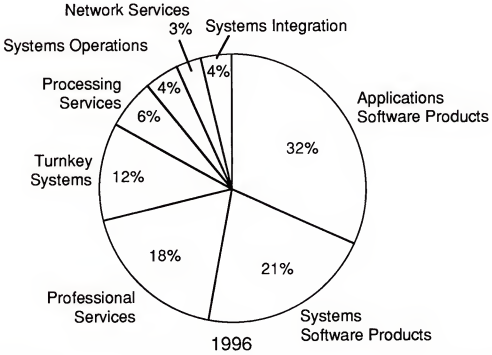
- *Systems software products*—The market for systems software products is another bright spot in Latin America, but will see somewhat slower growth than applications software products. Growth of software products is expected to continue at 20% for at least the next several years, due to the continuing demand for mini- and PC-based systems. With a growth rate of 20%, the market for systems software products will increase from $0.7 billion in 1991 to $1.7 billion in 1996.

Exhibit V-4 provides a comparison of the Latin American market by delivery mode for 1991 and 1996.

EXHIBIT V-4

Delivery Mode Analysis
Information Services Market—Latin America
1991 and 1996





C
Market Considerations

Each of the five more established information services markets have well-developed communities of information services vendors. These communities include numerous locally based companies as well as leading international firms. The national profiles identify these vendors and the delivery modes in which they are active. Many of the local firms have relationships with one or more international firms, particularly in the professional services and software products areas.

For organizations considering entering or expanding into the Latin American market, cautious optimism is advised. There are indications that a number of countries are beginning to successfully address their financial problems, but time will be needed to assess the effect of the new policies. In addition, there are signs that trade and software protection issues are also being addressed.

Primary opportunities appear to be in the mini and personal computer software product sectors in the fields of education and office productivity, and in certain vertical market areas such as manufacturing and financial services.

As a rule, the professional services segments of the larger markets are experiencing strong growth. Where the economy and specific company situations support investment, there is a need to move quickly. The professional services firms control many of the skilled computer professionals and thus are equipped to respond quickly.

In Latin America, use of a distributor/representative is a necessity. The primary reason is that success in getting things accomplished is highly dependent on the representative's knowledge and contacts within the government. The region should generally be considered on a country-by-country basis, although there are some larger Latin American vendors developing operations in more than one country.

Exhibit V-5 identifies major international information services vendors active in multiple countries within Latin America.

EXHIBIT V-5

International Vendors Active in Latin America, 1990

- ADP
- Andersen Consulting
- Computer Associates
- Coopers & Lybrand
- DEC
- Deloitte Touche
- EDS
- HP
- IBM
- Microsoft
- NCR
- Oracle
- Pansophic
- Peat Marwick
- Price Waterhouse
- Software AG
- Unisys

VI

Regional Summary—Middle/East Africa

A
Regional Overview

Although treated in this report as a single region, the Middle East and Africa are two distinct areas with considerably different demographics and business requirements.

Considering the differences, background data is provided for each region separately. However, since the markets are comparatively small, market data is provided for the total region. In addition, note is made that forecasts are limited to the most relevant delivery modes. For delivery modes that are not shown, the market can be considered negligible.

Since the 1990 report, the major changes have been the successful completion of the war in Iraq and further progress in the elimination of apartheid in South Africa.

1. Africa

Consisting of more than 35 countries and with more than 600 million people (12% of the world total), Africa covers an immense 11.7 million square miles. The area is burdened with vast, virtually uninhabitable land, such as the Sahara desert. Africa is also blessed with vast amounts of undeveloped natural resources.

For the purpose of this report, Africa is divided into two distinct areas: South Africa, and the remainder of the continent. South Africa is considered one of the more developed areas of the industrial world and as such has a developed, although modest, information services industry.

The changes in the South African government regarding apartheid continued to progress positively throughout 1991. The end seems to be in sight and the acceptance of this rich and well-developed country back into the world trade community appears assured. When this finally occurs it will reopen a modest but important information services market equal in size to those of the more developed countries in Latin America.

Aside from the country of South Africa, the continent is generally fragmented. Only a handful of countries have more than a subsistence economy, and many are plagued with political turmoil. Few significant opportunities are believed to exist in the remainder of the African countries for information technology and services companies.

a. Driving Forces

In South Africa, the driving forces are generally unchanged from the 1990 worldwide report.

- *Mini/Personal computer availability*—Considering the relative size of businesses in South Africa, increasing emphasis is being placed on the development of mini- and micro-based applications. With the increasing functionality of minis and PCs, many needs are satisfied with these types of equipment and the associated software.

- *Fourth-generation languages*—For the larger firms, there is increased emphasis on the development of systems based on 4GL and data base systems.

- *Economic expansion*—The development of mini/micro systems and data base systems is being driven by the recognized need to develop up-to-date systems capabilities if South Africa is to compete in the international market. The government is stimulating investment in national development projects.

- *Network development*—With the emphasis on systems development, there is increasing focus on networking, particularly for minis and micros. The majority of networking tools are imported from either the U.S. or the U.K. The use of LAN technology should spread throughout the next five years.

- *Education*—There is national recognition of the need to provide education to the black communities, if they are to share in the governing and business process. The government has been placing increased emphasis on providing technology-based tools for the educational system.

For areas outside South Africa, the driving forces are essentially the same. However, the level of emphasis is considerably less, and as noted before, the information services market in some African countries is nonexistent.

b. Inhibiting Factors

As well as driving forces in South Africa, there are a number of inhibiting forces that, to date, have had a negative impact on the information services market in that country. They continue to exist.

- *Disinvestment*—Requirements that U.S. firms reduce their investment in South Africa have had a significant impact on the development of the country. Many firms have withdrawn and others have had a difficult time establishing relationships with black-owned firms. The disinvestment requirement will remain until full elimination of the apartheid philosophy is achieved.

- *Labor skill level*—The skill level of local labor is generally considered to be low, outside the small white community. Although effort is being directed to providing increased educational opportunities, a labor shortage is expected to exist for some time.

- *Political policies*—National apartheid policies are declining quickly and will soon, it is hoped, be removed as a negative factor in the information services industry in South Africa.

- *Social unrest*—In addition to the inhibiting effect of the political policies, the resulting social unrest detracts from focus on growth, education and general improvement in industrial and individual quality of life.

2. Middle East

Comprised of approximately sixteen countries covering the area from Turkey to Saudi Arabia, the Middle East represents one of the most politically complex areas of the world.

It has a population representing 4% of the world total that is growing at 2.5% per year. But development of the area is dominated by two factors—oil and religion—as well as by the political climate of the Arab-Israeli issue.

This area was negatively impacted by the Iraq war in 1990 and 1991. The impact, other than in Iraq, has now passed and government programs have continued.

Having few natural resources, the region has been heavily dependent on the world market for oil. Since the decline of the oil industry, many of the countries have consolidated their economic positions and are experiencing only moderate growth.

In general, the economies of this area see little inflation, and are highly controlled by the government and the wealth from oil. Israel, on the other hand, has a broader industrial economy that is impacted by inflation, costs of defense and continued high immigration, which is expected to tax the country's economy for most of the decade.

A key determinant in the growth of the area is the political environment. To date, the focus on religious and territorial differences has diverted a significant portion of national revenues from growth opportunities to defense. This is expected to continue in spite of efforts by Western countries to diminish regional defense spending.

With a fractious political environment, a single-product economy and an isolationist perspective, opportunities in the near term (1-3 years) will be limited and difficult to realize, and for the most part will be driven by government spending.

A great deal of the information services activity is tied to government-sponsored programs, particularly in the Arab countries. Thus, the stability of the government is key to spending for professional services and software products.

There are a number of driving and inhibiting forces in both Africa and the Middle East. They remain unchanged from the 1990 report.

a. Driving Forces

Driving forces for the Middle East include:

- *Oil field development*—As a result of being a single-product economy, there is considerable emphasis on the continued development of methods to identify and develop new sources of oil.

- *Production control development*—With the decline in the world oil markets, there has been increased emphasis on obtaining greater benefits from existing production facilities and processes. A number of companies are working to streamline their operations so as to achieve greater efficiency.

- *Industrial development*—Recognizing the need to diversify, a number of countries have begun to search for other forms of industry. Though progress has been slow, focus on alternative revenue sources is expected to continue.

- *Education/Training*—Many countries have recognized that greater efforts are needed to provide educational opportunities. As a result, increased investments have been made in educational processes, including the use of automated tools.

b. Inhibiting Factors

In the Middle East, though the driving forces have contributed to growth of the information services industry, the inhibiting forces have had more impact.

- *Political environment*—The political environment continues to have a major negative impact on the development of industry. The Iraq/Kuwait situation has aggravated the political situation, further delaying the possibility of stability and slowing development in many countries.

- *Total solution requirement*—There is increasing emphasis on ability to provide a total solution. This puts single-product vendors at a disadvantage. The market is primarily driven by government spending, which dictates a full-service or solution approach.

- *Local representation*—In many countries, local representation is mandatory. Combined with the custom of noncontracted gratuities, many companies find operating in the Middle East to be extremely expensive and the margins small.

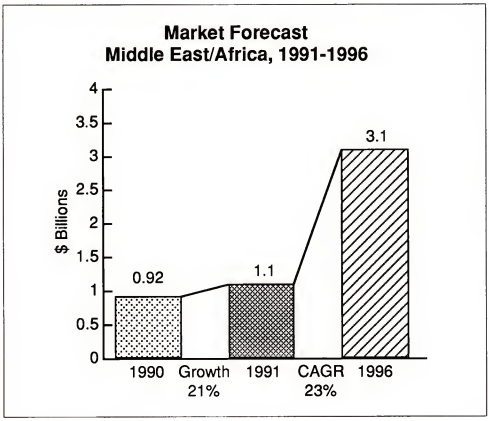
- *Software piracy*—There is a high incidence of software piracy in the Middle East. There is a general lack of recognition of copyright protection, and all packages and applications are subject to extensive copying.

B
Information Services Market Forecast

As a region, the Middle East/Africa area, comprised of more than 40 countries, continues to offer one of the least significant opportunities for information services. The best markets are Israel and South Africa, although the more oil-rich markets (such as Saudi Arabia) offer large opportunities to systems integrators and professional services firms.

For the period 1991 to 1996, the total market for information services for the region is estimated to grow from approximately $1.1 billion to $3.1 billion, as shown in Exhibit VI-1. The growth rate is expected to be approximately 23%, as the primary countries focus increasingly on building technological infrastructures.

EXHIBIT VI-1



Of the total market, the greatest opportunities are in the processing services, applications software products, and professional services delivery modes, as depicted in Exhibit VI-2.

- Processing services represent a solid and sizable market, due to the processing requirements of various governments that do not have the internal capabilities to operate their own processing facilities.

- Applications software products represents the largest area of growth, based on increased interest in mini and personal computer systems, in particular for governmental requirements. Much of the growth will result from the need for industry-specific applications. The applications software products sector is expected to grow at an estimated rate of 30%, to reach over $1 billion in 1996.

- Professional services are also expected to experience significant growth. Driven by the need to assist in developing technology-based systems and industry-specific applications, and by governmental program administration requirements, professional services are expected to grow from almost $300 million to over $1 billion during the forecast period, at a rate of 30%.

EXHIBIT VI-2

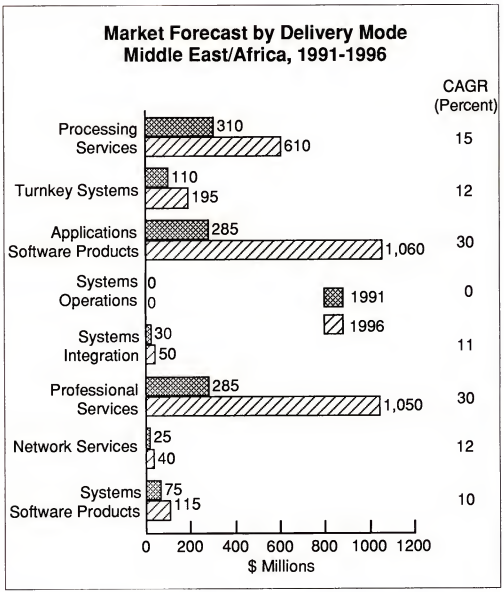
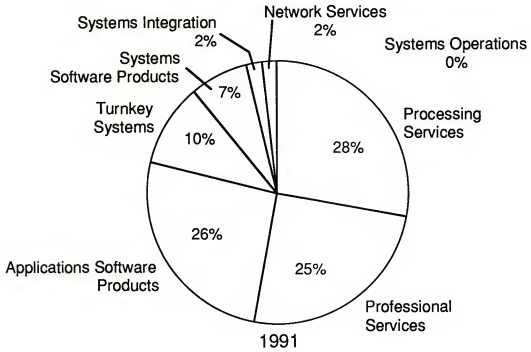
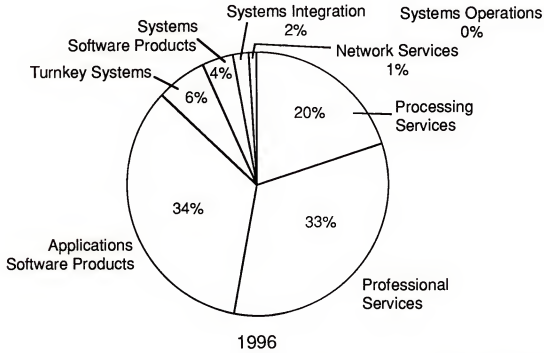


Exhibit VI-3 provides a comparison of the Middle East/Africa market by delivery mode for 1991 and 1996. Professional services and applications software products will gain share of the overall market during the next five years.

EXHIBIT VI-3

Delivery Mode Analysis
Information Services Market—Middle East/Africa
1991 and 1996





C
Market Considerations

This market is controlled greatly by the governmental program of the two major countries, Israel and South Africa. In total, these two countries represent more than half of the market for all information services.

Delivery modes other than applications software and professional services are expected to grow at respectable rates, but currently represent such a small portion of the overall market that their contribution to the market is small.

The concepts of systems integration and systems operations remain beyond the needs of this region in general.

In South Africa, there are a number of opportunities and they are expected to grow. However, companies must be able to make long-term investments in conjunction with local firms that are familiar with the economy and the social and political customs.

For companies considering entering or expanding into South Africa, investment in local firms is recommended, along with methods of providing education and training for local representatives.

In the Middle East, local representatives are mandatory. In addition, there must be recognition that sales cycles are long, and that personal rebates are part of the business process. It may also be a number of years before the negative impact of the Iraq/Kuwait confrontation is completely eliminated.

VII

Regional Summary—North America

A
Regional Overview

The North American market, consisting of Canada and the United States, is the largest region in the worldwide information services market. The 1991 market of nearly $115 billion is just under 50% of the worldwide total. In 1990, North America represented 52% of the worldwide market. Faster growth in Europe and Japan, as well as in the rest of the world in general, is slowly decreasing the North American share.

Growth has slowed over the past two years due to recessionary economies and increasing caution in the deployment of information technology. The year 1991 was the fourth of declining year-to-year growth.

The addition of a true recession to an already confused and slowing market dampened demand measurably.

The U.S., with its sheer size—$111 billion in 1991—dominates this region and impacts the entire worldwide market. The U.S. information services industry is the headquarters for many of the largest vendors active on a worldwide basis.

- The U.S. market is often the first to be impacted by major new trends such as systems integration and systems operations.
- It also has the greatest impact on the worldwide market during a recessionary period. Slowing growth rates in the U.S. for the past four years have slowed growth overall and caused shifts in many markets and marketing processes.
- In the immediate period (1992 to 1993), the North American market will experience the lowest growth rate of the past 10 to 15 years. Though growth exists (about 10% in 1991), it is not nearly the 20% annual growth rate of the 1980s, nor does it equal the growth being experienced in the other regions of the worldwide market (although those are declining in the near term as well).

The Canadian information services market was about $3.8 billion in 1990. Canada makes up just over 3% of the North American information services market. The Canadian market, though small and often overlooked, is a viable market known for aggressive programs by leading vendors and a number of larger industrial information systems programs that offer excellent opportunities to vendors willing to have a presence in Canada.

- Canadians are sensitive to the U.S. presence and size, and have sought to preserve their independence while entering the American markets. This has been a difficult balancing act, now complicated by the recent Canadian-U.S. trade agreement, which will liberalize regulations and encourage U.S. investment.

- Canadian information systems users have historically preferred to utilize Canadian vendors of applications where possible, but this has not prevented U.S. vendors with well-targeted solutions from gaining market share.

- Canadian information services vendors naturally look to the U.S. as their first target for international expansion. Similarly, U.S. vendors will often use Canada as a test base for international marketing of their products.

- The French language requirement is a complicating factor for English-language products. The provincial market of Quebec is the second largest in Canada; the federal government market is also large and requires dual-language capabilities in many application areas.

Driving and inhibiting forces for the U.S. and Canadian markets are described in detail in the respective country profiles. There are some common inhibitors present in both markets.

- *Shift to client/server*—In general, there is a belief that client/server technology holds much promise, yet there are few applications software products on the market and much needs to be learned about developing such applications. In the short term, this is an inhibitor; in the long term, client/server technology will be a strong force in strengthening the economy.

- *Recessionary climate*—Although there are signs of improvement in both economies, they are weak signs. In addition, the 1992 information systems budgets have been developed and put in place in a tight economy. Thus, even if there is a strong upturn, it may be 1993 before IS budgets and spending reflect the improvement.

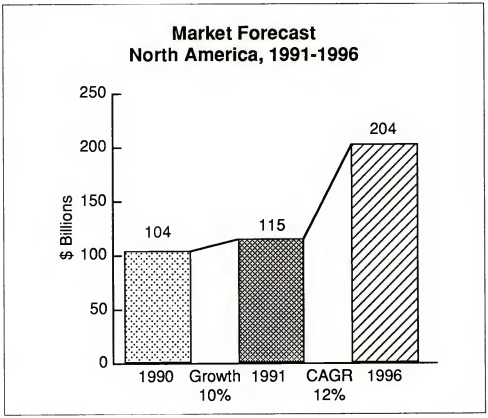
- *Outsourcing*—Both countries lead the way in willingness of corporations to outsource major portions of their IS function. The vendors are equipped to take the risk and to serve on an international basis. Canadian-based as well as U.S.-based vendors are equipped (or are becoming equipped) to operate on an international scale.

B

Information Services Market Forecast

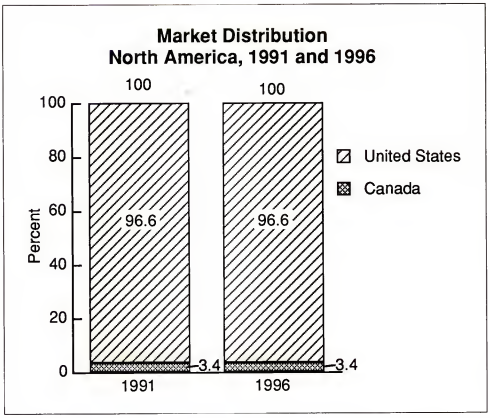
The overall information services market, shown in Exhibit VII-1, will grow from nearly $115 billion to over $200 billion by 1996, at a 12% CAGR. The sheer size of this market makes it very attractive to vendors in many countries.

EXHIBIT VII-1



As Exhibit VII-2 confirms, the size of the Canadian market is modest compared to that of the U.S. The distribution of the North American market is not expected to change over the five-year period; Canada will experience essentially the same rate of growth as the U.S. market.

EXHIBIT VII-2



It should be noted that the Canadian market, though a small portion of the North American market, is—at close to $4 billion—one of the larger national markets, exceeding many of the European country markets and larger than the total Latin American region. it is a market of real opportunity and it has developed a growing number of international information services vendors.

Exhibit VII-3 shows the size and growth rate of each of the eight delivery modes tracked by INPUT. The growth rates and size of market, of course, parallel those presented for the U.S. in the national profile.

Because the delivery mode forecasts are very similar to those for the U.S., the reader is referred to the national profiles for Canada and the U.S.

Exhibit VII-4 provides a comparison of the North American IS market by delivery mode for 1991 and 1996. Processing services will lose share of the overall market to systems operations, systems integration and network services.

EXHIBIT VII-3

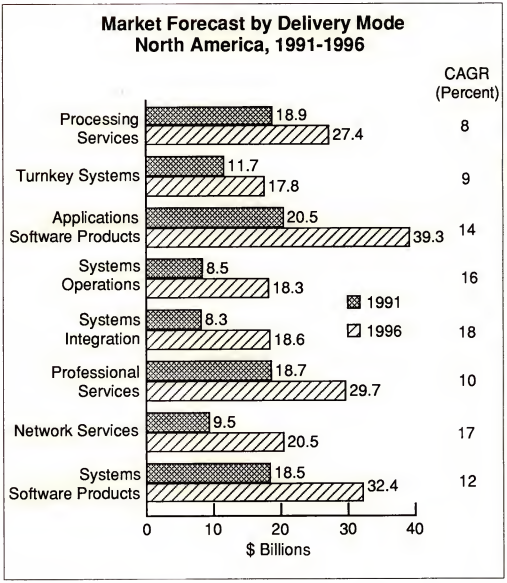
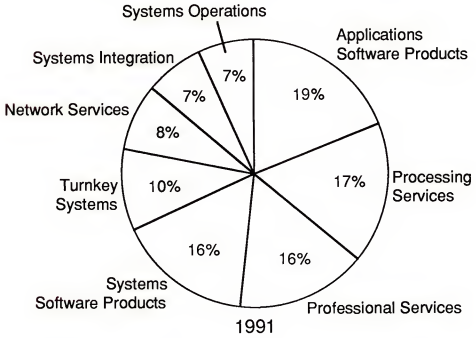
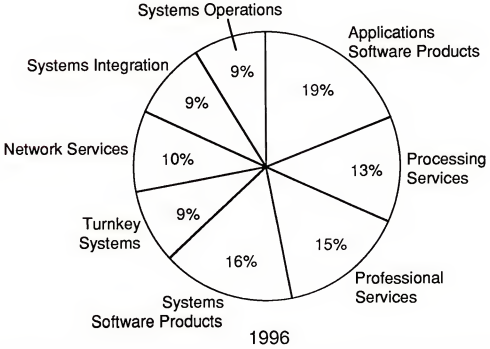


EXHIBIT VII-4

Delivery Mode Analysis
Information Services Market—North America
1991 and 1996





C
Market Considerations

On a worldwide basis, North America (the U.S. and Canada) leads the industry in establishing systems integration and systems operations as the delivery modes with the greatest growth rates.

- The larger U.S. vendors are moving quickly to implement full-service strategies and to assume the risk required by these types of services with their fixed pricing and long-term agreements.

- A number of vendors in Canada (ISM, DMR and SHL Systemhouse) have established or are establishing themselves as worldwide players in the outsourcing market.

Sheer size offers significant opportunities even in a slower growth period. As the largest geographic market available, North America offers significant potential to vendors with new products and the ability to penetrate a very established market. There are, however, some factors that make the North American market a challenge.

- Most market niches are well populated—even overcrowded—at this time, and a vendor shakeout in many sectors is under way.

- The size of the geographical market makes market entry difficult. Many U.S. customers expect a vendor to provide support on a national basis from the start.

- The market is becoming regionalized with increased variation in local marketing and sales practices by the larger firms.

- Vertical market focus is a strategy being adopted by many software and services vendors. Increasingly sophisticated users are requiring more complex solutions tailored to their lines of business.

- Vendors must be prepared to offer, as nearly as practical, a total solution with a wide range of supporting services. U.S. vendors are moving in this direction and achieving greater account control and revenues.

- Merger or acquisition may well be the best way to expand in North America. Many small and medium-sized vendors will be receptive to acquisition as a means of growth, liquidity or even survival.

The key to entry in the future may be through an alliance with a larger U.S.-based firm or in partnership with other firms from the same country that wish to enter North America.

Please refer to the national profiles for these two countries for information on leading vendors. All of the U.S.-based firms, of course, have a strong commitment to the Canadian market. Many of their Canadian subsidiaries operate with significant independence from the parent.

VIII

National Profiles

A
Introduction

Chapter VIII of the 1991-1996 worldwide forecast provides individual profiles of the market for information services for 29 countries or areas of the world. Changes from the *Worldwide Information Services Forecast, 1990-1995* report are:

- The Other Europe profile includes individual forecasts for Ireland, Greece, and Portugal.
- Where possible, the systems operations delivery mode forecasts are provided by the new submodes—platform systems operations and applications systems operations.

Each national profile includes:

- An introduction to the country or area, including a discussion of the general business climate for information services and products
- A summary of key technology trends, driving forces, and inhibiting factors impacting the information services market in the country or area
- The current size and forecast of the information services market for the country or area. (Note that the forecast data base table for each country or area is included in this chapter with the national profiles, rather than in Appendix B, for ease of reference.)
- A discussion of the competitive environment and leading vendors, where appropriate
- A brief summary of considerations regarding entering the market or expanding market presence. Areas of opportunity that appear to be particularly significant have been identified.

Each national profile includes the following exhibits:

- Market Forecast, 1991-1996
- Market Forecast by Delivery Mode, 1991-1996
- Leading Vendors, 1990
- Market Forecast Data Base by Delivery Mode and Submode by Year, 1990 through 1996

The forecast charts are in $U.S. billions unless the market is extremely small, in which case they are in $U.S. millions. The market forecast data base tables are all in $U.S. millions.

In many of the national profiles, the information services market situation has not changed significantly from the *1990-1995 Worldwide Forecast.* The driving forces and inhibiting factors are often the same or only slightly revised. All of the country and other area forecasts have been revised. In most instances, the projected growth rates have been reduced slightly.

B
Argentina

1. National Overview

Argentina continues its quest for economic stability. It has significant natural and human resources, but continues to suffer from inflation and significant swings between economic growth and decline. It has land area of more than one million square miles, a population of over 31 million, and a strong European heritage.

During 1991, Argentina's progress in controlling its excessively inflationary economy under new national leadership continued. Progress seems slow but real.

The forces driving and inhibiting the information services market are fundamental elements of the economic environment.

a. Driving Forces

- *Improved communications systems*—The government continues to invest in the telecommunications infrastructure and business in the development of information networks.

- *Industrial investment and general business climate*—The government is beginning to encourage investment in the industrial sector to stimulate economic growth of the country. However, this must be balanced against the inflationary pressure and a current recessionary climate.

- *Reduced tariffs*—Reductions in tariffs are expected to contribute to increased imports of hardware and software.

- *Economic stabilization*—There have been significant efforts to establish a stable economic base from which to grow.

b. Inhibiting Factors

- *Inflation*—Inflationary pressures that inhibit long-term investment in industry and technology remain a challenge. The solution is long term and the direction is positive, but in the short term it hampers investment from outside the country.

- *Political instability*—The ability of the country to develop a stable political environment remains in question. Many foreign firms are reluctant to make investment commitments without a stable government. Many are waiting to see the outcome of early initiatives.

- *Limited infrastructure*—With a limited technological base, significant short-term growth prospects are limited. However, significant investment must be made before information services technology will be of benefit.

- *Cost of technology*—Because much information technology (hardware and software products) is imported, internal inflation has often made such products too expensive, thus slowing investment. High import tariffs are also a problem.

2. Information Services Market Forecast

The market for information services in Argentina is small, but with stabilization of the economy and the political environment, it can grow at an estimated 17% rate, from $480 million in 1991 to over $1 billion by 1996, as shown in Exhibit VIII-1.

EXHIBIT VIII-1

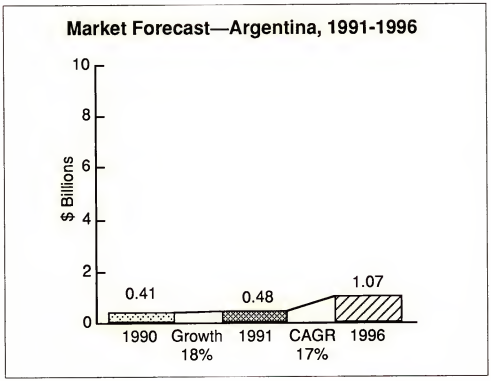
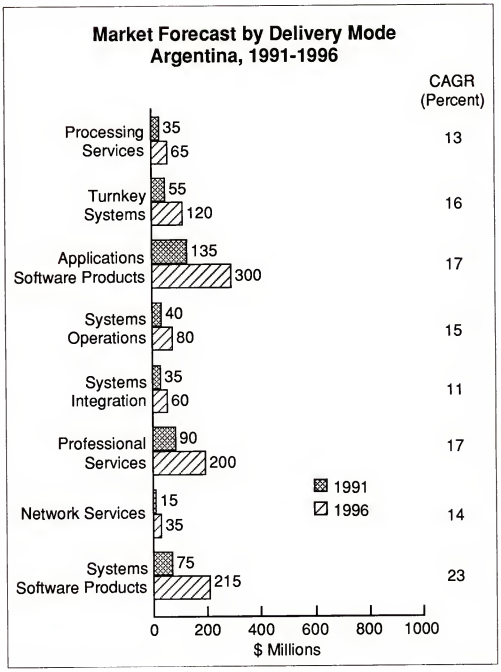


Exhibit VIII-2 provides the forecast by delivery mode. Exhibit VIII-4, found at the end of this profile of Argentina, provides the forecast in greater detail.

EXHIBIT VIII-2



In Argentina, processing services is expected to show steady growth as companies expand their processing capabilities or seek short-term solutions to meet growth demands. It is a good alternative, given the tariff situation on computer equipment. A comparable growth rate (15%) is projected for systems operations, a market of equal size to processing services.

Because of the cost of larger computers, there is a growing opportunity for processing services companies to offer full systems operations services economically compared to internal data centers.

As in other developing economies, turnkey systems are expected to grow at a higher rate than the U.S. average, due to the need to implement solutions immediately. The focus will be on personal computer- and LAN-based turnkey systems.

The network services sector in Argentina is modest and will remain small for several years at well under 5% of the total market.

- The country has a very poor telecommunications infrastructure and significant investment will be required before much growth can be expected.

- Note should be made that though Argentina has recently begun major efforts to upgrade its telecommunications infrastructure, the emphasis is on increased quality and quantity of basic services (telephone, telex, etc.), not enhanced services.

The fastest-growing area of the industry remains software products, both applications and systems software. There is a sufficiently large installed base to support a growing software market, in particular at the PC/workstation level.

- The market for software products represents about 45% of the total information services market.

- The systems software products sector will remain quite strong with a 23% CAGR, driven by increasing dependence on PCs, workstations and LANs as well as a growing interest in UNIX.

- Applications software products will see somewhat slower growth (17% CAGR). Investment costs are prohibitive and there is a desire to wait for UNIX and newer client/server products.

- If the planned lowering of duties and tariffs is accomplished, residual demand should result in high growth rates for applications, systems control and application development software.

- Urgent need exists for systems to be updated. During a visit by INPUT staff, managers responsible for systems indicated that many of their systems were old and there was a major need to upgrade them.

The market for systems integration is expected to grow from $35 million to approximately $60 million by 1996, a growth rate of about 11%. This growth is dependent on general growth in the economy which is lagging somewhat at present.

As industry begins to address lingering productivity problems, the professional services sector is expected to benefit, primarily from the need for consulting to identify solutions and alternatives. The professional services sector is expected to grow from about $90 million in 1991 to $200 million by 1996. Professional services will continue to outpace systems integration over the next five years. Buyers and vendors are more comfortable with the traditional professional services relationship than the more inclusive and higher risk systems integration relationship.

- While the need for consulting services is expected to be the greatest in the near term, software development should increase steadily over the five-year period, as work progresses from analysis and definition to the development stage of the growth process.

- Education and training is also a growing need. There is a limited base of trained personnel, and significant effort will be required to improve staff skills if internal staffs are to be able to handle new systems.

These projections for Argentina should be considered somewhat fragile. They assume a moderately improved economic base and that the political environment will continue to stabilize. These assumptions are not assured, given the past few years. 1991 results are generally positive, but not conclusive.

3. Market Considerations

Exhibit VIII-3 lists leading Argentina-based vendors and the delivery modes in which they primarily operate. Many international vendors are also active and are identified in Chapter V on Latin America.

As a general guideline, mainframes and minicomputers, as well as programming languages and operating systems, are imported from the U.S. Applications software is designed by foreign and Argentine firms. An increasing number of micro systems come from the Far East.

EXHIBIT VIII-3

Selected Vendors by Delivery Mode
Argentina, 1990

Vendor	Processing/ Network Services/ Systems Operations	Professional Services/ Systems Integration	Software Products	Turnkey Systems
Bairesco	x			
Baiwo	x			
Bergerman		x	x	
Dataproceso	x			
Haltener & Lopez		x		
Logica			x	
Pistelly, Lia & Accox		x		
Proceda	x	x	x	
Sacoma	x			
Sisercom		x		
Sisteco	x		x	
Sistematica		x		
S&M Consultores		x		x

There is a local information services infrastructure, which includes:

- Local professional services firms that include the international accounting and consulting companies such as Deloitte,Touche, IBM and Andersen Consulting. Relationships tend to be with the European (Spanish) rather than the U.S. branches of these firms.

- Local processing services firms

- Marketing arms of U.S. computer manufacturers and some software companies

Leading vendors of hardware and software include IBM, Unisys, Computer Associates, and Software AG. Companies such as Microsoft are represented by independent distributors.

In general the local vendors look to the U.S. for technology-based product and services relationships.

Whether this is a good time for entering or expanding into the Argentine market is speculative. There are signs that the country will begin to stabilize and that investment opportunities will be attractive. However, previous initiatives have met with limited success.

Many providers knowledgeable in the area suggest that distribution arrangements are the best method of entry or expansion for the near term. Establishing an equity participation arrangement can stimulate growth without significant up-front investment.

EXHIBIT VIII-4

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Argentina

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Argentina Information Services Market	412	18	485	572	671	789	928	1,070	17
Processing Services	32	9	35	38	44	49	56	64	13
-Transaction Processing Services	14	7	15	17	20	23	27	32	16
-Utility Processing	11	9	12	13	15	16	18	20	11
-Other Processing	7	14	8	8	9	10	11	12	8
Turnkey Systems	47	19	56	66	77	89	104	120	16
-Equipment	25	20	30	35	40	45	52	60	15
-Package Software Products	12	17	14	17	21	25	30	35	20
-Professional Services	10	20	12	14	16	19	22	25	16
Applications Software Products	110	23	135	160	190	225	265	300	17
Systems Operations	35	14	40	47	54	62	72	80	15
-Platform Systems Operations	20	15	23	27	31	35	41	45	14
-Applications Systems Operations	15	13	17	20	23	27	31	35	16
Systems Integration	32	9	35	39	43	48	53	58	11
-Equipment	9	11	10	11	12	13	14	15	8
-Packaged Software Products	14	7	15	16	18	20	22	24	10
-Professional Services	8	13	9	11	12	14	16	18	15
-Other Services	1	5	1	1	1	1	1	1	5
Professional Services	79	16	92	109	127	151	176	201	17
-Consulting	22	14	25	29	34	41	48	55	17
-Software Development	45	18	53	64	75	90	105	120	18
-Education and Training	12	17	14	16	18	20	23	26	13
Network Services	16	6	17	19	23	25	29	33	14
-Electronic Information Services	13	8	14	16	19	21	24	28	15
-Network Applications	3	10	3	3	4	4	5	5	11
Systems Software Products	61	23	75	94	113	140	173	214	23
-Systems Control	36	25	45	58	70	88	110	135	25
-Operations Management	5	0	5	6	6	7	8	9	12
-Applications Development	20	25	25	30	37	45	55	70	23

C
Australia

1. National Overview

The past several years have seen significant changes in the overall economic and political setting in Australia. The economy has long been dominated by a highly centralized government, a welfare-oriented economy, and strong labor unions, resulting in slow business development. The slowdown experienced in 1990 continued through 1991 and resulted in a change of Prime Minister.

Changes in the government have favored greater support for business growth and investment, but the results are yet to be gained. The government has supported moderation of union influence and expansion of private industry investment. Perhaps by the middle of the decade, Australia will return to a reasonable rate of economic growth.

The information services industry in Australia has included some significant vendors that have brought software products, such as NetView, to the worldwide market. In general, however, it has concentrated on the importation of technology with local adaptation. A key element has been the continued development, through education and training, of a local data processing profession. Australia has a fairly large human resource base with which to absorb new technologies.

Over the past two years, industry growth has lagged due to the recessionary economic environment. This may continue for another year or two.

The forces driving and inhibiting growth in the information services market in Australia are summarized below. They are very consistent with those reported in INPUT's 1990 report.

a. Driving Forces

- *Privatization*—Privatization of industry is providing a stimulus for investment, modernization and expansion. This program continues, but at a slower rate due to the economic downturn.

- *Industrial expansion*—The government is working to expand the industrial base of the country.

- *Financial services expansion*—The financial services industry has been one of the first industries to begin expansion.

- *Mini-based applications*—With the availability of high-performance mini and microcomputers, companies are looking for industry-specific applications to meet current and future needs.

- *Network development*—Networking capability is an increasingly important aspect of the information services industry. With a widely dispersed population, network technology is a key development and operational tool.

b. Inhibiting Factors

- *Unionism*—Unions have traditionally had a strong voice in industrial and political developments. Seeing the potential of losing jobs, the unions generally resist the application of technology. The strength of unions has begun to decline somewhat, but they still have a strong voice, and progress toward the use of information technology must be made slowly.

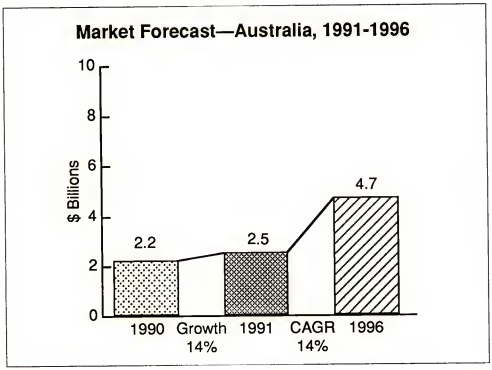
- *Skilled labor shortage*—There is a significant shortage of skilled labor in the information services industry. Efforts are needed to increase the level of education and practical experience.

- *Infant industry*—The information services industry is in its infancy. Although the growth potential is good, there is a relatively small base from which to grow.

2. Information Services Market Forecast

The market for information services in Australia is expected to grow from an estimated $2.5 billion in 1991 to $4.7 billion by 1996, as shown in Exhibit VIII-5. The annual growth rate of 14% is down from 17% projected last year, further reflecting the recession impact.

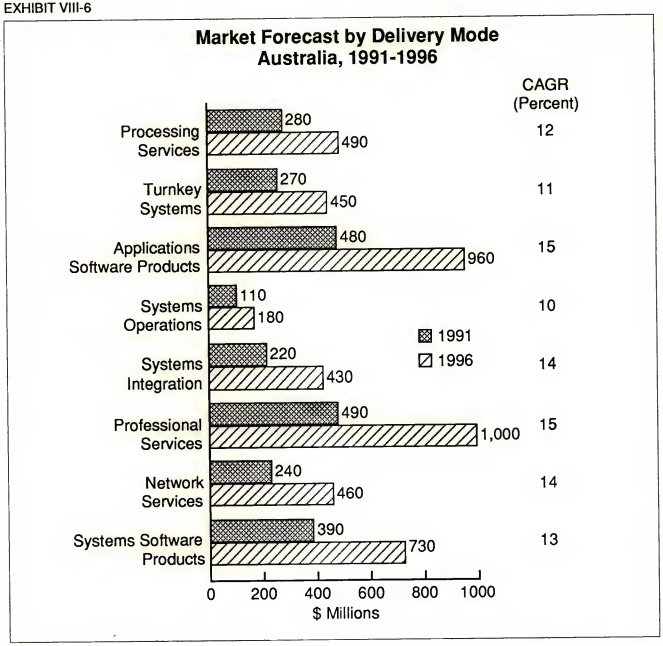
EXHIBIT VIII-5



The specific trends by market segment are generally unchanged, with slightly lower growth rates overall, again due to the recessionary economy.

Exhibit VIII-6 provides the forecast by delivery mode, and Exhibit VIII-8, at the end of this profile, provides the detail behind this forecast.

EXHIBIT VIII-6



The largest growth is projected in network services, applications software products and professional services.

The market for processing services is expected to grow from an estimated $280 million in 1991 to almost $500 million by 1996, an average growth rate of approximately 12%, as shown in Exhibit VIII-6.

The demand for turnkey systems in Australia is expected to be reasonably strong, with an 11% CAGR. There is strength in the PC/workstation sector for smaller firms, supported by improved availability of packaged software products.

Software products will grow at a rate of 15% for applications and 13% for systems software products.

- There will be a continued need for applications software in all segments of the economy, ensuring steady growth for the next several years.

- The need for systems control and application development tools is also expected to increase steadily, as an increasing number of organizations work to develop or improve internal processing capabilities.

The $100 million systems operations market will grow at a more modest rate of 10%. The concept of shifting full data center operations is slow to catch on in Australia, as it is in most smaller information services markets.

The demand for systems integration and professional services is expected to lag behind that forecast in 1990. Industry has simply slowed down investment and systems projects due to reduced budgets. Both will experience growth rates of about 15%, compared to the previously forecasted 21%.

- Systems integration services are expected to be driven primarily by the government's need to modernize and expand federal and statewide services. A notable example is a recent contract to upgrade the country's national flight systems. Commercial systems integration will lag behind that in the government sector.

- Within professional services, consulting is expected to grow at a significantly high rate, as companies consider alternatives that will allow them to modernize and leverage newer, more integrated information technologies.

- Education and training is receiving more attention as the country works to develop a broader range of information technology skills. Although the quality of trained staff is high, Australia has been generally slow in educating and training sufficient staff to meet growing needs.

The demand for network services is expected to rise, due to the need for the government to provide more service to remote areas of the country, and to the need for on-line services to link financial service centers across the country.

- Given the commitment of the government to network-based services, network services are expected to grow at an estimated 14% per year, from $240 million in 1991 to about $460 million in 1995 (Exhibit VIII-6).

- Strong growth is expected in both electronic information services and network applications.

- Organizations recognize the value of information and have been working to develop an on-line data base industry that will be accessible worldwide. International electronic information services firms are serving the Australian market.

- Data base and information exchange services such as medical services are expected to stimulate growth of network applications as well.

- As in many countries, there is great interest in EDI and E-mail services in Australia, which will contribute greatly to the growth of network applications.

The market is nearly $2.5 billion and is experiencing reasonable growth in a difficult economy. Opportunities are real, and over time increased growth is expected to return.

3. Market Considerations

Prospects for entry into or expansion of the Australian market are good. However, vendors should consider the market immature and should expect an extended growth period.

Distribution channels are similar to those in the U.S. Processing and professional services are generally sold directly to the prospect. Systems software generally accompanies hardware sales.

There are many distributors of software, and vendors entering the market are encouraged to establish relationships with them as the preferred method of gaining entry.

There are few inhibitors to entering the Australian market, and there are a number of well-established firms that have a presence beyond the country of Australia.

Both outsourcing and downsizing are active trends in the Australian market. Thus, the activities of vendors in the U.S. market are directly applicable in Australia.

Exhibit VIII-7 lists local vendors by delivery mode that were identified during INPUT's 1991 research. In addition, all of the major computer manufacturers and leading U.S. vendors, such as EDS, Oracle, Computer Associates and Andersen Consulting are active in this market. There is no language barrier, making entry very easy for U.S.- and U.K.-based firms.

EXHIBIT VIII-7

Selected Vendors by Delivery Mode
Australia, 1991

Vendor	Processing/ Network Services/ Systems Operations	Professional Services/ Systems Integration	Software Products	Turnkey Systems
Aspect		x		
BHP-IT		x		
COCAM				x
Computer Science of Australia	x	x		
Computer Power Group		x		
DMR	x	x		
Ferntree	x	x		
MLC	x			
PAXUS	x			
Telecom Plus	x			

EXHIBIT VIII-8

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Australia

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Australia Information Services Market	2,181	14	2,480	2,815	3,203	3,641	4,130	4,705	14
Processing Services	253	12	283	320	357	393	446	495	12
-Transaction Processing Services	210	12	235	265	295	325	370	410	12
-Utility Processing	15	7	16	17	18	20	22	25	9
-Other Processing	28	14	32	38	44	48	54	60	13
Turnkey Systems	240	10	265	293	324	357	401	450	11
-Equipment	110	11	122	135	150	163	180	200	10
-Packaged Software Products	60	10	66	72	79	86	93	100	9
-Professional Services	70	10	77	86	95	108	128	150	14
Applications Software Products	420	15	485	550	625	730	840	960	15
Systems Operations	100	11	111	123	134	149	160	177	10
-Platform Systems Operations	60	10	66	73	79	89	95	105	10
-Applications Systems Operations	40	13	45	50	55	60	65	72	10
Systems Integration	188	17	220	247	282	322	371	428	14
-Equipment	80	19	95	104	120	135	155	180	14
-Packaged Software Products	18	22	22	25	29	34	40	45	15
-Professional Services	80	15	92	106	120	139	160	185	15
-Other Services	10	10	11	12	13	14	16	18	10
Professional Services	425	15	487	558	660	764	872	1,000	15
-Consulting	100	15	115	130	155	180	210	250	17
-Software Development	270	15	310	360	430	500	570	650	16
-Education and Training	55	13	62	68	75	84	92	100	10
Network Services	205	16	237	277	317	360	405	465	14
-Electronic Information Services	170	15	195	225	255	285	315	350	12
-Network Applications	35	20	42	52	62	75	90	115	22
Systems Software Products	350	12	392	447	504	566	635	730	13
-Systems Control	145	14	165	192	220	253	280	325	15
-Operations Management	75	9	82	92	104	115	130	145	12
-Applications Development	130	12	145	163	180	198	225	260	12

D
Austria

1. National Overview

Austria has a population of around 7.6 million and is a member of the European Free Trade Association (EFTA). Its information services market is very active, but represents only around 1% of the total for Europe.

Austria performed well in 1989 and 1990 compared to most other industrial European economies, with GDP growth of between 4% and 4.5%. The OECD (Organization for Economic Cooperation and Development) forecasts that this will slow to 2.9% in 1991 and 1992. But unemployment remains low at 3.3%, and inflation is expected to average only 2.6% over the next five years.

The government seems set to apply for European Economic Community (EEC) membership in 1992. Well positioned to gain advantage from increased trade with the East European bloc, Austria is nevertheless cautious about the short-term benefits.

Despite a reputation for having one of the most regulated economies in the West, Austria is on a deregulation path. It is hopeful that Vienna can regain some of its historic position as a financial centre, exploiting its own economic success, the proximity with the East, and government action to sell off parts of major state-owned companies. State ownership was a natural way of providing stability for industrial recovery after the last war.

Germany is Austria's dominant trading partner, accounting for about 45% of all imports and 35% of exports, and continuing to generate strong demand. The EEC accounts for about two-thirds of all international trade, no doubt the major factor in the decision to apply for EEC membership. Any prolonging of the crisis in Yugoslavia is likely to dampen business confidence within Austria to some extent.

2. Information Services Market Forecast

Exhibit VIII-9 shows the Austrian market for information services. The market is forecast by INPUT to grow from $1.2 billion in 1991 to $2.3 billion by 1996, at a CAGR of 14%. Exhibit VIII-10 shows the market by delivery mode.

In comparison to the overall European market, Austria exhibits similar characteristics to Germany, with packaged application solutions—applications software products and turnkey systems—more dominant in the business mix than is usual.

EXHIBIT VIII-9

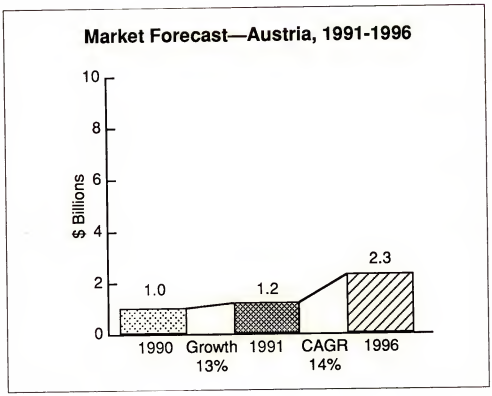
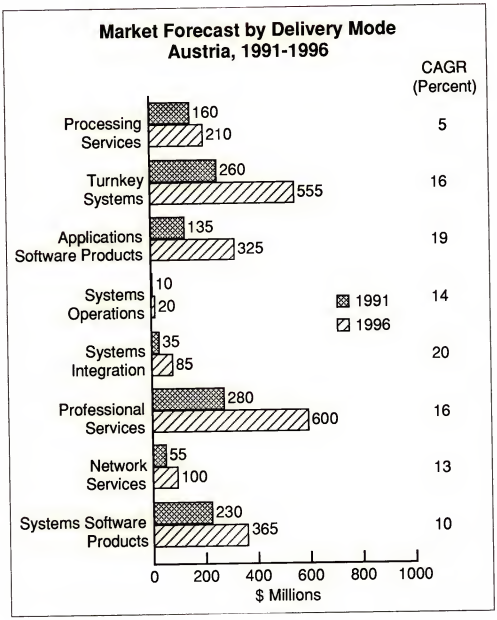


EXHIBIT VIII-10



3. Market Considerations

Exhibit VIII-11 lists the top vendors in the Austrian market for 1990.

IBM is the largest information services vendor in Austria, with the merged Siemens-Nixdorf (SNI) still generating attributable revenues of less than half those of the market leader, IBM. Neither company has grown as significantly as its major Austrian competitors in the past two years. In fact, SNI probably suffered some loss of client base to competitors as a result of uncertainty during the takeover.

EXHIBIT VIII-11

Leading Information Services Vendors
Austria, 1990

Vendor	Country of Origin	Estimated Sector Revenues ($ Millions)
IBM	U.S.	93
Siemens-Nixdorf	Germany	40
Management Data	Austria	33
Dataservice	Austria	30
Beko	Austria	25
Mannesmann Kienzle	Germany	23
Digital	U.S.	21
GRZ Linz	Austria	20
Reuters	U.K.	15
Voest-Alpine	Austria	15

Management Data is a twenty-year-old company operating out of Vienna, Innsbruck, Salzburg, Germany, Hungary, the U.K. and Singapore. It has a network of agents across the rest of Europe, Japan and South Africa. Its main specialization is international banking software, which it primarily sells as turnkey systems.

Dataservice is a wholly owned subsidiary of an Austrian bank. It has a strong PC orientation as well as a wide range of processing services, and specializes in banking, insurance and manufacturing systems. Beko has an engineering bias across a wide range of platforms and specializes in manufacturing, laboratory and general business administration systems.

The absorbtion of Mannesmann Kienzle by Digital Equipment Corp. will radically alter the leader rankings for 1991.

EXHIBIT VIII-12

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Austria

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Austria Information Services Market	1,030	13	1,170	1,320	1,510	1,710	1,970	2,260	14
Processing Services	153	6	161	167	176	186	195	208	5
-Transaction Processing Services	135	6	142	148	157	165	174	186	6
-Utility Processing	6	3	6	6	7	7	7	7	2
-Other Processing	12	4	12	13	13	14	14	15	4
Turnkey Systems	229	15	262	304	351	403	475	554	16
-Equipment	123	10	136	153	170	186	212	237	12
-Applications Software Products	38	22	47	56	68	84	102	127	22
-Systems Software Products	15	9	16	19	20	23	25	29	12
-Professional Services	53	20	64	77	93	110	136	161	20
Applications Software Products	114	19	134	161	191	226	271	325	19
-Mainframe	14	6	15	16	17	17	19	20	6
-Minicomputer	36	15	42	48	56	64	75	85	15
-Workstation/PC	64	23	78	98	119	144	178	220	23
Systems Operations	9	19	11	12	14	16	18	21	14
-Platform Systems Operations	5	18	6	6	7	8	9	11	14
-Applications Systems Operations	4	20	5	6	7	8	9	10	15
Systems Integration	27	25	34	39	48	59	71	85	20
-Equipment	13	20	15	17	20	24	28	33	17
-Applications Software Products	1	30	1	1	2	2	3	4	30
-Systems Software Products	1	20	1	1	2	2	2	3	22
-Professional Services	12	31	16	19	24	30	36	44	22
-Other Services	0	0	0	1	1	1	1	1	15
Professional Services	246	16	282	328	386	446	517	601	16
-Consulting	32	18	38	45	53	64	75	89	18
-Software Development	178	14	203	237	280	322	373	432	16
-Education and Training	36	14	41	46	53	60	69	80	14
Network Services	48	12	54	61	69	79	92	99	13
-Electronic Information Services	42	10	46	50	55	60	66	71	9
-Network Applications	6	33	9	11	14	19	25	28	27
Systems Software Products	208	9	227	249	271	298	331	364	10
-Mainframe	106	4	110	114	119	123	127	131	4
-Minicomputer	64	12	71	81	89	98	110	123	12
-Workstation/PC	38	20	46	54	64	78	93	110	19

E
Belgium

1. National Overview

Belgium has a population of 10 million and was a founding member of the European Community. Belgium is also part of Benelux, which as a customs union was one of the foundations of the EC. Luxembourg, with a population of 380,000, is a partner with Belgium and the Netherlands in Benelux and is considered for INPUT's marketing purposes as part of Belgium.

Belgium's information services market is estimated to be the ninth largest in Europe, at $2.2 billion in 1991.

Gross domestic product rose by 3.4% in 1990 compared to 4.0% in 1989, well above the European 1990 average of 2.8%. Belgium has a strong economy with low inflation but with relatively high unemployment rates (for Europe) of around 8% in 1990, rising towards 9% in 1991.

Tension between the country's two main language regions (Flanders and Wallonia) appears to have diminished, contributing to a period of stable growth over the last three years. The Dutch-speaking Flemish population slightly outnumber the French-speaking Walloons, with 57% of the population and 60% of turnover in the national economy. Belgium's geographical position has resulted in it doing more trade across its borders than internally, with over 60% of the country's ouput going to export.

Wealth in the country centers on Brussels—main seat of the European Community administration—and on the northern, Flemish, part of the country. The rapid decline of the steel, coal, textiles and ship-building industries have left the country's government with heavy debts that are gradually being passed to the regional governments to service directly.

Luxembourg, once a beneficiary of the steel industry, is prospering as a kind of fiscal paradise, with low tax, banking secrecy, duty-free shopping, etcetera. It is possible that some of the new banking laws on disclosure in Switzerland are causing some substantial funds to be diverted alternatively to Luxembourg. This increase in Luxembourg's competitive advantage is only threatened by the possibility that other EC members may push for new banking legislation across the community.

2. Information Services Market Forecast

INPUT forecasts that the Belgian market for information services will be $2.2 billion in 1991, growing at an average of 16% per annum to $4.7 billion by 1996. This is shown in Exhibit VIII-13.

EXHIBIT VIII-13

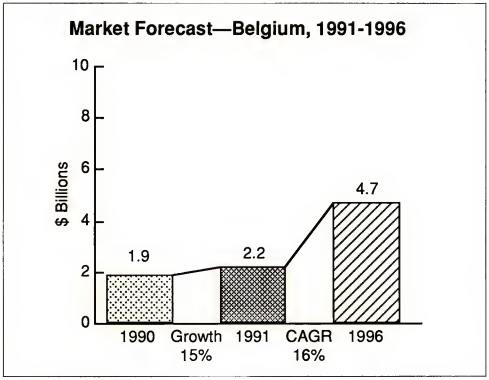
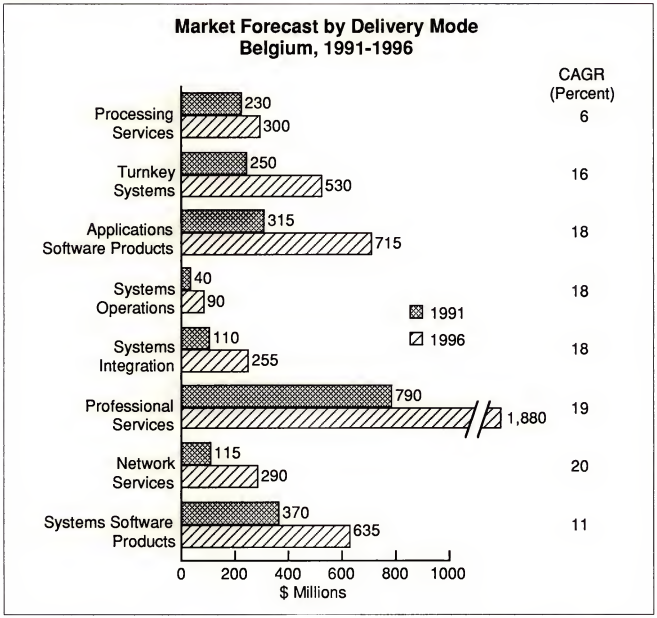


Exhibit VIII-14 gives the detailed forecast by INPUT service delivery mode. The Belgian market is strong in custom software development, an element of the professional services delivery mode. Professional services represented 35% of the whole Belgian market in 1990, compared to 32% for Europe overall.

The primary high-growth opportunities lie in the area of application solutions, especially software products, custom software development, network services and systems integration.

Detailed forecasts of the components making up each service delivery mode are shown in Exhibit VIII-16 for Belgium for the period 1991-1996.

EXHIBIT VIII-14



3. Market Considerations

Exhibit VIII-15 lists the top ten vendors in the Belgian market during 1990. It was compiled using only the information services revenues attributable to the domestic market within Belgium, excluding exports and excluding revenues from any parent companies.

EXHIBIT VIII-15

Leading Information Services Vendors Belgium, 1990

Vendor	Country of Origin	Estimated Sector Revenues ($ Millions)
IBM	U.S.	208
CSC	U.S.	107
Digital	U.S.	35
Sema Group	France	35
Cap Gemini Sogeti	France	32
Orda-B	Belgium	30
Unisys	U.S.	29
Volmac	Netherlands	29
Reuters	U.K.	26
Trasys	Belgium	25

As in nearly every European country, IBM leads in information services revenues. It has vigorously pursued additional business in information services in order to counter falling income and margins from its equipment supply and maintenance businesses. It has been particularly successful in establishing a Europe-wide systems integration business.

CSC, the largest independent vendor in the U.S., established a strong position in Belgium with its acquisition of CIG Intersys in 1989. This acquisition doubled CSC's revenues in Europe. The Belgian subsidiary offers a full range of services, specializing in the transport, manufacturing, and banking and finance sectors. CSC's more recent acquisitions aim to establish a European management consulting group led by its subsidiary, Index.

INPUT has revised Digital's software and service revenues upwards this year. The company has reorganized its services business under a single management structure and is rapidly diversifying into all types of service, with the general exception of applications software development.

Sema and Cap Gemini Sogeti illustrate the strong position of French independent vendors in Belgium.

The first wholly Belgian company on the list is Orda-B N.V. Orda-B has 350 employees and offers a wide range of services, specializing in network-based services and industrial and general business automation.

Trasys SA is a subsidiary of Tractebel and specializes in development and implementation of complex information systems. The main industry sectors in which it operates are government, utilities, telecommunications and manufacturing.

EXHIBIT VIII-16

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Belgium

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Belgium Information Services Market	1,930	15	2,230	2,590	3,000	3,470	4,050	4,700	16
Processing Services	216	5	228	241	254	269	284	301	6
-Transaction Processing Services	192	5	202	214	225	238	251	266	6
-Utility Processing	7	2	7	7	7	7	7	8	2
-Other Processing	17	8	19	20	22	23	25	28	8
Turnkey Systems	215	17	253	294	341	392	456	533	16
-Equipment	114	11	127	142	156	171	191	211	11
-Applications Software Products	44	24	55	67	81	98	119	145	21
-Systems Software Products	6	14	7	8	9	10	11	12	11
-Professional Services	51	26	64	78	95	113	136	165	21
Applications Software Products	269	18	316	373	438	516	610	715	18
-Mainframe	30	5	32	33	36	39	41	42	6
-Minicomputer	85	17	100	114	130	150	173	197	15
-Workstation/PC	153	21	185	225	272	327	396	477	21
Systems Operations	35	17	41	49	58	68	79	92	18
-Platform Systems Operations	22	19	26	30	36	42	49	56	17
-Applications Systems Operations	13	18	15	19	22	26	30	36	19
Systems Integration	93	19	111	128	151	182	215	254	18
-Equipment	38	15	43	49	56	67	78	91	16
-Applications Software Products	3	25	4	5	6	8	10	13	29
-Systems Software Products	3	25	4	4	5	5	6	7	15
-Professional Services	46	23	57	67	80	97	116	137	19
-Other Services	3	9	3	4	4	5	5	6	11
Professional Services	671	17	788	954	1,127	1,335	1,587	1,876	19
-Consulting	97	21	117	142	171	205	249	301	21
-Software Development	520	17	607	737	867	1,026	1,214	1,431	19
-Education and Training	54	18	64	75	90	104	124	145	18
Network Services	95	20	114	137	165	198	240	289	20
-Electronic Information Services	64	16	74	87	101	119	139	162	17
-Network Applications	32	27	41	51	64	80	101	127	26
Systems Software Products	338	10	373	413	462	512	571	636	11
-Mainframe	179	5	188	197	208	217	228	237	5
-Minicomputer	101	14	116	133	153	173	194	220	14
-Workstation/PC	58	20	69	84	101	121	149	179	21

F
Brazil

1. National Overview

1989 and 1990 brought some stability to Brazil's economy; however, as in Argentina, it takes time to know if real change is occurring. Fundamental changes now being made that will facilitate the information services industry include:

Brazil continues its struggle to balance natural resource wealth and a fast-growth population. There was some progress in 1991 in the governmental and industrial areas but also economic difficulties from continued inflation and some recessionary pressures.

- *Infrastructure development*—With a more stable economy anticipated, focus is being placed on the development of a national technological infrastructure. Development to date has been fragmented and has been delayed due to continual changes in the economic situation.

- *Local industry development*—The country is committed to the development of a national information services industry. The national computer law provides high protection for national firms and places severe restrictions on the entry of foreign companies.

- *Network development*—The government has recognized the need for a comprehensive national network and is committed to expanding and enhancing network capabilities. However, there are extensive restrictions on participation by foreign firms in this development.

Forces driving and inhibiting growth in the information services market include the following, which are essentially unchanged from the previous worldwide forecast report.

a. Driving Forces

- *Political stability*—A return to political stability is beginning to attract the interest of a number of foreign firms that had delayed entry into the market or reduced their efforts in the country.

- *Copyright law enforcement*—The government has begun to enforce international copyright protection laws. Software piracy has been somewhat reduced, causing some companies to consider increasing their efforts in the Brazilian market.

- *End of informatics law*—The current informatics law is scheduled to expire in 1992. The planned end to the law has caused some firms to consider entry more favorably. The new law is now expected to improve the business climate for market entry by international firms.

- *Relaxed investment policies/procedures*—Government policy has improved in favor of R&D investments. Easing of registration times and product ownership rules is in process and a better information technology industry is expected to develop.

- *Economic climate*—In spite of continued inflation and recessionary pressures, many industries continue to show growth and sponsor new investment, including in information technology.

b. Inhibiting Factors

- *Inflation and recession*—There are enough negative economic pressures that growth is expected to be slower over the next five years than previously projected by INPUT.

- *Protectionism*—The government policy of protecting infant industry is expected to remain in force for the foreseeable future. Foreign capital restrictions remain, to some degree.

- *Complex entry procedures*—Bureaucratic entry procedures are expected to remain. Estimates are that up to 18 months can be required to obtain the necessary approval to conduct business in the country.

- *Entry restriction*—Although there is a general trend toward easing permission to enter the market, the market is expected to remain restricted.

- *Economic stability*—The overall economic stability of the country remains a significant question for many firms considering entering or expanding in Brazil.

2. Information Services Market Forecast

The market for information services in Brazil is largely untapped. Although its economy is five time larger than Argentina's, the information services market is only two-and-a-half times as large. As a result of technological isolationism, extreme bureaucracy, and a weak economic infrastructure, the market has languished.

The current market for information services is estimated to be approximately $1.5 billion. The market is expected to grow at an annual rate of 20%, to over $3.7 billion by 1996, as shown in Exhibit VIII-17. The five-year CAGR for 1990-1995 was also 20%.

EXHIBIT VIII-17

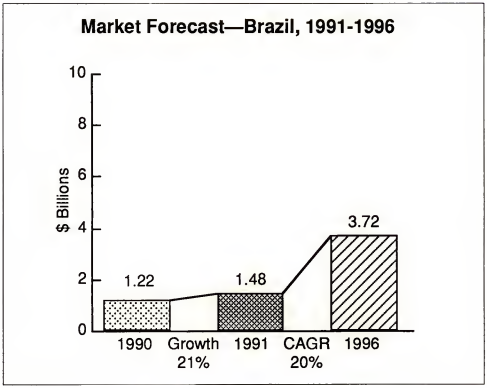
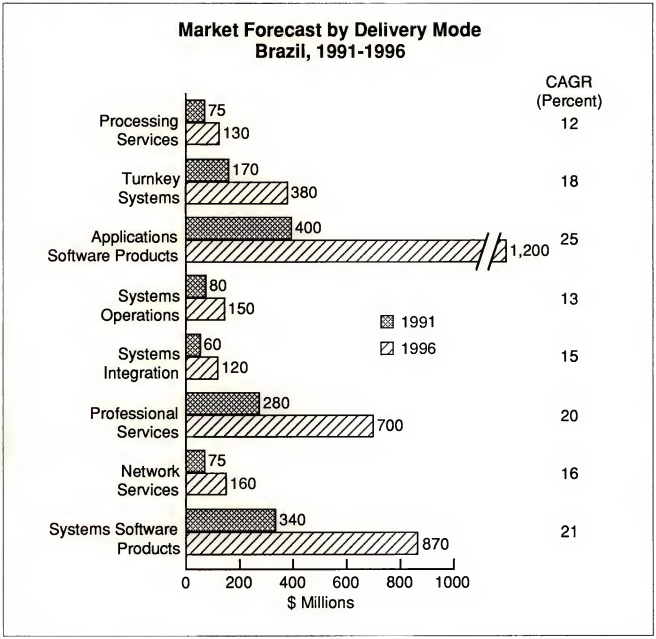


Exhibit VIII-18 provides the forecast by delivery mode. Exhibit VIII-20, at the end of this profile, provides the detail behind this forecast.

Key contributors to growth are expected to be software products, turnkey systems and professional services. Over the next several years, professional services will be needed to assist in identifying ways to strengthen the economy's use of information technology. An improved economic climate will permit greater importation of information technology products; however, implementation skills must be developed locally to insure successful deployment.

Growth of software products can be realized if the government takes an aggressive stand on software piracy and alters its policy of requiring that imported products become products of the country.

EXHIBIT VIII-18



- Efforts to reduce piracy continue with a new law. The federal government has indicated its commitment to altering its position on product ownership.

- Assuming that these efforts are successful and believed by international software products firms, the market for software products is expected to grow from over $700 million in 1991 to $2.0 billion in 1996, an annual growth rate of 23%.

- As in many areas of the world, the key software requirements will be for applications software and application development tools.

As shown in Exhibit VIII-18, the market for processing services is expected to show moderate growth as an increasing number of organizations expand their information services requirements to meet the needs of a growing economy. As in many of the Latin American markets, the use of processing and systems operations-type services is modest in relation to the overall information services market. These vendors need to justify their economies of scale from which significantly higher growth can result.

The market for network services is expected to show modest growth as the country works to develop and expand its national value-added services network. The demand for network services should be driven primarily by the increasing national requirement for electronic information services to improve industrial productivity. Until a stronger telecommunications infrastructure is in place, this segment will lag behind the industry in growth.

The market for turnkey systems is expected to grow at a rate about double that in the U.S. This growth is due to residual demand for solutions to address immediate requirements. The market for turnkey systems will be at least $380 million by 1996. There will be a heavy dependence on PC- and LAN-based products.

The market for systems integration in Brazil is small, as indicated in Exhibit VIII-18. Professional services remains the favored way to buy systems deployment services in most of the Latin American markets.

As Exhibit VIII-18 shows, the market for professional services in Brazil is of moderate size, considering the size of the country. This market is expected to grow at 20% per year for the next several years. Within professional services, the highest growth rates are expected to be in consulting and software development.

- Consulting growth will result from the need for businesses to identify solution alternatives.

- Software development growth will result from organizations' need for custom solutions and the lack of internally trained systems professionals.

- However, education and training may develop into a major opportunity. Should the economy of Brazil go into a period of sustained and balanced growth, the opportunity for the use of information technology will be limited only by the availability of internally trained personnel. Local professional services firms should be looking closely at the training opportunity.

Overall, the market for information services in Brazil has major potential. Recent changes indicate that growth could be sustained for several years, and could in fact exceed that forecast by INPUT. However, much will

depend on the success of the government in maintaining a balanced course.

3. Market Considerations

Exhibit VIII-19 lists leading Brazil-based vendors and the delivery modes in which they primarily operate. Many international vendors are also active and are identified in Chapter V on Latin America.

Preferring to stimulate and protect indigenous industry, Brazil has not realized the benefit of foreign products and services. Many of the vendors listed above are of modest size, yet they are well established and many have international relationships. In an improved economic climate with improved laws regarding the importation of information technology products, opportunities for local and international vendors abound.

If the recent changes in the government commitment to provide a stable, directed economy and a balanced, open information technology market are successful, Brazil could become a major market experiencing strong growth throughout the 1990s.

Entry into the Brazilian market is suggested, but still with a high degree of caution. Policies and procedures are lengthy and complex. Ownership of products entering the country can be questioned, although as the new law takes effect this situation should improve.

The most logical form of entry remains through a local representative. Such a move should follow a comprehensive review to ensure a thorough understanding of the opportunities and risks.

Over the long term, Brazil is expected to take a more prominent role in Latin American development. Cautious entry combined with a long growth cycle could bring long-term rewards.

Due to the restrictive environment and the lax enforcement of copyright protection laws, many firms have delayed entry into Brazil. Major foreign companies include IBM, NCR, and Unisys. Apple, Microsoft, and other software firms are notably absent due to concerns over ownership rights and software piracy; however, this is now expected to change.

Any company doing business in Latin America must now look at the Brazilian market. It is the largest and has by far the greatest total potential.

EXHIBIT VIII-19

Selected Vendors by Delivery Mode
Brazil, 1990

Vendor	Processing/ Network Services/ Systems Operations	Professional Services/ Systems Integration	Software Products	Turnkey Systems
Cetil	x	x		
Compucenter			x	
CPM Informatica		x	x	
Datalogica			x	
Embratel	x			
Gerden Informatica		x		x
GSI (Gerdan Servicos de Informatica)	x		x	x
Intertec	x		x	x
Methodus			x	
Nantutec			x	
Proceda	x		x	
Proconsult	x	x	x	
Serpro	x			
Villares		x		x

EXHIBIT VIII-20

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Brazil

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Brazil Information Services Market	1,219	21	1,478	1,771	2,135	2,580	3,084	3,722	20
Processing Services	66	15	76	84	95	106	118	132	12
-Transaction Processing Services	27	15	31	36	42	48	55	62	15
-Utility Processing	25	16	29	31	34	37	40	44	9
-Other Processing	14	14	16	17	19	21	23	26	10
Turnkey Systems	142	18	167	196	232	274	326	384	18
-Equipment	66	11	73	81	90	100	112	125	11
-Package Software Products	41	27	52	64	81	101	126	155	24
-Professional Services	35	20	42	51	61	73	88	104	20
Applications Software Products	320	25	400	500	620	775	950	1,200	25
Systems Operations	70	14	80	90	100	114	130	150	13
-Platform Systems Operations	40	13	45	50	55	62	70	80	12
-Applications Systems Operations	30	17	35	40	45	52	60	70	15
Systems Integration	54	15	62	71	81	94	107	123	15
-Equipment	22	14	25	28	32	36	40	45	12
-Packaged Software Products	5	10	5	6	6	7	8	9	12
-Professional Services	25	20	30	35	40	48	55	65	17
-Other Services	2	5	2	2	3	3	4	4	5
Professional Services	230	22	280	340	410	492	590	705	20
-Consulting	60	25	75	95	115	140	175	210	23
-Software Development	135	22	165	195	235	280	330	395	19
-Education and Training	35	14	40	50	60	72	85	100	20
Network Services	62	20	73	85	102	120	138	156	16
-Electronic Information Services	50	20	60	70	85	100	115	130	17
-Network Applications	12	20	13	15	17	20	23	26	15
Systems Software Products	275	24	340	405	495	605	725	872	21
-Systems Control	170	24	210	250	310	380	455	550	21
-Oper Mgmt	20	25	25	30	35	40	45	52	16
-Appl Dev	85	24	105	125	150	185	225	270	21

G
Canada

1. National Overview

During 1990, INPUT conducted an in-depth assessment of the Canadian information services market. A second such assessment is being implemented in early 1992. This profile is based on the 1990 assessment with updates for 1991 activity.

The Canadian economy has suffered many of the negative impacts being experienced in the United States. Recessionary pressures have slowed growth and expenditures for information technology and services. At the same time they have created some significant opportunities for systems operations services, and the software products segments remain reasonably strong.

The overall attitude of Canadian businesses, as well as the government, toward the use of information technology and services remains strong and positive, but with the caution that comes with a recession. Key factors affecting this market include:

- *Increased technology investment*—Because of stimulation by government actions, there is an increasing amount of investment in information technology and services. The trend is expected to continue for at least the next several years.

- *Increasingly integrated systems*—There is increased emphasis on integrating systems as they are upgraded and expanded. The need for comprehensive processing capabilities has fostered growth of the systems integration market.

- *Expanded DBMS/4GL use*—Many organizations are placing increased emphasis on the development of DBMS systems and the use of fourth-generation languages as part of the development process.

- *Industry-specific applications*—Although the growth of cross-industry applications is strong, greater emphasis being placed on industry-specific applications.

The Canadian economy appears to be recovering from the recessionary climate ahead of the U.S. and may see an earlier improvement relative to information services expenditures.

Forces driving and inhibiting growth in the information services market in Canada are listed below. Other than the impact of a recession, they are unchanged for the 1991 report.

a. Driving Forces

There are a number of forces causing change in the information services industry in Canada. These forces are oriented significantly to the overall economy of the country, and include the following:

- *Worldwide market position*—The government of Canada has recognized that investment is necessary for Canada to regain its position in the world economy. As a result, significant investment is being made in information technology.

- *Trade agreement*—The recently completed trade agreement with the United States, which liberalizes many import/export requirements, is stimulating investment by American companies. Conversely, Canadian companies are beginning to look south of the border for more business.

- *Government technology development*—The government is spending larger amounts to upgrade its technology base.

- *New systems development tools*—New tools and techniques are stimulating the upgrading and replacement of many systems. They are also fostering more integrated systems.

- *Mini/Micro systems*—More powerful and lower priced mini and micro systems are providing opportunities for smaller firms to take advantage of computer capability.

b. Inhibiting Factors

- *Recession*—Canada entered a recession in the third quarter of 1990 that lasted through 1991. This has deferred decisions throughout the economy, including within the information services industry, but recovery appears to have started and should ease pressures by late 1992.

- *Isolationism*—A faction within Canadian society would like to see a return to an isolationist policy to keep out many influences of the industrial world. To date, isolationist efforts have been somewhat obstructive, but without great success. They are not expected to become a major consideration, but do retard the rate of development. The recent free trade agreement with the U.S. counters this isolation attitude and should help Canada's position in the world trade community.

- *U.S. dominance*—There has been continuous effort to develop an indigenous information services industry and there are a number of large and successful Canadian firms. However, there is continuing concern that, with the liberalized trade agreement, the larger U.S. firms will move into the country and dominate the industry.

- *Geographic area*—The size of the country and the concentration of the population into several population centers make national development difficult. The large investment needed to link the centers limits overall development.

- *Language requirements*—Dual-language requirements have an inhibiting effect on the introduction of new products and services. In Quebec, which includes Montréal, French or dual languages are required on all advertising, promotion, and legal documents. To be fully accepted in Quebec, documentation should be available in French.

2. Information Services Market Forecast

The strength of the market for information services in Canada is very similar to that in the U.S. The overall growth rate for the next five years will average 13%. This forecast is unchanged from that published in the 1990 Canadian study by INPUT. A major reassessment is in process and may result in a revision to market size and projected growth rates.

- Exhibit VIII-21 shows that the total market for information services is expected to grow from an estimated $3.8 billion in 1991 to about $7 billion by 1996.

- The outlook is for modest steady growth that parallels that in the U.S. Certainly recovery from the recession will help, but no major upswings in growth are currently expected.

EXHIBIT VIII-21

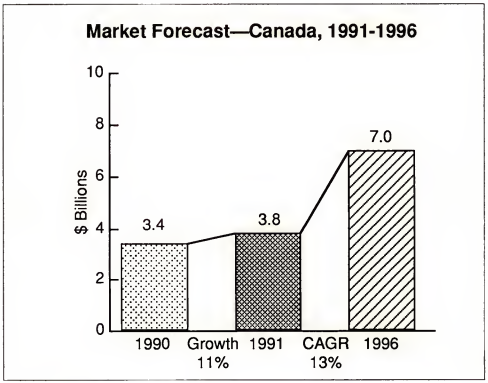
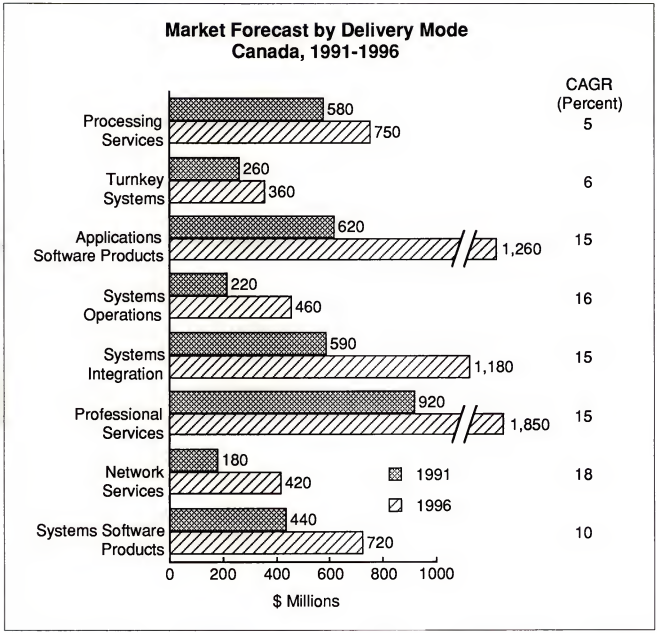


Exhibit VIII-22 provides the forecast by delivery mode, and Exhibit VIII-24 provides the detail behind this forecast.

EXHIBIT VIII-22



During the five-year period, processing services are expected to grow at a modest rate of 5%, from about $580 million in 1991 to an estimated $750 million by 1996. The systems operations sector of the market will experience a much stronger 16% CAGR, and should reach nearly $460 million over the same period. The market in Canada is expected to favor the systems operations alternative.

Turnkey systems growth will also be modest, at 6%.

Applications software products will see a 15% growth rate, and systems software products a somewhat lower rate of 10%. Growth is impacted by the following:

- U.S. applications software products vendors often find that considerable customization is needed to meet national or local requirements.
- The dual-language requirement is also an inhibitor.
- A shift is under way to client/server architectures and many buyers are simply waiting for new application systems products to become available.

The systems integration and professional services sectors will grow in the 15% range, with the markets reaching a combined $3.0 billion in 1996, or over 40% of the total market.

- In the short term, the market for systems integration is driven primarily by national government efforts to modernize existing systems. In the longer term, an increasing portion of revenues will be derived from the commercial sector, as larger firms respond to modernization efforts.
- Note should be made that one of the leading firms in the field of systems integration—SHL Systemhouse—is Canadian, and strong competition should be expected. In addition, some American companies indicate bias in favor of Canadian companies.
- The growth rate for professional services reflects the growing need for expertise in information technology to assist companies in identifying solution alternatives (consulting) and to implement the solutions with custom software.
- Growth in professional services is somewhat lower in the U.S., reflecting a strong impact from the recessionary climate. In Canada the impact has been less. On the other hand, the growth rate of systems integration in Canada lags behind that in the U.S.

The willingness to outsource through systems integration, professional services and systems operations vendors is fairly strong in Canada, and makes for a significant market opportunity, even with growth rates lower than in some European countries.

Exhibit VIII-22 shows that the network services CAGR will be an estimated 18%, from $180 million in 1991 to over $400 million in 1996. Growth for network services will result from significant emphasis being placed on the development of national network services to serve the more remote areas of the country. Services such as E-mail and EDI will be key contributors to growth.

The overall market for information services in Canada is expected to remain stable until at least the mid-1990s as many government entities try to modernize their systems and more companies implement new systems and services.

3. Market Considerations

A number of large, well-established companies operate in the information services industry in Canada, including many U.S.-based firms.

- Canadian firms include SHL Systemhouse, DMR and ISM (which resulted from the STM merger with Westbridge and includes IBM Canada as a minority owner). These Canadian vendors have growing interest and success outside the Canadian information services market.

- In addition to these vendors, there are numerous American companies with significant business interests, such as EDS, Andersen Consulting, Martin Marietta, SAIC, Hewlett-Packard, AT&T, Ashton-Tate, Computer Associates, Microsoft, Lotus, and Software Publishing.

With an estimated 50% of the market, American firms have a strong position in the Canadian market, but are experiencing growing competition from the leading Canadian firms, some of which (STM/Westbridge/IBM) are banding together to provide a broader, full-service offering.

There are few restrictions on entering the Canadian market. However, more than one American company has discovered that entry and success can be quite different. A number of American companies report bias against American companies and a preference among Canadian companies for working with other Canadian companies offering the same services.

In addition, although Canada is a single country, there is a considerably different product orientation in Quebec, where there is strong French influence. In many cases, different marketing strategies are required in Quebec.

There are opportunities throughout Canada, but the primary markets are in Ontario and Quebec. About three-quarters of the top 200 computer users are located in Ontario.

The strong French influence in Quebec provides an opportunity for American companies wishing to enter the French or European markets. French Canadian companies have modified or created systems in French and have been successful in marketing these in France and Europe. Partnership with a French Canadian company could result in entry into the French market without the cost of extensive travel to France.

Leading vendors in Canada include those listed in Exhibit VIII-23.

EXHIBIT VIII-23

Leading Information Services Vendors Canada, 1990

- IBM
- Andersen Consulting
- DMR
- EDS
- ISM (Formerly STM and Westbridge)
- SHL Systemhouse
- Cognos

EXHIBIT VIII-24

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Canada

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Canada Information Services Market	3,423	11	3,814	4,265	4,806	5,459	6,201	7,002	13
Processing Services	548	5	578	609	643	678	715	754	5
-Transaction Processing Services	331	6	351	372	394	418	443	469	6
-Utility Processing	190	5	200	210	220	231	243	255	5
-Other Processing	27	2	28	28	29	29	30	30	2
Turnkey Systems	248	6	264	281	300	320	341	361	6
-Equipment	85	3	88	91	93	96	99	101	3
-Packaged Software	137	8	148	159	172	186	201	215	8
-Professional Services	26	10	28	31	34	37	41	45	10
Applications Software Products	542	15	622	716	824	950	1,096	1,265	15
-Mainframe	303	12	339	380	426	477	534	598	12
-Minicomputer	187	18	220	260	307	362	427	503	18
-Workstation/PC	52	21	63	76	92	111	135	164	21
Systems Operations	189	16	219	254	294	341	396	458	16
-Processing Services	141	16	163	189	219	254	295	341	16
-Professional Services	48	16	56	65	75	87	101	117	16
Systems Integration	524	13	590	670	769	895	1,030	1,176	15
-Equipment	220	12	247	276	312	352	398	446	13
-Packaged Software	99	13	112	128	146	166	189	215	14
-Other Services	178	14	203	234	275	335	397	464	18
-Professional Services	26	12	29	33	37	41	46	51	12
Professional Services	819	12	918	1,034	1,186	1,384	1,616	1,847	15
-Consulting	287	13	324	369	428	505	597	687	16
-Education & Training	393	12	440	492	561	651	755	859	14
-Software Development	140	10	154	172	197	228	265	301	14
Network/Electronic Information Services	155	18	183	215	254	299	353	418	18
-Electronic Information Services	57	16	66	77	89	103	120	139	16
-Network Applications	98	19	116	139	165	196	233	279	19
Systems Software Products	400	10	441	486	536	592	654	723	10
-Mainframe	281	9	306	334	364	397	433	471	9
-Minicomputer	93	11	103	115	127	141	157	174	11
-Workstation/PC	26	20	31	38	45	54	65	78	20

H
Denmark

1. National Overview

Denmark has a population of over 5 million in a land area of over 43,000 square kilometres, giving it one of Western Europe's higher densities of population.

Denmark was one of the second wave of countries to join the European Community (EC), joining together with Ireland and the U.K. in 1973. Since that time the country has experienced a number of ups and downs in its highly taxed economy, although on balance it has benefited considerably from being a member. Until recently there has been a strong minority element in the populace who were reluctant adherents to the Treaty of Rome.

Danish GDP rose by almost 2% in real terms in 1990, compared to a more modest growth of 1.1% in 1989. Economists have praised Denmark for accepting the tight monetary policies needed to recover from the recession of 1986-88. In 1991 the country felt only a mild recession compared to other EC countries.

Inflation slowed in 1990 and at 2.6% dipped below the OECD average for the first time in 10 years. It is expected to rise to 2.8% this year and possibly reach over 3% in 1992.

In 1988 the trade balance moved into surplus, and in 1990 the current account balance followed it into what was the first surplus since 1963 at $1.8 billion. The account is expected to remain in surplus for 1991 and 1992. Unemployment is, however, expected to remain high at almost 10%, but to dip below that level a little as increased economic activity takes up some of the slack.

Denmark is a country with many small enterprises; Some 400,000 enterprises were estimated in 1988 to be active in the economy, one third of which were essentially family enterprises in the fields of agriculture and fisheries. The largest employer is the public sector, which employs about 1 million out of the labour force of 3 million.

The top 4,000 private sector companies (those that employ 50 or more persons) employ another million. The main industry sectors in which these companies are active are:

- Manufacturing (40%+)
- Transport (13%)
- Financial services (11%)
- Wholesale distribution (10%)
- Construction (8%)
- Retail (6%)
- Others (10%+)

2. Information Services Market Forecast

The information services industry in Denmark is sharing in the improved growth of the country's economy. INPUT forecasts that the Danish market will reach $1.8 billion in 1991, and will grow at an average of 12% per annum to reach $3.2 billion by 1996.

Exhibit VIII-25 shows the total forecast and VIII-26 shows the detailed forecast by INPUT delivery mode.

EXHIBIT VIII-25

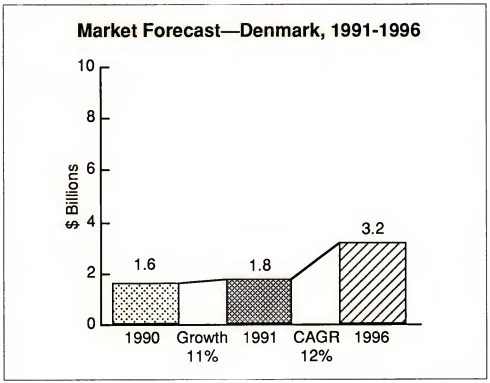
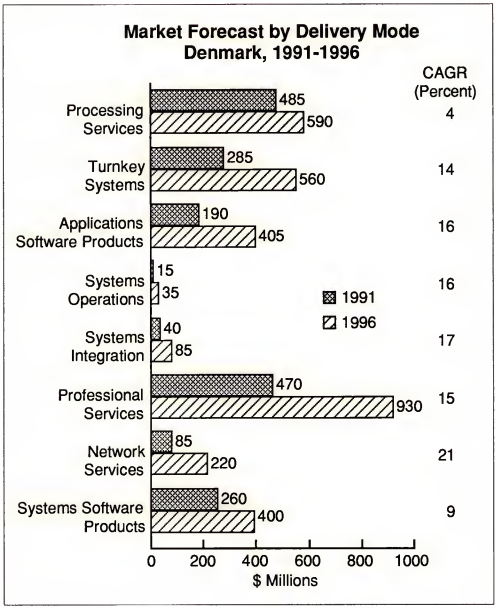


EXHIBIT VIII-26



The Danish market is strong in processing and professional services, although turnkey systems and applications software exhibit strong growth. The main opportunity markets (all with forecast growth rates of over 15%) are in network services, systems integration, applications software products and systems operations. The professional services sector shows good growth through strong interest in CASE tools and the application of object-oriented systems techniques.

Processing services constitutes 26% of the 1991 market, which is more than double the Western European (WE) average, but is forecast to grow much slower (at 4% per annum) than the WE market (7%). Processing services in Denmark is still important, especially in the agricultural and financial services sectors.

Turnkey systems is expected to continue with average growth as the many small enterprises in Denmark replace their company systems. Average prices for new products are expected to fall and more standard software products will be used.

Applications software in Denmark is forecast to grow with a CAGR of 16%. The attractiveness of the pre-built solution is likely to increase in the midrange and minicomputer sectors over the five-year forecast period, as open systems based on UNIX and networks are already accepted in the Danish market. Downsizing is not a major issue in Denmark because there are few large systems installed. Systems software products shows a 9% CAGR—a lower growth rate than the WE average of 11%—in line with Denmark's overall services growth being 3% lower than Western Europe's.

The consultancy component of the professional services sector shows a good growth rate of 19%. This sector does not have the same level of penetration, at 26%, as the overall Western European market (32%). Network services is expected to show the highest growth rate (21%) over the five-year period of any of the subsectors. Both electronic information (EI) services and network applications are forecast to grow faster than the overall WE average. In both cases the use of the services is more highly developed in Denmark than in some of the other country markets, both large and small. The public telecommunications authority, Danish Telecom, has recently been reconstituted to include the previously local telephone companies. It is expected to increase its activities in value-added network services (VANS).

Systems operations is less favored in Denmark than in the larger country markets of Western Europe, due to the smaller number of reasonably sized opportunities. It is expected to grow at a good growth rate of 16%, with public sector and utilities contracts offering the most opportunities.

Systems integration in Denmark has half the penetration of Western Europe as a whole, again due to the small number of large project opportunities. Its growth rate of 17% is below the WE average of 19%. Nevertheless, opportunities will arise for projects in public sector, utilities and financial services.

3. Market Considerations

Exhibit VIII-27 lists the top ten vendors in the Danish market as measured on their 1990 (or equivalent 1990) revenues. It has been compiled using only the information services revenues attributable to the domestic market in Denmark, and excludes exports and revenues gained from within any parent group companies.

As in most other countries, IBM heads the list in information services revenues, assisted by its large component of systems software product revenues. IBM's strengths in Denmark include also PC-level product sales, systems integration, processing and network services. IBM has a joint-venture participation with KTAS, the Copenhagen telephone company, in the danNet processing and network services company.

EXHIBIT VIII-27

Leading Information Services Vendors Denmark, 1990

Vendor	Country of Origin	Estimated Sector Revenues ($ Millions)
IBM	U.S.	145
PBS	Denmark	130
JDC Data	Denmark	50
Siemens-Nixdorf	Germany	31
Oracle	U.S.	23
Bording Data	Denmark	85
Digital	U.S.	17
Landbrugets		
EDB Center (LEC)	Denmark	17
NCR	U.S.	15
ICL (Fujitsu)	U.K. (Japan)	14

EXHIBIT VIII-28

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Denmark

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Denmark Information Services Market	1,640	11	1,830	2,070	2,300	2,580	2,880	3,240	12
Processing Services	460	5	486	511	529	546	565	592	4
-Transaction Processing Services	423	6	446	470	485	501	516	540	4
-Utility Processing	9	4	9	9	10	10	10	10	2
-Other Processing	28	8	31	32	34	36	38	42	6
Turnkey Systems	252	14	286	333	382	435	499	562	14
-Equipment	133	11	147	164	180	196	219	235	10
-Applications Software Products	42	19	50	61	75	91	106	127	20
-Systems Software Products	16	10	17	20	22	24	25	28	10
-Professional Services	61	18	72	88	105	125	149	172	19
Applications Software Products	164	16	191	232	265	307	359	405	16
-Mainframe	16	0	16	16	16	17	18	19	4
-Minicomputer	55	14	63	74	85	94	106	121	14
-Workstation/PC	94	20	113	142	164	196	235	266	19
Systems Operations	14	17	16	19	22	26	29	34	16
-Platform Systems Operations	6	13	7	9	10	12	13	16	17
-Applications Systems Operations	8	20	9	10	12	14	16	19	15
Systems Integration	33	19	39	45	53	62	74	86	17
-Equipment	13	18	16	17	20	21	24	27	11
-Applications Software Products	1	29	1	2	2	3	3	4	25
-Systems Software Products	1	20	1	1	2	2	2	3	23
-Professional Services	17	18	20	24	29	35	42	51	20
-Other Services	1	0	1	1	1	1	2	2	15
Professional Services	408	15	471	538	617	722	825	932	15
-Consulting	63	18	74	88	91	127	152	172	19
-Software Development	313	15	360	407	477	540	610	689	14
-Education and Training	33	14	38	43	49	56	63	71	14
Network Services	73	17	85	101	121	147	182	222	21
-Electronic Information Services	48	13	54	60	68	77	88	100	13
-Network Applications	25	25	31	41	53	70	94	122	31
Systems Software Products	237	9	260	283	307	337	354	404	9
-Mainframe	105	3	108	111	113	115	117	117	2
-Minicomputer	84	10	92	102	110	121	116	141	9
-Workstation/PC	49	23	60	70	85	102	122	146	20

I
Eastern Europe

1. National Overview

For the purposes of the worldwide forecast, Eastern Europe is defined as including: Albania, Bulgaria, Czechoslovakia, Hungary, Poland, Romania, the Baltic States (Estonia, Latvia, Lithuania), the independent states emerging from the breakup of Yugoslavia (Croatia, Slovenia and the remainder of Yugoslavia), and the independent republics of the new Commonwealth, which were established at the beginning of 1992 as the result of the dissolution of Soviet Union (Byelorussia, Russia, Ukraine, and the other republics).

Strictly speaking, certain of the republics in what used to be Russia that are in Asia, such as Kazakhstan, Georgia, Armenia, Azerbaijan, etc., should be included in the Asia region. There are already signs that business and telecommunications infrastructures in the old Soviet Far East will look to Japan and Hong Kong for new project implementations and for ongoing operational support. These markets are, however, small and are included under Eastern European forecasts at this point.

East Germany is now part of the German market, although it still has many of the characteristics of the Eastern European second world market.

During 1991, the pace of change in Eastern Europe continued unabated and in fact accelerated. Albania broke out of its previous isolation. Elections were held in Poland, the Russian Federation and Bulgaria. The Soviet Union dissolved into fourteen independent states with the three Baltic republics leading the way, and the Ukraine with its 51 million people voting 90% in a referendum for independence. During all this change the economic situation grew steadily worse, as the previous patterns of trade between these countries and with the West were disrupted.

- East German industry and trade started to look West and became overnight a medium-term drag on the overall German economy.
- The trade between the USSR and Finland diminished to a trickle as purchasing bodies within the USSR lost their financial power.
- Poland, Czechoslovakia and Hungry all rushed to convert to Western market economies and realized at once that new trade patterns with the free world could not be established fast enough to replace the old.
- The trade patterns within the USSR crumbled during the power struggle between market economy reformers and command economy conservatives. With nationalism and decentralization winning in the end, a soft landing for the Soviet economy became impossible.

Inflation has taken hold in all of these countries as prices become freed. This worsens economic recession as workers are laid off from all uneconomic state owned enterprises. High external debt and a dearth of hard currency makes it difficult for these countries to attract external investment or to launch new industries through the import of technology.

The hordes of Western advisors and consultants who flocked into the newly freed countries in 1989 and 1990 have been beating a path back to their home bases during 1991. Their overoptimistic initial reactions have been replaced by perhaps equally excessive predictions of catastrophes for the economy. Certainly the one thing they have all learned from their experience is that economic change does not occur overnight.

Nevertheless, there remains a significant pent-up demand for information systems products and services in most if not all of these countries. What participants in this market need to know is when the basic driving forces will overcome the present inhibitors.

2. Information Services Market Forecast

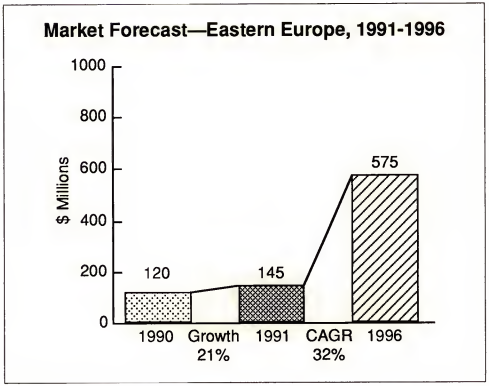
Although the market for information services in Eastern Europe is still relatively small and underdeveloped, the sheer size of the potential, coupled with the population size and its desire to catch up with Western standards, has caused INPUT to revise its five-year forecast upwards in terms of growth. This is also in spite of the short-term dampener being put upon the import of Western technology by the current rates of inflation and the lack of hard currency.

An IBM-compatible personal computer costing over 35,000 rubles in Moscow in September, 1991 was reported to cost 55,000 by November. Because of this high rate of inflation, INPUT has not attempted to build any inflation factor into its five-year forecast for the Eastern Europe region. Therefore, the forecasts are quoted in constant U.S. dollars.

The total market size for information services, including software products, is anticipated to be $145 million for 1991. It presently consists primarily of software products and professional services, with some turnkey systems and processing services. The growth rate is expected to continue to rise over the forecast period, from 21% between 1990 and 1991 to as high as 46% by 1996.

Exhibit VIII-29 provides the total forecast showing the market reaching $575 million in 1996, with a five-year CAGR of 32%.

EXHIBIT VIII-29

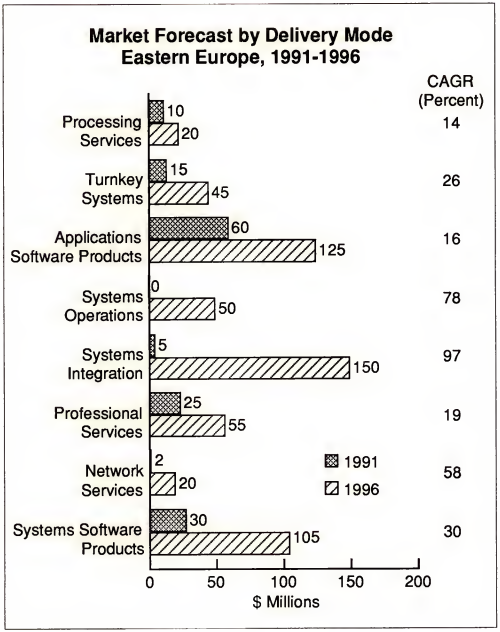


This growth assumes reasonable economic progress in the most important countries: Poland, Czechoslovakia, Hungary, Ukraine and Russia. It also assumes that there is continuing Western support for trade between these countries and the free world.

Exhibit VIII-30 provides the forecast by delivery mode.

- Systems integration, and applications and systems software products are expected to be the leading segments.
- Professional services and turnkey systems have reasonable growth rates, relying on the medium-sized enterprises.
- Systems operations will become an important way to support existing public sector data centers, which will have no home after privatization.
- Processing services and network services will remain fairly small markets.

EXHIBIT VIII-30



3. Market Considerations

Telecommunications infrastructures are woefully inadequate in all of the Eastern European countries. New systems and improvements are being obtained by the expedient of installing cellular-based mobile networks either before or simultaneously with fixed network capabilities.

Electronic mail already has over 15,000 subscribers in Russia from among what were parts of the previous state structures. Privatization will unearth and disrupt many state-funded systems.

Local distributors stress the need to reinvest profits locally to counter the vicious circle that occurs when technology imports are being transferred into inflationary economies. Nantucket and Lotus are two software companies that have set up local offices and distributor/dealer networks in the old USSR. McDonnell Douglas Information Systems and NCR Corporation have interests in the government and banking sectors, respectively.

INPUT believes that there are many opportunities waiting to be created by working closely with partners in local industry and local government in these countries. At the strategic level, these countries have the chance to leap-frog development generations and establish electronic commerce-based business structures. Innovative thinking based on partnerships between Western service-oriented companies and local post-communist neo-capitalist entrepreneurs is the way forward for economies that do not have the time to tread the path beaten by the advanced Western industrial nations.

EXHIBIT VIII-31

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Eastern Europe

Delivery Modes	1990 ($M)	Growth 89-90 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Eastern European Information Services Market	120	21	145	177	222	286	395	575	32
Processing Services	11	9	12	13	15	17	20	23	14
Turnkey Systems	12	17	14	17	20	25	32	45	26
Applications Software Products	50	20	60	70	82	94	108	125	16
Systems Operations	0	0	0	5	10	16	25	50	78
Systems Integration	0	0	5	10	20	40	80	150	97
Professional Services	22	9	24	27	31	36	47	57	19
Network/Electronic Information Services	0	0	2	3	5	8	13	20	58
Systems Software Products	25	12	28	32	39	50	70	105	30

J
Finland

1. National Overview

Finland has a population of just under 5 million (4.99 estimated for the end of 1990) in a land area of 338,000 square kilometers, making it one of the least densely populated Western European countries.

Although a member of the EFTA nations, Finland is looking increasingly towards its Western neighbors for its future. Negotiations between EFTA and the EC have been discussing the establishment of a 19-nation European Economic Area (EEA), but as 1991 progressed, impatience at the length of time being taken up by the dialogue has led many Finns to hope for full inclusion in the EC on a bilaterally negotiated agreement. In June 1991, the Finnish markka was pegged to the ECU, which caused interest rates to fall from previously high levels.

More than any other nation being considered in this report, Finland has been hit by the difficulties of the present world economic climate. The Finnish GDP in 1990 registered an actual fall (albeit small—0.04%) in real terms. This was in comparison with a growth of 5% in 1989 and a period during the 1980s when Finland's growth was only bettered among the industrial nations of the world by Japan's.

Inflation has been running at over 6%, is expected to average 5% for 1991 and to dip to around 4% in 1992. Unemployment has risen as a result of the recession, and is expected to average 8.5% in 1991 and to reach 10% in 1992. For the under-25 age group, the figures are 15% and 18% respectively.

The current account balance, meanwhile, is plunging, with almost a $24 billion deficit due for 1991, trimming to a $18 billion deficit by 1992. Political and business leaders do not see any real upturn in the country's fortunes until 1995 at the earliest.

Finland's main industries are forest products, refining, mining, shipping and real estate. Traditionally, Finland has exported 20% of its GDP, and a major proportion of this was until 1990 its barter trade with the Soviet Union. Its current economic woes stem from the confluence of a number of factors:

- Withdrawal of the Soviet Union as a barter trade partner
- Onset of the worldwide recession
- Restrictive laws on inward foreign investment
- Monopolistic large corporations dominating the key sectors

In summary, the country is facing very difficult external trading conditions with inflexible industrial and commercial structures. Nevertheless, it is a country rich in expertise and natural resources, and with a population who have had their backs to the wall before.

2. Information Services Market Forecast

The information services market in Finland is forecast by INPUT to be $1.3 billion in 1991. The market is forecast to grow at an average of 14% per annum to reach $2.6 billion by 1996 (see Exhibit VIII-32). Exhibit VIII-33 shows the detailed forecast by INPUT service mode. The actual 1990 market is shown together with the predictions for 1991, 1992 and 1996 in Exhibit VIII-35.

The primary opportunity markets are:

- Network services, where network management and EDI are expected to be growth areas in the current cost-cutting climate
- Systems operations, which offers opportunity in the large corporation area in parallel with the government privatization program
- Applications software products, which will grow in line with the market trend to downsize
- Professional services, which will increase in market share from the current 29% to nearer the Western European average by 1996, led by the increasing need for consultancy and systems development as companies slim down and restructure under the pressure of economic forces

EXHIBIT VIII-32

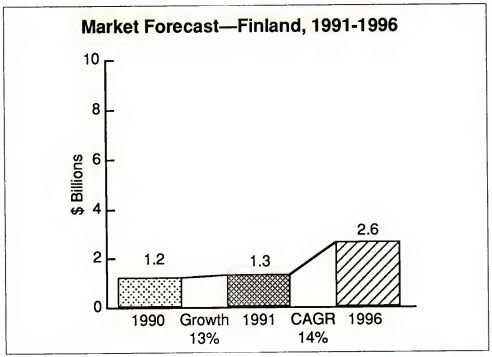
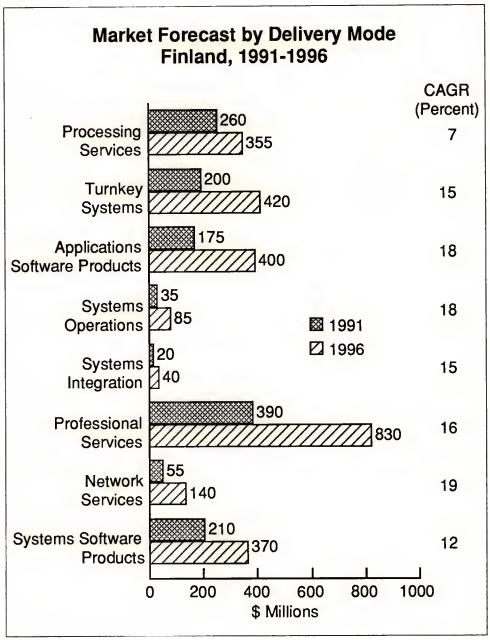


EXHIBIT VIII-33



3. Market Considerations

Exhibit VIII-34 lists the leading ten information services vendors in the Finnish market, as measured by their 1990 revenues. This list has been compiled using only the information services revenues attributable to the domestic Finnish market, and excludes exports and revenues gained from any parent companies.

EXHIBIT VIII-34

Leading Information Services Vendors Finland, 1990

Vendor	Country of Origin	Estimated Sector Revenues ($ Millions)
Tietotehdas	Finland	126
VTKK	Finland	98
IBM	U.S.	73
Nokia	Sweden	70
Elorg-Data	Finland	40
AB Programator	Sweden	38
Digital	U.S.	35
Paakaupunkiseudom	Finland	35
CMA Data	Denmark	30
KT-Tietokeskus	Finland	30

Unlike in most other countries, IBM is not the leading vendor, but holds third place in the ranking for Finland. Eight of the companies are from Scandinavia (six from Finland itself and one each from Sweden and Denmark). IBM and Digital are the two non-Nordic companies; both of these U.S.-owned equipment manufacturers have increased their penetration of information services markets as hardware markets softened during the 1980s.

The leading two Finnish information services companies, Tietotehdas and VTKK, are both long-established (1960s) companies that have developed from sophisticated service bureaux into vendors with a broad range of capabilities, including professional services, equipment supply, processing and network services.

Fourth in INPUT's 1990 rankings is Nokia Data Systems, which was the loss-making information services wing of the Nokia Telecommunications giant, Finland's second largest publicly quoted company. Nokia Data was sold in 1991 to ICL, the U.K. company now itself 80% owned by Fujitsu of Japan. It is strong in turnkey systems, with special strength in the banking and finance sector.

The largest vendor specializing in professional services is the Finnish subsidiary of the Swedish Programator group. Programator Business Communications Oy (PBC) has capability in networking, EDI and the open systems area. It is number six in the vendor ranking.

EXHIBIT VIII-35

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Finland

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Finland Information Services Market	1,190	13	1,340	1,540	1,740	1,990	2,300	2,630	14
Processing Services	241	6	258	276	295	309	324	354	7
-Transaction Processing Services	217	7	232	248	265	278	290	316	6
-Utility Processing	8	3	8	8	8	9	9	9	3
-Other Processing	16	8	18	20	22	23	25	29	10
Turnkey Systems	178	13	201	229	261	302	352	409	15
-Equipment	93	8	101	114	126	139	157	177	12
-Applications Software Products	30	21	37	43	51	58	71	83	18
-Systems Software Products	11	11	13	14	16	19	22	25	15
-Professional Services	43	18	51	58	68	86	104	124	20
Applications Software Products	144	20	173	201	239	286	337	399	18
-Mainframe	18	6	19	19	20	21	22	23	4
-Minicomputer	46	22	56	63	76	88	104	124	17
-Workstation/PC	81	22	99	119	144	177	212	253	21
Systems Operations	30	21	37	43	52	62	74	85	18
-Platform Systems Operations	18	21	21	25	30	37	44	51	19
-Applications Systems Operations	13	20	15	18	21	25	30	34	18
Systems Integration	15	25	19	22	25	29	33	38	15
-Equipment	6	20	8	8	9	10	11	13	11
-Applications Software Products	1	50	1	1	1	1	2	2	18
-Systems Software Products	1	0	1	1	1	1	1	1	20
-Professional Services	8	25	10	12	14	16	18	22	16
-Other Services	0	0	0	0	0	1	1	1	0
Professional Services	336	15	388	453	534	614	716	833	16
-Consulting	51	20	61	71	83	96	116	139	18
-Software Development	253	15	290	341	404	467	543	631	17
-Education and Training	33	12	37	42	47	51	57	63	12
Network Services	48	21	57	67	80	96	116	141	19
-Electronic Information Services	29	17	34	39	44	53	63	76	17
-Network Applications	19	20	23	28	35	43	53	66	24
Systems Software Products	191	11	212	240	265	293	331	371	12
-Mainframe	96	5	101	106	109	114	119	121	4
-Minicomputer	58	13	66	78	88	99	114	129	14
-Workstation/PC	37	24	46	56	68	81	99	121	22

K
France

1. National Overview

France continues to be the largest single market for information services in Western Europe, and in Cap Gemini Sogeti (CGS) has the only European-owned independent professional services company to operate on a world scale.

The larger French information services vendors (companies like Sligos, GSI and CGS) have enjoyed an extensive period of high growth within this market and within a strong stable economic environment, certainly since the middle of the 1980s. Worldwide recession in computer equipment markets (as shown by Bull's problems in its traditional equipment markets), the threat of economic slowdown and domestic political uncertainty, and a change of Prime Minister are all conspiring to frame a less confident and more troublesome environment for the French information services industry. The recent accord between Daimler-Benz and CGS and the increased presence of EDS through its acquisition of GFI are creating some particular challenges for French vendors.

France, with a population of 55 million, is the second largest economy (next to Germany) in the whole of Western Europe. Until the end of the 1980s, France's economy continued to grow, although the economic experiments of the first Mitterand presidency had slowed growth from the 4.5% annual average experienced during the 1970s to something just under 2% per annum during the 1980s.

The triumph of Mitterand in being re-elected as President in 1988 was also a watershed for France as the first time a President had been re-elected under the universal suffrage of the Fifth Republic. It was also a triumph for the Socialist Party, as for the first time in the 30-year history of the Fifth French Republic, the Gaullist party lost its pre-eminent position as the largest right wing grouping in the National Assembly. However, this position was tempered by the fact that the Socialists did not obtain an absolute majority in parliament.

This background of political uncertainty, combined with a slowing economy has exacerbated the challenges facing vendors in the French information services market.

The period of President Mitterand's stewardship of France has also been marked by dramatic change in the world of business and trade. An industrial and commercial landscape dominated by large state-owned organizations dedicated to serving French markets has been transformed. French organizations have conducted an offensive on foreign companies over the

past decade, resulting in significant merger and acquisition activity. For example, Thomson CSF acquired Philips' defense business and CGS has continued its acquisition program, culminating in the purchase of a majority shareholding in Hoskyns in 1990.

The last decade has seen a liberalization of industrial policy which has resulted in a significant private share ownership of public companies—for example, in Dassault (49%), Elf (44%) and Pechiney (25%). Now President Mitterand has relaxed his policy of allowing neither nationalization nor privatization because of their restrictive effects on the formation of foreign partnerships and on access to private sources of finance.

It is interesting to note that although France is renowned for its industrial concentration in large organizations (for example, Renault, Thomson, and Aerospatiale in the government sector, and PSA in the private sector), it does not have one representative in the top 15 industrial companies ranked by worldwide sales. (In contrast, the list of the leading companies includes two Italian, one German and one Anglo-Dutch). Only seventeen of the top 100 European companies are French owned. France does have, however, three banks listed in the leading group of 15 banks worldwide ranked by assets. The French economy is thus typified by strength in many manufacturing and service sectors, but without any particular sector being clearly predominant.

The general economic outlook for France is provided by the following indicators: unemployment and inflation. Unemployment is currently at ten percent of the workforce and rising gradually. This rate is the fourth highest proportion for any OECD country and the highest amongst the major European economies.

Inflation, currently at 3.1% and falling, is expected to be below 3% during 1992. Overall, France's economy is expected to grow by 1.3% in 1991 and by 2% in 1992.

2. Information Services Market Forecast

The French market is the largest national market for computer information services in Europe, and represents some 23% of the total European market. INPUT estimates that in 1990 the French market reached a total of $15.9 billion and that it will grow by just under 14% (including inflation) to exceed $18 billion in 1991. This rate represents a significant slowdown from the historic perspective over the last decade, when an average annual growth of 24% measured in current currency (i.e., including inflation) was achieved.

As can be seen from Exhibit VIII-36, INPUT forecasts that market growth over the next five years is expected to average only 15% per annum. Although current levels of growth are lower than this, it is expected that the overall economic climate will improve and that the increasing demand for solutions and the services to support them will drive the overall growth of the market.

EXHIBIT VIII-36

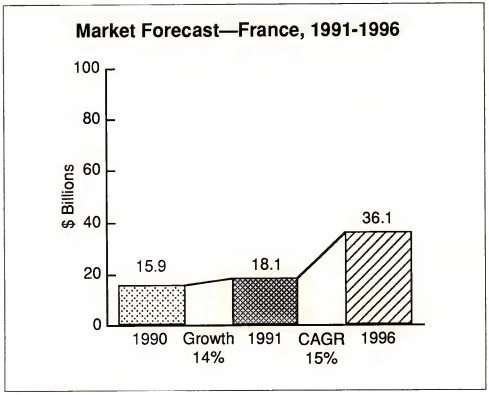
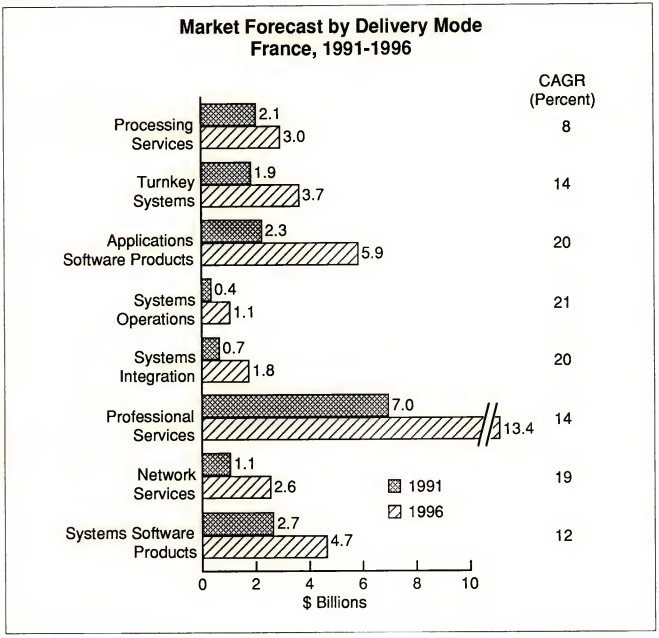


Exhibit VIII-37 provides an analysis of the French market divided into the eight separate delivery modes identified by INPUT.

Relative to the overall European information services market, professional services represents some 38% of the total French market versus 30% for the whole of Europe. The French market thus accounts for nearly one-third of the total European professional services market. French professional services vendors, notably CGS, are strongly represented in the professional services markets of other countries.

One of the strongest observable general trends in France is toward the delivery by vendors of more complete solutions and away from purpose-built customized application building. Consequently, strong growth is expected in the applications software products market and in the systems integration market. Two other areas of anticipated high growth are systems operations and network applications.

EXHIBIT VIII-37



3. Market Considerations

Historically, the larger French vendors of information services (for example, Sligos, GSI, GGI, SG2 and Steria, in addition to CGS) have been significantly successful in creating a strong indigenous French industry in stark contrast to the computer systems market where Bull, the state-aided computer systems manufacturer, continues to face major challenges in its traditional product markets.

Exhibit VIII-38 lists the leading vendors in the French market in 1990. The high proportion of these vendors under French ownership is clear from the exhibit. However, seven companies listed are of U.S. origin and EDS's acquisition of GFI adds an eighth. Further acquisition can be anticipated by ambitious vendors seeking to further consolidate their international position.

However, the recent accord between CGS and Debis Systemhaus, the information services arm of the Daimler-Benz industrial conglomerate, and the increased competitive threat represented by EDS's acquisition of GFI (formerly owned by SD-Scicon) represent a threat to continuing hegemony of the information services business. Certainly the French independent information services vendors are also concerned at the erosion of their market share caused by computer systems vendors. NEC's minority stake in Bull, and Fujitsu's control of ICL and Nokia are increasing evidence of Japanese influence in the computer systems sector. EDS, Andersen Consulting and CSC (inter alia) also represent a challenge to the major French vendors active in the rapidly changing information services market.

One of the most interesting developments in the French industry has been CGS's move into management consultancy with the formation, through acquisitions, of Gemini Consulting. Nothing more clearly emphasizes the change in user attitudes toward information services procurement, away from focusing on the selection of system platform to a concern for a solution determined by the business needs of the organization. Businesses are being affected by rapid changes in industry and commerce in preparation for 1993 and the increasing need to compete in a global rather than just a national market.

EXHIBIT VIII-38

Leading Information Services Vendors France, 1990

Vendor	Country of Origin	Estimated Sector Revenues ($ Millions)
IBM	U.S.	894
Cap Gemini Sogeti	France	637
Sligos	France	469
Axime	France	398
Bull	France	389
Concept	France	297
Télésystèmes	France	280
Reuters	U.K.	271
Sema Group	France	267
GSI	France	239
CGI	France	191
GFI (SD-Scicon)	France (U.K.)	173

EXHIBIT VIII-39

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
France

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total France Information Services Market	15,930	14	18,140	20,970	23,890	27,430	31,500	36,110	15
Processing Services	1,947	6	2,067	2,223	2,416	2,612	2,809	3,009	8
-Transaction Processing Services	1,788	6	1,894	2,035	2,212	2,389	2,566	2,743	8
-Utility Processing	58	3	60	62	64	67	69	71	3
-Other Processing	101	12	113	126	140	156	174	195	11
Turnkey Systems	1,646	14	1,880	2,156	2,480	2,819	3,195	3,678	14
-Equipment	867	12	974	1,080	1,186	1,327	1,434	1,593	10
-Applications Software Products	354	18	416	496	602	690	814	974	19
-Systems Software Products	27	13	30	32	37	41	44	50	10
-Professional Services	398	16	460	549	655	761	903	1,062	18
Applications Software Products	1,965	18	2,327	2,832	3,354	4,035	4,912	5,912	20
-Mainframe	195	5	204	212	221	230	239	248	4
-Minicomputer	743	14	850	974	1,097	1,239	1,398	1,593	13
-Workstation/PC	1,027	24	1,274	1,646	2,035	2,566	3,274	4,071	26
Systems Operations	327	22	398	487	593	726	876	1,053	21
-Platform Systems Operations	133	20	159	186	221	257	301	345	17
-Applications Systems Operations	195	23	239	301	372	469	575	708	24
Systems Integration	602	22	733	867	1,044	1,264	1,513	1,823	20
-Equipment	239	20	287	327	381	443	504	564	15
-Applications Software Products	19	18	23	28	35	51	65	85	30
-Systems Software Products	18	20	21	25	32	39	50	62	24
-Professional Services	315	24	389	473	579	708	864	1,055	22
-Other Services	11	17	12	14	18	23	30	37	25
Professional Services	6,110	15	7,000	8,154	9,159	10,439	11,912	13,434	14
-Consulting	664	15	761	867	991	1,115	1,239	1,398	13
-Software Development	4,938	15	5,664	6,637	7,434	8,496	9,735	10,974	14
-Education and Training	508	13	575	650	735	828	938	1,062	13
Network Services	912	15	1,062	1,257	1,496	1,779	2,124	2,558	19
-Electronic Information Services	584	12	655	743	841	947	1,080	1,230	13
-Network Applications	327	24	407	513	655	832	1,044	1,327	27
Systems Software Products	2,407	11	2,673	2,973	3,310	3,699	4,159	4,655	12
-Mainframe	1,204	3	1,239	1,310	1,381	1,469	1,558	1,628	6
-Minicomputer	761	14	867	974	1,080	1,204	1,345	1,487	11
-Workstation/PC	443	28	566	690	850	1,027	1,257	1,540	22

L
Germany

1. National Overview

Germany now has a population of 79 million—by far the largest in Western Europe—following the integration of 16 million East Germans in 1990. Germany was a founding member of the European Community. Its information services market is the second largest in Europe, with a total value of $14 billion in 1991.

The West German economy remains the strongest in Europe, though it now carries the burden of funding the transformation of East Germany. It is estimated that Bonn has in the past year paid in excess of DM50 billion on pensions, unemployment and associated benefits into the east of the country. Overall, in 1990 Germany had a gross domestic product of $1,400 billion and a GDP per capita of $23,000. The German trade balance for 1990 was $63 billion. Gross domestic product rose by 4.5% in 1990, though there are some signs of a slowdown in growth in the second half of 1991 as the initial surge of consumer spending in East Germany comes to an end. Over the past year, the big West German retail chains had been investing heavily in the east, and the consumer products being offered met with enthusiastic demand. The food and drink industry grew by 12% over this period.

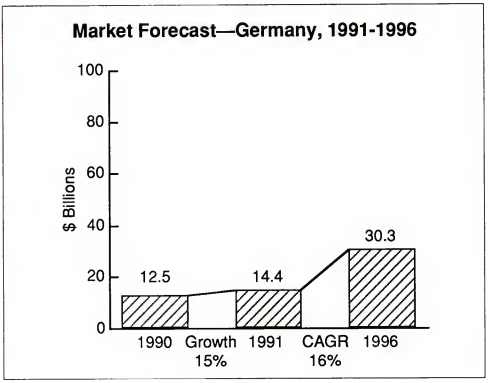
In the immediate future, spending on the renewal of the East German infrastructure is expected to boost companies in the transport, telecommunications and energy sectors, with spending on plant and capital equipment slowly increasing at a later date.

The need to develop industry in East Germany is one of the most pressing concerns of the German government. Expectation of similar living standards to those achieved in West Germany are high throughout the east of the country. However, currently the average East German is earning less than half the amount earned by a West German counterpart. There are also dangers of high levels of unemployment in the east, and this situation is being exacerbated by the collapse of much of the business formerly conducted with the Soviets.

The principal strength of the economy is its manufacturing base, particularly in sectors such as engineering and chemicals, including companies such as Daimler-Benz, Volkswagen, Siemens, BASF, Bayer and Hoechst. The strength of these sectors is reflected in their spending on information services, shown in Exhibit VIII-40. Germany is the largest country market for information services spending in the discrete manufacturing sector, and is widely regarded as the most progressive market in Europe in the development of information systems for the discrete manufacturing sector.

The German information services market is the second largest market in Europe. INPUT estimates that in 1991 the market totaled $14.4 billion, and will grow at an average of 16% per annum to reach $30 billion by 1996, as shown in Exhibit VIII-40. The development of East Germany is not forecast to significantly increase growth rates for information services in the short term. However, expenditure will increasingly become more widely distributed throughout the whole of the country.

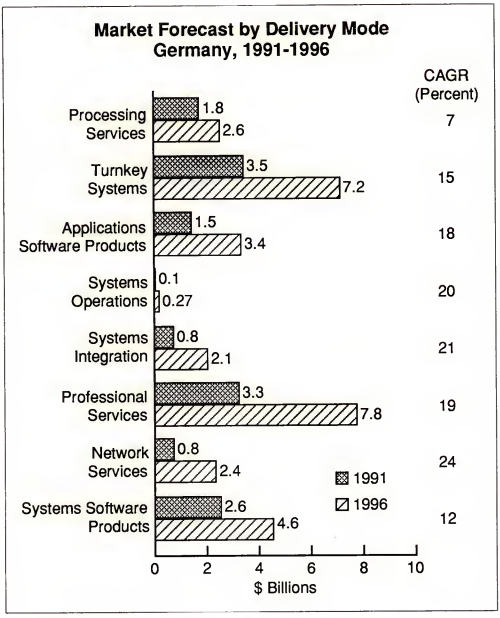
EXHIBIT VIII-40



Led by vendors such as Siemens-Nixdorf, Mannesmann Kienzle, and Taylorix, the German market has always had a strong emphasis on turnkey systems; professional services has a lower profile in Germany compared to the other major European national markets. However, professional services, like network services, is expected to show comparatively high growth over the forecast period and increase its share of the overall information services market in Germany from 23% in 1991 to 26% by 1996.

Another delivery mode in which Germany lags behind the European average is systems operations. This should not be surprising, since Germany has traditionally shown a strong aversion to outsourcing across much of its industry, preferring to manufacture its own components rather than purchase them from subcontractors. The delivery mode forecast is shown in Exhibit VIII-41.

EXHIBIT VIII-41



The growth in systems integration is expected to be relatively high in Germany compared to the rest of Europe over the forecast period. This is because elsewhere the feeling of recession is leading to the postponement of major development projects. So far, this has not generally been the case in Germany, where the redevelopment of the infrastructure can be expected to increase the proportion of large projects under way.

2. Market Considerations

Exhibit VIII-42 lists the top vendors in the German market during 1990. It was compiled using only the information services revenues attributable to the domestic market within Germany, excluding exports and excluding revenues from any parent companies.

EXHIBIT VIII-42

Leading Information Services Vendors Germany, 1990

Vendor	Country of Origin	Estimated Sector Revenues ($ Millions)
IBM	U.S.	1,070
Siemens-Nixdorf	Germany	1,048
Datev	Germany	363
Reuters	U.K.	289
Mannesmann Kienzle	Germany	229
Digital	U.S.	226
SAP	Germany	184
Prime	U.S.	170
Microsoft	U.S.	131
Compunet Computer	Germany	125
Computer Associates	U.S.	125
Software AG	Germany	119

As in nearly every European country, IBM leads in information services revenues. However, in Germany it is very closely followed by Siemens-Nixdorf Informationsysteme, which was formally constituted on October lst 1990, following Siemens' earlier acquisition of a majority stake in Nixdorf Computer AG.

For many years, Nixdorf was an extremely successful vendor of turnkey systems based on its proprietary minicomputers and COMET software. However, the company suffered heavy losses in 1989 and 1990 as open systems made inroads into this traditional client base, and the company became increasingly dependent on its sales of point-of-sale systems to the financial and retail sectors. SNI is expected to continue to make a loss in 1991. The turnkey systems market remains a difficult one; another of Germany's leading turnkey systems vendors—Mannesmann Kienzle—has also been recently acquired, by Digital.

Datev, the third largest information services vendor in Germany, is a cooperative owned by German accountants and tax specialists. It provides software products and processing services to support specialists in these fields.

SAP established itself during the 1980s as the most successful European applications software products vendor with its dominance of the market for accounting and production management applications based on mainframe architectures. However, the company has also recognized the changes taking place in its marketplace, particularly the moves to downsizing and open systems, and has modified its strategy and product development program accordingly. A new product, R/3, based on UNIX-based equipment and initially aimed at medium-sized organizations, was to be launched on lst January 1992. The German market remains a difficult one for foreign software products companies to penetrate. While this is particularly true for commercial applications software products, vendors of technical products such as CAD vendors Intergraph and Prime have met with greater success. With its manufacturing strength, Germany remains the largest national market for Intergraph across Europe.

Software AG is the only European software product vendor to appear in the top thirty leading vendors in Europe with an established global market presence. Originally best known for its mainframe ADABAS data base products, recent product launches have positioned it to carry its worldwide user base into the realms of client/server and open systems computing.

Cap Gemini Sogeti has strengthened its position in Germany over the last year with its acquisition of SCS from SD-Scicon and via its relationship with Daimler-Benz. Daimler-Benz's own subsidiary Debis Systemhaus is combining with Cap Gemini Sogeti in a joint venture to take a more aggressive stance in the information services market in Germany.

EXHIBIT VIII-43

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Germany

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Germany Information Services Market	12,500	15	14,400	16,670	19,290	22,560	26,130	30,300	16
Processing Services	1,673	7	1,783	1,958	2,110	2,262	2,411	2,563	7
-Transaction Processing Services	1,488	6	1,577	1,726	1,845	1,964	2,083	2,202	7
-Utility Processing	60	5	63	66	69	71	71	74	4
-Other Processing	125	14	143	167	196	226	256	286	15
Turnkey Systems	3,080	15	3,533	4,104	4,768	5,551	6,274	7,176	15
-Equipment	1,607	11	1,786	2,024	2,321	2,619	2,857	3,155	12
-Applications Software Products	655	18	774	952	1,131	1,369	1,548	1,845	19
-Systems Software Products	45	13	51	57	66	74	83	92	13
-Professional Services	774	19	923	1,071	1,250	1,488	1,786	2,083	18
Applications Software Products	1,250	19	1,482	1,720	2,065	2,432	2,887	3,423	18
-Mainframe	220	5	232	238	250	259	268	268	3
-Minicomputer	405	18	476	530	625	685	774	893	13
-Workstation/PC	625	24	774	952	1,191	1,488	1,845	2,262	24
Systems Operations	80	22	98	116	143	170	199	241	20
-Platform Systems Operations	36	17	42	48	57	65	74	86	16
-Applications Systems Operations	45	27	57	68	86	104	125	155	22
Systems Integration	655	21	792	943	1,155	1,405	1,693	2,054	21
-Equipment	286	17	333	387	452	530	613	714	16
-Applications Software Products	24	25	30	36	48	63	80	107	29
-Systems Software Products	21	14	24	30	36	45	54	60	20
-Professional Services	307	26	387	470	595	738	911	1,131	24
-Other Services	18	0	18	21	24	30	36	42	18
Professional Services	2,839	17	3,310	3,929	4,601	5,536	6,607	7,815	19
-Consulting	351	17	411	476	554	655	804	952	18
-Software Development	1,994	16	2,321	2,798	3,274	3,988	4,762	5,655	19
-Education and Training	494	17	577	655	774	893	1,042	1,208	16
Network Services	637	29	789	946	1,167	1,488	1,905	2,381	24
-Electronic Information Services	524	19	625	714	833	1,012	1,191	1,429	18
-Network Applications	113	45	164	232	333	476	714	952	42
Systems Software Products	2,321	12	2,589	2,917	3,274	3,690	4,167	4,643	12
-Mainframe	1,280	7	1,369	1,429	1,488	1,548	1,607	1,607	3
-Minicomputer	685	13	774	923	1,071	1,250	1,429	1,667	17
-Workstation/PC	357	25	446	566	714	893	1,131	1,369	25

M
Hong Kong

1. National Overview

The approaching transfer of power from England to China in 1997 continues to dominate political and, to a growing degree, business considerations. As the transfer draws ever nearer, increased uncertainty about the economic future is slowing investment.

Most significant are the issues of Hong Kong residents' assurance of the sincerity of the PRC in abiding by the Basic Law being drafted and of the degree of economic and political freedom there will be in Hong Kong after 1997. As 1997 draws near, skepticism seems to be developing that may impact economic growth and therefore the information services market.

An economic center of only 404 square miles, Hong Kong has a population of more than five million. The majority of the population are refugees and the business center is one of the most sophisticated in the world.

Hong Kong has relied heavily on the export of manufactured products and has consistently achieved an economic growth rate of over 7% per year. In a period of recession in much of the Western world, Hong Kong has maintained a relatively stable economic environment, although the value of "shopping" in Hong Kong seems to have lost its edge.

The past few years have seen an increase in emigration and increasing wage rates that will have negative longer-term effects. Fear of the transition in power is causing many middle management and skilled professionals to move to other countries such as Canada and Australia. This outflow creates a significant shortage of trained technical and managerial personnel and thereby an opportunity for information services vendors to fill the resulting requirements.

The economic and political future of Hong Kong is unknown. Some believe that the change will have little effect in the long term. Others believe that the change will signal the beginning of a decline of Hong Kong as an economic center in the Asia/Pacific area.

Many companies have adopted a wait-and-see attitude relative to 1997 and are following defensive investment strategies that will protect long-term positions. Others are continuing to make significant investment and are operating with a more progressive outlook. Some businesses are moving some or even all of their operations out of Hong Kong to Singapore or elswhere.

Technology trends of importance to the Hong Kong market remain consistent with those in INPUT's 1989 and 1990 reports.

- *On-line services*—Building on a processing services infrastructure that is already in place, focus is being put on the development of on-line services such as cable-based services and interactive cable TV.

- *Gateway services*—As well as being a developed technological center, Hong Kong continues to be a primary gateway for information services provided to other countries in Southeast Asia.

- *Transaction processing*—As work shifts from an economy based on manual labor to one based on information, the country is becoming a leader in developing transaction processing services. Continued emphasis on on-line transaction processing (OLTP) services is expected.

- *Digital cellular services*—Digital cellular services have exhibited strong growth over the past several years. Growth is expected to continue for at least the next three to four years.

- *Software services*—There is a continuing need for quality software services. Historically, foreign firms have not provided high-quality support for products brought to the colony. This lack of support has resulted in a generally poor quality of software being used.

a. Driving Forces

The forces driving the information services market are described below.

- *Economic freedom*—A policy of "positive nonintervention" contributes to a continuing flow of funds to develop and provide an increasing number of services.

- *Asian entree*—Numerous firms consider Hong Kong the primary center for entree into the Asian market, although these numbers are declining as other centers such as Singapore grow in importance.

- *Technological infrastructure*—Hong Kong has a developed technological infrastructure that provides a base for the use of advanced products, particularly in the area of financial services.

- *Chinese trade*—Hong Kong is the recognized center for contacts and business development with the People's Republic of China. As 1997 approaches, this recognition will become more important.

- *Financial services*—As a financial center for Southeast Asia, Hong Kong is in continuing need of services to improve its position in the world financial community.

b. Inhibiting Factors

A number of inhibiting factors exist that could have a significant effect on future development in the colony.

- *Political uncertainty*—Concern over long-term political stability is expected to continue to be the most significant factor affecting future investment and development. This concern will increase in negative impact as 1997 draws closer.

- *Labor shortage*—There is a growing shortage of skilled labor in the colony. Emigration is reducing the labor force and driving up wages. The colony is in need of services that can supplant the waning pool of middle management and technical skills. Education and training services are of growing importance. The problem is expected to increase as 1997 gets closer.

- *Labor cost*—With the declining labor supply, salaries are increasing. This increase is causing a number of firms to consider other geographic areas as opportunities for investment or relocation.

- *Capital flight*—Also related to the political situation, a number of firms are protecting their economic position by moving portions of their capital from the colony, thus reducing the amount of funds available for long-term investment. In addition, as middle management and professionals leave, they are taking their capital with them.

2. Information Services Market Forecast

Exhibit VIII-44 shows that the market for information services in Hong Kong is estimated to have been approximately $500 million in 1991. The market will grow to approximately $1 billion by 1996. INPUT has lowered its projection of growth from 21% per year to 17% as a result of declining business investment.

Although the size of the economic base would suggest that the market might be bigger, there are significant reasons why this is not occurring.

- One reason the market is not larger is the nature of the business community. Many major users of information services are foreign firms that acquire hardware and support services (maintenance, etc.) locally, but rely on a headquarters office in another country for much of their software, software development, and consulting services.

- Unlike Japan, the U.S., and the countries of Europe, Hong Kong has a comparatively low industrial base. Hong Kong's GNP is derived primarily from labor-intensive and financial trade businesses.

- In Hong Kong, industry contributes only 28% to the total GNP; the contribution of industry is more than 40% in Japan. In addition, a large portion of the industrial community is geared to the re-export of products (adding value to imported products that are subsequently exported). Without a large and growing industrial base, the potential market for information services products is limited.

EXHIBIT VIII-44

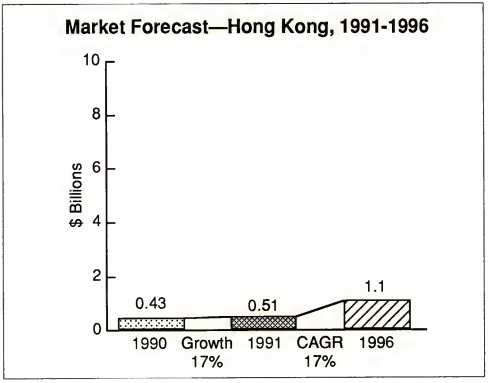


Exhibit VIII-45 provides the forecast by delivery mode. Exhibit VIII-46, at the end of this profile of Hong Kong, provides the detail behind this forecast.

Overall, the delivery mode growth rates are lower than in the 1990 forecast.

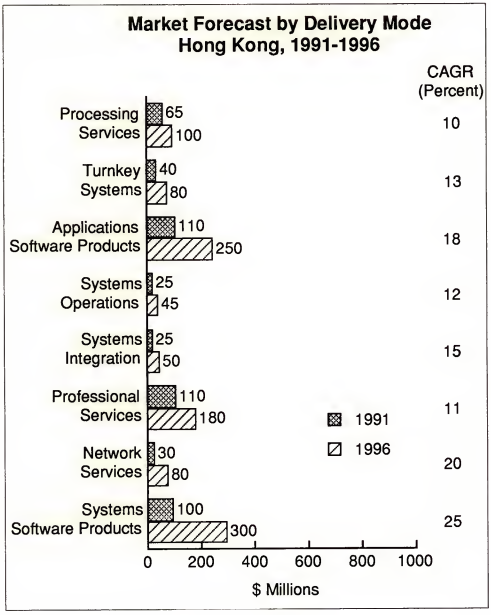
As shown in Exhibit VIII-45, the market for processing services is estimated to be approximately $65 million. The market will grow at a steady 10% per year to an estimated $100 million by 1996.

The market for turnkey systems is expected to grow from $40 million to an estimated $80 million by 1996. The interest in application solutions for use in more modest businesses is expected to continue to grow.

- The market for turnkey systems is driven primarily by companies that are outgrowing their micro systems and seeking mini and mainframe solutions. In addition, there is an increasing number of smaller businesses in need of micro-based solutions.

- There will be greater demand for customized rather than packaged software. Negative experience with support of packaged software has led many companies to purchase customized software and rely increasingly on local providers for after-sales support.

EXHIBIT VIII-45



The applications software products market is over 20% of the total and experiencing strong growth at 18% per year. Because of the growing scarcity of professional staff, companies are seeking vendors that will provide high-quality products and follow-on support services. Growth is expected to be from $110 million in 1991 to $250 million in 1996. The greatest opportunity for applications software products is in the constantly expanding micro market. Applications software products is one area where U.S. vendors are favored.

Systems software products will experience somewhat stronger growth—from about $100 million to $300 million in 1996, a 25% CAGR. Systems control products needed to support increasingly sophisticated financial systems are a key factor.

The market for systems integration in Hong Kong is quite small, as shown in Exhibit VIII-45.

- Since many of the larger companies are foreign, major systems changes (systems integration) are initiated and managed by the headquarters office. In addition, many of the service sector firms are too small for systems integration services.

Professional services are expected to grow from an estimated $110 million in 1991 to over $180 million in 1996. The annual growth rate projection has been revised downward significantly to just 11%, reflecting the outlook for investment prior to 1997.

- Software development requirements are the strongest, driven by the need to develop and support custom software which results from the general lack of acceptance of packaged products.

Network services are expected to show strong growth (20%) for the next several years, from $30 million in 1991 to about $80 million in 1996.

- The recent awarding of a contract to build a new network for the delivery of cable services could drive the market for network services higher than projected.

- Services such as E-mail and EDI will also help to drive the market; however, the implementation of EDI is just beginning and it will be several years before significant revenues are realized. Hong Kong still serves as a business hub for the region and can be expected to benefit from the expanded use of EDI in the Asia/Pacific area.

The market for information products and services should remain modestly strong for at least the next several years. The situation is not entirely clear—some managers anticipate that although a number of companies are making investments now, they will reduce or curtail investments as 1997 draws near.

3. Market Considerations

Entry into the market is generally easy. However, with cost for facilities already high and labor rates rising, operating costs can be quite high.

Key opportunities are for telecommunications and software support services. Hong Kong also provides opportunities for entree into China.

All major U.S., European, and Japanese vendors of hardware and software are represented in Hong Kong. In addition, many information services vendors have representation through local firms.

- Companies interviewed by INPUT in 1991 identified primarily major U.S.-based vendors (IBM, DEC, HP, American Express) as the leaders in the Hong Kong market.
- Unlike Japan, Australia or the major Latin American countries, there are very few local vendors that are major factors in this market.
- The major accounting firms also have information services offices in Hong Kong.

The demand for professional services will continue to grow as emigration of technical and professional staff continues, creating additional market opportunities if the staff can be provided.

The least represented are firms providing software support. Although most products are available, after-sales support is generally considered quite poor.

EXHIBIT VIII-46

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Hong Kong

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Hong Kong Information Services Market	434	17	506	575	672	785	917	1,089	17
Processing Services	57	11	63	69	76	85	93	101	10
-Transaction Processing Services	40	10	44	49	54	60	66	71	10
-Utility Processing	10	10	11	12	13	15	16	18	10
-Other Processing	7	10	8	8	9	10	11	12	8
Turnkey Systems	36	17	42	47	53	60	69	79	13
-Equipment	17	18	20	22	25	29	34	40	15
-Packaged Software Products	9	11	10	11	12	13	14	15	8
-Professional Services	10	20	12	14	16	18	21	24	15
Applications Software Products	90	22	110	120	145	170	205	250	18
Systems Operations	23	13	26	29	33	36	40	45	12
-Platform Systems Operations	15	13	17	19	22	24	27	30	12
-Applications Systems Operations	8	13	9	10	11	12	13	15	11
Systems Integration	22	18	26	30	35	40	45	52	15
-Equipment	12	17	14	16	18	20	23	26	13
-Packaged Software	2	0	2	3	3	4	4	5	20
-Professional Services Products	6	33	8	9	11	13	15	17	16
-Other Services	2	0	2	2	3	3	3	4	15
Professional Services	100	9	109	120	133	151	166	184	11
-Consulting	25	12	28	31	34	38	42	46	10
-Software Development	65	8	70	77	86	98	108	120	11
-Education and Training	10	10	11	12	13	15	16	18	10
Network Services	26	19	31	38	46	55	66	78	20
-Electronic Information Services	12	17	14	17	21	25	30	34	19
-Network Applications	14	21	17	21	25	30	36	44	21
Systems Software Products	80	24	99	122	151	188	233	300	25
-Systems Control	40	25	50	62	78	98	125	160	26
-Operations Management	20	20	24	29	35	42	50	60	20
-Applications Development	20	25	25	31	38	48	58	80	26

N
India

1. National Overview

The environment and outlook relative to information services in India remains relatively unchanged from the 1990 report. India is a country very interested in exporting its information services capabilities and continues to build a local industry.

India is an extremely poor country with significant internal economic and political difficulties, yet it is beginning to emerge as a developer of high technology. Placing increased emphasis on the allocation of government resources to technology development, India is becoming a source of well-trained personnel for development projects. The U.S and European countries have begun contracting significant development projects to companies using local data professional staffs.

Progress toward industrialization has been slow, but progress has been made. Economic development has been sporadic and the continued rate of development is speculative. In 1988, plans to devote significant national funds to technology development had to be changed due to a major drought that required use of the funds for economic relief in the agriculture sector. Continued diversion of funds will inhibit development.

In addition to the limit on national funds available to stimulate industrial development, the country has a fractious political environment. Regional political groups continue to seek increased representation in national affairs, creating instability. This situation grew more difficult in 1990 and early 1991.

Key trends in India center on the need to provide a base from which to continue to develop the country.

- *Infrastructure development*—The country is expected to continue to invest in the development of the basic infrastructure by liberalizing trade and investment policies and encouraging partnerships that will result in a transfer of technology. Included is an efort to better structure its information technology industry through government policy and support. It has the potential to become a major manufacturing site with very low-cost labor.

- *Education*—The country continues to place emphasis on the development of data processing skills and professionals. India's goal is to export skills and capabilities, not people.

- *Network development*—Development of a national network is high on the list of national priorities. The country recognizes that a reliable communications capability is necessary to support multinational investment in the country.

- *Mini/personal computer growth*—As in many newly developing countries, mini and personal computer systems are an increasingly important tool to achieve automation.

a. Driving Forces

The driving forces behind the development of information services are generally unchanged from the 1990 report and include the following:

- *Industrial development*—India has made a commitment to changing from a rural, agrarian society to a knowledge-based society. The process is long, but progress is being recorded.

- *Trade liberalization*—Growth of information products and services is being stimulated by recent changes in trade policies. These changes encourage investment and partnering in information technology.

- *Technology transfer*—The country has expressed eagerness to enter into agreements that will permit the training and transfer of technology in a number of high-technology areas. India has particular interest in telecommunications products and services. In general, India has become more liberal relative to importation of information technology in an effort to strengthen internal skills which can then be exported through contract labor.

- *Software development*—The government believes that its highly trained, English-speaking workforce can provide resources for complex software development projects and is receptive to cooperative development arrangements.

b. Inhibiting Factors

There are also a number of inhibiting factors.

- *Political instability*—With a fractious political environment, there are concerns about the long-term political stability of the country. Lack of confidence in India's stability keeps a number of firms from making long-term investments.

- *Poor infrastructure*—A poor technological infrastructure reduces the willingness of many companies to invest in the country. Telecommunications capabilities remain limited.

- *Currency convertibility*—The inability to freely convert the local currency to other currencies restricts a company's ability to freely move funds to meet demands.

- *Employment policies*—Until recently, the government provided tax incentives to firms for hiring more people. There have been no incentives for investment in technology, except to export software development services.

2. Information Services Market Forecast

The economy of India is growing at 8% to 9% a year and has potential for greater growth. INPUT has projected the growth in information services at 30%, but believes it could easily be twice that within the next few years.

The market for information services in India is small, but with economic stimulation, has the potential to become large. As shown in Exhibit VIII-47, the market in 1991 is estimated to be only about $250 million. INPUT projects that the market will grow to over $900 million by 1996, with an annual growth rate of 30%. Inflation and the unpredictability of the economy are countering factors.

EXHIBIT VIII-47

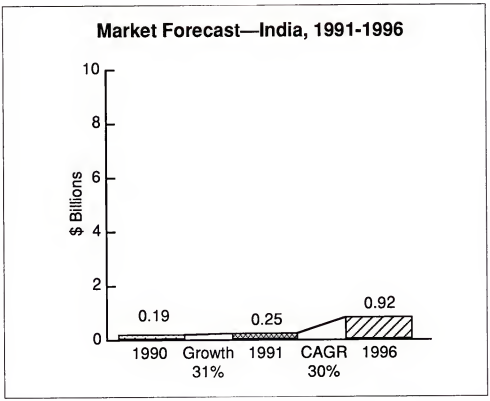


Exhibit VIII-48 provides the forecast by delivery mode. Exhibit VIII-50, at the end of this profile, provides the detail behind this forecast.

- *Processing services*—There are only a few firms providing processing services due to the small number of firms that have sufficiently large processing requirements. With an industry that is oriented to hiring large numbers of people, there has been only limited demand for processing services. The market was a modest $15 million in 1991.

- *Turnkey systems*—The demand for turnkey systems results from the demand for mini- and PC-based system solutions from the few, but growing companies that are in need of processing solutions. As the general economy strengthens, turnkey systems based on personal computer solutions should develop into a significnat market.

- *Applications software products*—The software sector is a bright spot in the industry and is expected to continue to grow. There are major national efforts to establish an offshore software development industry and there is high interest in use and development of all types of software. The applications software market will grow from $60 million in 1991 to $220 million in 1996.

- *Systems operations*—There is currently no market for systems operations.

- *Systems integration*—Although there are undoubtedly some projects that could possibly qualify as systems integration, no recognizable market exists. This situation could change over the next several years if the government is able to stimulate the information services industry and begins to automate its own processes.

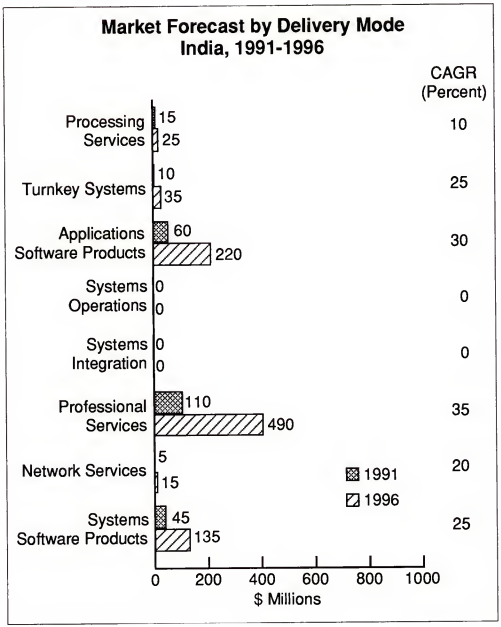
- *Professional services*—The strongest area of the information services market, with a growth rate of 35% per year, is professional services. The market will develop from $110 million in 1991 to almost $500 million in 1996. There is high demand for professional services, particularly to participate in software development efforts. In addition, there is an increasing need for consulting services in the public sector to assist in preparing plans for the development of technology-based services.

  The development of a strong professional services segment is key to India's goal to export information services skills under contract and to establish the resources to speed the eduction and training required to support an information services industry.

- *Network services*—There is only limited network capability in India. The infrastructure is poor and there is limited demand for any of the traditional services. The demand that does exist results from the needs of multinational firms communicating with offices in other countries. This modest market will grow at 20% per year.

- *Systems software products*—Like applications software products, the systems software products market though modest is strong and growing at 25% per year. The demand is tied mostly to mini and personal computer requirements for systems control products and for application development tools to support software development.

EXHIBIT VIII-48



3. Market Considerations

With an underdeveloped infrastructure and limited market opportunities, full representation would be considered less than cost-effective in the short and medium terms. At the same time, the local vendor base is small.

Representation through joint ventures is recommended as the most cost-effective method of entry or expansion in the market. Investment should be considered long term.

In the short and medium terms, the greatest areas of opportunity are in the development of telecommunications and in personal computer-based applications.

Until recently, there was only limited representation by U.S. firms in India. Policies that required companies to be majority owned by Indian nationals caused IBM to significantly reduce its representation and other companies to be slow to enter the market. Recent liberalization has stimulated a number of firms to re-enter the market. IBM reopened offices in major cities. Unisys has continued its presence through joint-venture agreements. DEC now has representation.

The major information services companies are Indian. The two leaders are Tata Consulting (also Tata Unisys) and Wipro. Both are involved in hardware and software sales and service. Tata is the largest consulting company.

Exhibit VIII-49 lists the Indian information services vendors identified by INPUT in its 1991 research.

EXHIBIT VIII-49

Selected Vendors by Delivery Mode
India, 1990

Vendor	Processing/ Network Services/ Systems Operations	Professional Services/ Systems Integration	Software Products	Turnkey Systems
CMC	x	x	x	x
Datamatics	x			
HCL		x		x
IDM	x			
Kale Consultants		x		
Mastek		x	x	
NIIC	x			
Softek			x	
Sonata			x	
Tata Consultancy Services	x	x	x	x
TUL		x	x	
Wipro			x	x

EXHIBIT VIII-50

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
India

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total India Information Services Market	188	31	247	334	448	588	741	919	30
Processing Services	13	8	14	16	18	19	21	23	10
Turnkey Systems	10	20	12	16	19	24	28	36	25
Applications Software Products	45	33	60	80	115	150	180	220	30
Systems Operations	0	0	0	0	0	0	0	0	0
Systems Integration	0	0	0	0	0	0	0	0	0
Professional Services	80	38	110	160	220	300	390	490	35
Network/Electronic Information Services	5	20	6	7	8	10	12	15	20
Systems Software Products	35	29	45	55	68	85	110	135	25

O
Italy

1. National Overview

Although by some measures the Italian economy is considered to be the third largest in Western Europe, its information services market is only the fourth largest after France, Germany and the United Kingdom. Thus, despite the achievement of "il Surpasso" in overtaking the U.K. economy in size, the Italian information services business is still only about 60% as big as that of the United Kingdom and less than half as big as that of France, the largest single country market in Western Europe.

To date, with perhaps the exception of Olivetti, Italian information services firms have made little impact outside of their home market. Although Finsiel, the largest vendor, ranks in revenue as one of the top five independent information services firms in Europe, it obtains over 90% of its business from within Italy.

As the industry has grown—rapidly—over the last decade, foreign firms have continued to establish significant market positions and thus represent a competitive challenge to domestic firms. Not surprisingly, this has led to much current speculation that a merger of the information services interests of Finsiel and OIS (Olivetti Information Systems) can be anticipated.

The Italian economy experienced strong growth through the middle and late 1980s, but entered a relatively mild recession in 1989. Some economists believe that this recession bottomed out in early 1991 and that the gross domestic product should increase marginally (by 1%) in 1991. However, industrial production is expected to record a decline of around 2%, the first fall experienced since 1983. The relative shallowness of the recession in Italy is also underlined by the employment statistics, which give no indication of a labor shakeout.

Italian business underwent a significant transformation during the 1980s. There was considerable restructuring as firms reorganized and products and processes were renewed. However, there are continuing concerns over the Italian economy which center around the issues of inflation and the budget deficit.

Inflation was reduced considerably during the 1980s. From an annual rate of 18% in 1981, it bottomed out at just over 4% in 1987 and is currently running at around 6.5%. This is, however, still the second highest rate of any of the advanced economies, Sweden having the highest rate at some 10% per annum.

The budget deficit remains a significant problem for the Italian economy because of the situation in Italy's public sector finances. For example, the Italian railways employ approximately the same number of people as do the French railways, but for a network that is only half as big.

The key policy issue is thus the budget deficit, which at 10.5% of GDP (estimated for 1991) is second only to that of Greece (nearly 16%). The Italian economy has continued to thrive because of the high level of private savings, but the high budget deficit is now posing a considerable threat to Italy's full participation in the EMU (European Monetary Union). EMU plans call for budget deficits less than 4% of GDP and outstanding public sector debt to be no more than 60% of GDP. Italy's outstanding debt is currently equivalent to 103% of GDP. This is roughly double that of the other members of the EEC. Further, Italy's debt is growing faster than its economy.

These economic problems cannot be separated from the political situation. Elections are due in May 1992 and as a result the politicians are reluctant to propose harsh measures to address the budget deficit problem. The threat of being shut out of the EMU might possibly lead to the necessary political and economic reforms.

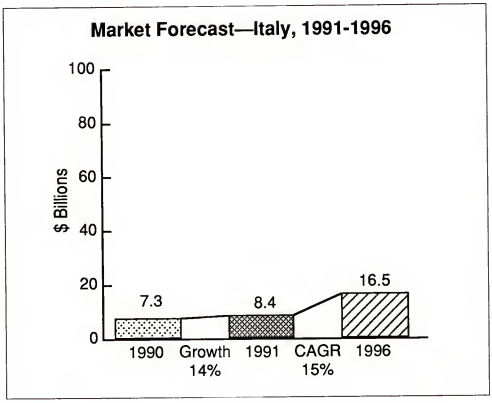
On the positive side, the Italian economy has shown remarkable resilience in the past in overcoming structural problems. The stability of the lira within the narrow constraints of the EMS (European Monetary System), despite the removal of exchange controls in 1990, is some indication of the confidence with which both the currency and the economy are viewed.

2. Information Services Market Forecast

The Italian information services industry, following strong growth (around 30% per annum) throughout the 1980s, is expected to show only 14% annual growth between 1990 and 1991, reaching $8.4 billion in 1991. For 1991 through 1996 the CAGR is projected at 15% leading to a $16.5 billion market in 1996 (see Exhibit VIII-51).

Although the Italian government has initiated investment programs in the past to support Olivetti research and development initiatives, it has not used public sector procurement as an instrument to support the information technology industry. Although the public sector is the largest customer of the computer industry, its expenditure on computers has grown less rapidly than that of the commercial market. Altogether, the government sector accounts for some 17% of the total information services market, compared to 14% for the whole of Western Europe.

EXHIBIT VIII-51



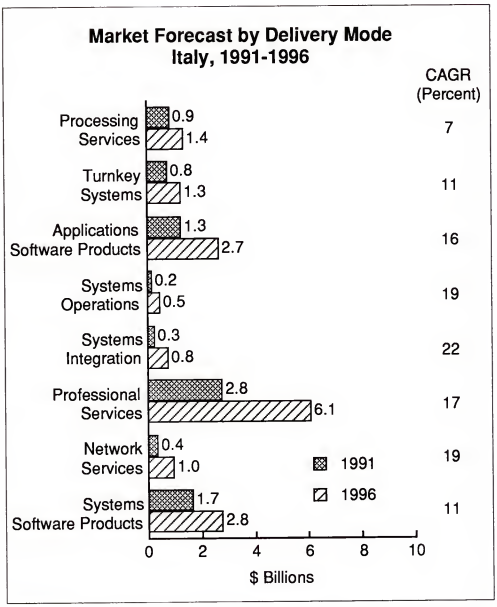
The market forecast is given in Exhibit VIII-52, which also provides INPUT's market forecast to 1996 for all eight information services delivery modes. Demand for computer information services, once largely unaffected by macroeconomic and general investment trends, has now reached a size and level of penetration that subjects it to these influences.

Information services growth continued at rates well in excess of 35% per annum at the beginning of the 1980s, despite an economic recession. Computerization was, for example, one of the ways in which small manufacturing companies were able to rationalize their activities at this time. Now it can be expected that the overall economic environment will play a much larger part in the future development of the information services business.

As is being experienced in the rest of Europe, the areas of systems integration, systems operations and network services (specifically network applications services) are offering the highest growth opportunities.

In comparison with the whole of Western Europe, the Italian market is particularly strong in both software products sectors. This is despite a reputation within Italy of software product copying being a widely accepted practice.

EXHIBIT VIII-52



Professional services is another delivery mode that represents a larger share of the overall information services market in Italy than in the whole of Western Europe. Correspondingly, the turnkey systems sector is proportionally lower in Italy—only 9% of the market compared to a Western European average of 16%. Italian users want an individual solution, though one based upon a standard application package, to meet system needs.

3. Market Considerations

Exhibit VIII-53 lists the leading thirteen organizations active in the Italian information services market.

EXHIBIT VIII-53

Leading Information Services Vendors
Italy, 1990

Vendor	Country of Origin	Estimated Sector Revenues ($ Millions)
IBM	U.S.	770
Finsiel	Italy	620
Olivetti Info. Sys.	Italy	395
Bull	France	140
Reuters	U.K.	130
Datamat	Italy	105
Digital	U.S.	105
Enidata	Italy	105
S & M (Gruppo)	Italy	95
Cap Gemini Sogeti	France	90
Microsoft	U.S.	85
Cerved	Italy	80
Siemens-Nixdorf	Germany	80

This exhibit demonstrates the high representation of indigenous vendors, with the following exceptions:

- The U.S.-owned companies, primarily computer systems vendors, are strongly represented, reflecting their dominance of the systems markets.

- Similarly, the information services businesses of two other European owned equipment vendors, Bull and Siemens-Nixdorf, are also represented.

- With the exception of Reuters (U.K.) which is active primarily in the specialized electronic information services sector, only CGS represents an independent non-Italian professional services vendor within this leading group. Amongst European-owned companies it is largely the French vendors who view Italy as a natural foreign expansion area for their activities.

IBM was the leading information services vendor, with Italian revenues of nearly $770 million in 1990.

Finsiel, the largest domestic Italian vendor, is owned 83% by the state and 17% by Banca d'Italia. With 1990 revenues of over $620 million, Finsiel controlled some 8% of the overall Italian market. It specializes in processing services and customized software development.

Olivetti Information Systems (OIS), the Italian equipment vendor specializing in PCs and minicomputers, was the third largest information services vendor in 1990, with revenues of nearly $395 million.

EXHIBIT VIII-54

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Italy

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Italy Information Services Market	7,340	14	8,350	9,570	10,950	12,610	14,560	16,460	15
Processing Services	876	7	942	991	1,036	1,167	1,261	1,352	7
-Transaction Processing Services	795	7	852	892	933	1,054	1,135	1,217	7
-Utility Processing	16	5	17	18	19	20	20	22	5
-Other Processing	65	13	73	81	85	93	105	114	9
Turnkey Systems	689	12	771	869	983	1,089	1,366	1,318	11
-Equipment	365	7	389	422	462	487	511	535	7
-Applications Software Products	138	18	162	195	227	268	470	341	16
-Systems Software Products	8	10	9	10	10	11	11	12	6
-Professional Services	178	18	211	243	284	324	373	430	15
Applications Software Products	1,091	16	1,269	1,529	1,764	2,076	2,336	2,701	16
-Mainframe	134	0	134	142	142	146	146	146	2
-Minicomputer	341	12	381	454	527	592	649	730	14
-Workstation/PC	616	22	754	933	1,095	1,338	1,541	1,825	19
Systems Operations	162	23	199	235	280	341	406	483	19
-Platform Systems Operations	77	21	93	105	126	154	178	207	17
-Applications Systems Operations	85	24	105	130	154	187	227	276	21
Systems Integration	239	22	292	357	434	526	649	791	22
-Equipment	93	17	110	130	150	170	203	235	17
-ApplicationsSoftware Products	10	25	12	15	19	24	29	37	25
-Systems Software Products	6	25	8	9	11	12	14	16	15
-Professional Services	122	27	154	195	243	308	389	487	26
-Other Services	8	0	8	8	11	12	14	16	15
Professional Services	2,449	15	2,814	3,273	3,848	4,517	5,211	6,071	17
-Consulting	324	5	341	406	503	568	649	730	16
-Software Development	1,947	17	2,271	2,636	3,082	3,650	4,217	4,947	17
-Education and Training	178	14	203	231	264	300	345	393	14
Network Services	357	15	410	487	580	689	823	994	19
-Electronic Information Services	260	9	284	316	353	389	434	483	11
-Network Applications	97	29	126	170	227	300	389	511	32
Systems Software Products	1,500	11	1,646	1,825	2,036	2,230	2,457	2,758	11
-Mainframe	706	3	730	754	779	795	803	811	2
-Minicomputer	479	12	535	592	665	730	803	892	11
-Workstation/PC	316	21	381	479	592	706	852	1,054	23

P

Japan

1. National Overview

The Japanese market for information services is the second largest in the world, following only the United States, but is estimated to contribute slightly less than 1% to the total GNP of the country. This is approximately half the relative amount that information services contributes in the United States.

The industry continues to exhibit strong growth and is becoming a basis for exportation of services, although some slowdown began in 1991.

Considering the increasing importance of information to the economy of Japan, there is ample opportunity for growth.

Although stability and growth is expected, trade friction is also expected to continue, with Western countries pressuring Japan for greater freedom of Japanese markets and for Japan to assume greater responsibility for global economics.

Although technologically sophisticated, Japan has yet to take full advantage of technology as a service. However, this picture is beginning to change. There are several trends that are expected to result in substantial changes over the next several years.

- *Industrial modernization*—Although the production facilities (hardware) of Japanese industry are sophisticated, considerable work remains to be done in the front office and in the use of information.

  The government has recognized the value of information and is providing inducements for investment in technology products such as software and for capital investment in new services such as cellular telephone and network services.

  There is renewed concentration on automating the office processes of larger organizations. These processes remain very labor intensive and are not as responsive as required by international business.

- *Software emphasis*—With a strong base in hardware, industry and government are beginning to place increased emphasis on the development of software. At the same time, there is a real shortage of software engineers. Japan is learning to develop high-quality software, is strengthening its applications software products position and seeking international opportunities.

- *Partnering*—There is an increasing trend toward the use of partners for the development of information services. There are indications that partners will be increasingly important as the country develops its software industry.

- *Standardization*—Japan has been a consistent supporter of international standards. Emphasis on standards is consistent with the Japanese interest in orderliness and common work interests.

  - Japan is very interested in UNIX and its progress on a worldwide basis.

  - Japanese vendors are becoming active in the electronic data interchange area and have joined a number of international standards bodies. There is an emerging EDI activity within Japan and it is expected to spread internationally.

a. Driving Forces

There are several forces causing changes in Japanese industry.

- *Globalization*—Japan is expanding its influence into other countries, increasing its requirement for global network capabilities. In addition, Japan is being pressured by international political and economic institutions to play a more prominent role in the international community. To meet the needs of a global market, Japanese companies need increased information services to meet both local and international operating requirements.

- *Increasing competition*—An increasing number of organizations are entering the information services market. Large industrial companies have established separate information service subsidiaries.

- *Outsourcing*—The concept of outsourcing is relatively common in Japanese industry and is becoming more common in the information systems area. The use of information services vendors to meet systems integration and systems operations requirements is increasing rapidly.

- *Government policies*—Through financial incentives, the government is stimulating the growth of information services. There is a growing concern about a shortage of software and computer hardware engineers and the government is taking steps to improve educational programs in this area.

- *New vendors*—Major corporations continue to turn their information systems organizations into business units, which in turn become new information services vendors.

b. Inhibiting Factors

Despite strong growth, a few inhibiting factors continue to be a modest retarding force.

- *Strategic systems*—The overselling of competitive advantage by information services vendors is increasing the caution of information systems and general management. Vendors' overconfidence may work to their disadvantage.

- *Domestic software development capabilities*—The capabilities of Japanese software developers still lag behind those of the U.S. and Europe, although they are improving rapidly. International software developers need to be prepared for competition from the Japanese software industry.

- *Trade friction*—Continued trade friction could retard development of the information services industry. Having to continually respond to questions about market competitiveness and to international standards development issues has an inhibiting effect. There has been some recent movement to ease the trade balance problem, but the Japanese move slowly and will have to change behavior about consumption on a national scale. It will take many, many years.

- *Language*—Language differences continue to handicap Japanese businesses. Japan has traditionally placed only limited emphasis on foreign language skills, making joint-development projects difficult and reducing the acceptance of foreign language-based products. Japanization of an imported software product is a very expensive process.

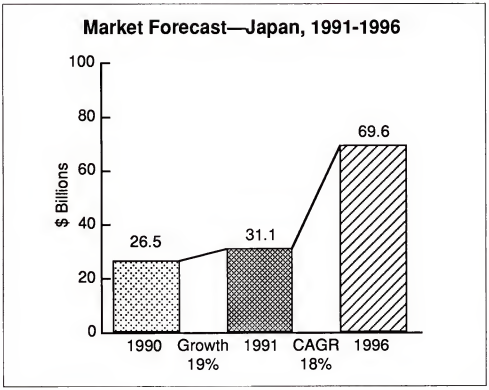
2. Information Services Market Forecast

The information services industry experienced strong growth in 1990 and again in 1991. Before the impact of exchange rates, the growth approached 30% in 1990 and was somewhat less in 1991.

As indicated in Exhibit VIII-55, the market for information services in Japan is expected to grow from an estimated $31 billion in 1991 to nearly $70 billion in 1996. The overall growth rate is estimated to be approximately 18%. INPUT lowered its five-year projection for Japan from 19% to 18% on the belief that a slowdown in the overall economy will occur in 1992 and possibly 1993. Renewed growth is expected after that.

Japan is the second largest information services market worldwide, behind the U.S. and larger than France or Germany.

EXHIBIT VIII-55



The industry has benefited for some time from strong governmental support designed to help information services vendors grow successfully. A shift in governmental support may be developing that will place more emphasis on the international information systems function of major corporations and less on the vendors.

To counter the expected shortage of computer engineers, the government wants to convince industry to increase pay scales and opportunities for computer professionals.

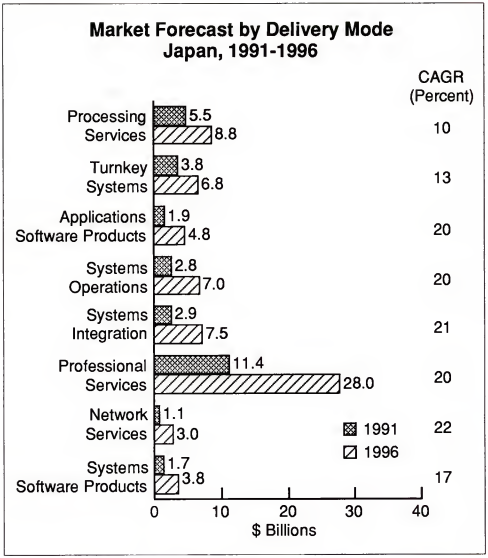
All of the major trends within the information services area are now impacting Japan. Downsizing, outsourcing, networking and open systems are all areas of concern and opportunity.

- The IS function has been traditionally centralized in Japanese corporations, but in the growing concern about economic growth and costs, downsized and distributed computing capabilities are gaining interest.

- UNIX has attracted great attention, as it provides a basis for Japan to develop software products for sale on an international basis. Japan can stay outside the market defined by IBM operating systems and still compete on an international scale.

Exhibit VIII-56 provides the forecast by delivery mode. Exhibit VIII-58, at the end of this profile, provides the detail behind this forecast.

EXHIBIT VIII-56



Analysis of the delivery modes for the Japanese market indicates two key differences between the market in Japan and that in other countries.

- The market for software products in Japan is estimated to be approximately 12% of the total information services market, compared to an estimated 30% in the United States. The low percentage is attributable to three reasons:

  - The Japanese place great emphasis on the reliability of software and expend considerable effort to ensure the reliability of products. The Japanese are frequently displeased with the quality of foreign software products and continue to develop them primarily in house.

  - The Japanese generally prefer products that are industry- and task-specific, as compared to more-generalized packaged software available in the U.S. and Europe.

- The differences in language cause the Japanese considerable problems. Frequently, documentation and programs must be translated into Japanese to be fully usable.

  Only recently has a true software products industry started to develop in Japan. In the second half of the decade, the software products markets are expected to increase their share of the total market within Japan.

- The percentage represented by systems integration and professional services is over 45% of the industry. The higher percentage of professional services is generally attributable to the increased level of custom software development in Japan.

Processing services represent the industry's second largest category of services. The market for processing services is estimated to have been approximately $5.5 billion in 1991 and will grow to nearly $8.8 billion by 1996.

- In 1991, applications software product revenues were approximately $1.9 billion. This market is expected to grow to approximately $4.8 billion by 1996, an annual growth rate of 20%. This growth rate has been increased from 16% on the belief that the willingness to buy packaged software is growing and that the software developers are gaining stronger reputations.

- Systems software, particularly application development tools, is expected to grow at a somewhat higher rate, from $1.7 billion in 1991 to $3.8 billion by 1996. The growth rate for systems software products is expected to be approximately 17%, with the growth rate for application development tools being at least 25%.

  The growth rate for application development tools is expected to be higher than for other submode categories due to the increased emphasis on software development efforts. Emphasis will be on products such as CASE tools.

As Exhibit VIII-56 shows, turnkey systems are expected to follow the general trend and to exhibit a growth rate of approximately 13%, growing from $3.8 billion in 1991 to $6.8 billion in 1996.

- This growth rate is somewhat higher than that in the U.S. due to the increased emphasis on computerization by medium-sized and smaller companies. However, unlike in the U.S., Japanese companies will place greater emphasis on tailoring software to meet specific needs, rather than using standard packaged software.

- Japan is still experiencing strong growth in personal computer sales (15% in 1991), which also supports strong turnkey sales.

The market for systems integration services is expected to grow at a rate of 21%—from $2.9 billion in 1991 to an estimated $7.5 billion in 1996.

- The market for systems integration services is well established in Japan. It will see significant growth over the next several years as larger companies work to integrate production and office processes.

- In the market for systems integration services, professional services are expected to have the highest growth rate, reflecting continued emphasis on the development of custom software to meet specific needs. The growth rate for professional services is expected to be nearly 30%.

Professional services is the dominant delivery mode in the Japanese information services market. With 1991 revenues of $11.4 billion, it represents 35% of the total market. And with growth projected at 20% per year, it will reach $28 billion in 1996. At that point, professional services would make up 40% of the market.

- As part of professional services, software development should be strong, following the trend in using custom-developed software to meet specific needs. Consulting services are also expected to show strong growth as Japanese industry works to develop more-integrated management systems.

As a percentage of the information services industry, network services are comparatively small (3%). Independent VANs are relatively scarce; companies have traditionally developed private networks with their trading partners.

However, the rate of growth is expected to be approximately 22%, growing from an estimated $1.1 billion in 1991 to $3 billion by 1996.

- Electronic information services are expected to represent the greatest portion of network services for the foreseeable future. Growth is expected to be in new products and new forms of delivery.

- The need for services such as EDI and E-mail are developing and an independent set of VANs should evolve over the next few years.

3. Market Considerations

The conditions and opportunities identified in the 1990 report remain and are presented below. Some easing of regulations and constraints on market entry has been accomplished and more progress is promised. This is the second largest information services market, thus any serious international vendor must work to capture the opportunity.

Now is generally considered to be a good time to enter or expand in the Japanese market. There is a continuing increase in openness in the Japanese market, but there are still some roadblocks. There are several considerations that could have a significant impact on a company's ability to realize its objectives.

- *Long-term investment*—Any investment should be considered very long term. Significant value is placed on relationships in Japan, and developing relationships can require an extended time.

- *Japan-specific products*—Generic products and services will generally meet with little success. To be successful, products and services must reflect the differences in the way business is conducted in Japan and the Japanese language.

- *Creative products*—Products that provide only basic services will not meet with great success. Japanese industry is creative and looks for products that will meet future goals rather than just immediate needs.

- *Vertical-industry knowledge*—To be successful in a vertical industry, a high degree of industry knowledge is required. With the exception of the medical industry, generalized industry products are not expected to compete successfully.

- *Unique personal computers*—Most PCs in Japan have been adapted to provide Japanese language support. IBM Japan has now converted its PCs to meet local requirements; however, these PCs are not able to run much of the standard IBM PC-compatible software developed in the U.S.

- *Distributor agreements*—Considering the high cost of startup and marketing, distributor and partner agreements are recommended as the best means of market entry.

Key opportunities are expected to exist for the following products and services:

- *CASE/DBMS products*—Development tools and data base products are expected to have the highest growth in the near term.

- *Decision support systems*—Systems that support the decision process are expected to be in greater demand in the future.

- *Project management systems*—Products to manage large, complex development efforts are expected to be in great demand over the next several years.

There are numerous large and small vendors of information products and services in Japan, including representatives from the majority of the large foreign companies. However, the majority of the market is dominated by several large companies. The leading vendors are listed in Exhibit VIII-57.

EXHIBIT VIII-57

Leading Information Services Vendors Japan, 1990

Vendor	Revenue ($ Billions)	Market Share (Percent)
NTT Data	$2.5	8
CSK	0.7	2
Nomura Research Institute	0.65	2
Hitachi Information Systems	0.6	2
Japan Research Institute	0.55	2
Quick	0.53	2
Toyo Information Systems	0.47	1
INTEC	0.46	1
Hitachi Software Engineering	0.2	<1

EXHIBIT VIII-58

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Japan

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Japan Information Services Market	26,465	19	31,071	36,432	42,832	50,235	59,086	69,620	18
Processing Services	5,075	9	5,545	6,075	6,650	7,290	7,990	8,765	10
-Transaction Processing Services	4,275	10	4,700	5,170	5,685	6,255	6,880	7,570	10
-Utility Processing	225	-4	215	205	195	185	175	165	-5
-Other Processing	575	10	630	700	770	850	935	1,030	10
Turnkey Systems	3,355	12	3,750	4,235	4,795	5,385	6,115	6,780	13
-Equipment	1,140	10	1,250	1,375	1,520	1,675	1,830	2,010	10
-Packaged Software	1,375	9	1,500	1,660	1,825	2,010	2,210	2,380	10
-Professional Services	840	19	1,000	1,200	1,450	1,700	2,075	2,390	19
Applications Software Products	1,560	21	1,890	2,320	2,800	3,300	4,005	4,790	20
Systems Operations	2,440	16	2,830	3,390	4,070	4,875	5,855	7,030	20
-Platform Systems Operations	1,465	16	1,700	2,040	2,450	2,935	3,525	4,230	20
-Applications Systems Operations	975	16	1,130	1,350	1,620	1,940	2,330	2,800	20
Systems Integration	2,335	22	2,850	3,465	4,201	5,098	6,163	7,485	21
-Equipment	945	19	1,125	1,350	1,620	1,945	2,310	2,775	20
-Packaged Software	240	21	290	345	390	440	490	550	14
-Professional Services	1,020	26	1,290	1,610	2,015	2,520	3,150	3,930	25
-Other Services	130	12	145	160	176	193	213	230	10
Professional Services	9,320	22	11,380	13,540	16,260	19,410	23,150	27,950	20
-Consulting	2,110	22	2,580	3,040	3,650	4,320	5,120	6,100	19
-Software Development	6,050	22	7,400	8,850	10,800	12,900	15,500	18,900	21
-Education & Training	1,160	21	1,400	1,650	1,810	2,190	2,530	2,950	16
Network Information Services	915	22	1,116	1,362	1,662	2,027	2,473	3,000	22
-Electronic Information Services	732	22	893	1,090	1,329	1,622	1,978	2,410	22
-Network Applications	183	22	223	272	332	405	495	590	21
Systems Software Products	1,465	17	1,710	2,045	2,395	2,850	3,335	3,820	17
-System Control	560	20	670	850	1,020	1,260	1,500	1,710	21
-Data Ctr. Mgt.	575	11	640	720	805	905	1,010	1,120	12
-Appl. Dev.	330	21	400	475	570	685	825	990	20

Q
Mexico

1. National Overview

Long an economic ally and dependent on the U.S., Mexico has sought in recent years to establish an economic identity that is less tied to the U.S. economy. The current administration is doing much to spread economic growth across the country, to increase private ownership of industries such as telecommunications, and to increase industrial growth.

During 1991, the Mexican government continued a policy of industrial growth with some success, and strengthened its trading ties with the U.S. and Canada. If this progress continues for another two to three years, the economic balance and stability will be much improved and the dependence on Mexican oil exports decreased.

Although the overall situation has begun to look somewhat brighter over the past couple of years, significant time and effort will be needed for Mexico to assume an international leadership role. In many ways Mexico is striving to be an economic leader for Latin America, benefiting in part from its geographic proximity to the U.S. industrial market. The recent free trade agreement with the U.S. is a key step.

A key determinant of the development of the information services industry will be improvements in the telecommunications infrastructure and the interconnection with network services in the U.S. and Canada. Becoming a full trading partner will require Mexican companies to utilize electronic data interchange and related technologies.

The privatization of the telecommunication industry, now in process, is another key step toward full membership in the North American trading community.

National growth hinges on the country's ability to manage a large foreign debt (approximately $100 billion). Growth is predicted to reach 5% by 1995, if debt repayment restructuring can be accomplished. Debt restructuring is crucial to repayment and the ability to stabilize the economy.

Although there has been general acceptance of the country's efforts to establish economic stability, many observers indicate that only time will tell whether such efforts will be successful. Previous efforts have met with only limited success.

Information technology trends in Mexico include the following:

- *Personal computer growth*—There is greater focus on personal computers as the best solution for meeting the needs of small and medium-sized businesses.

- *Industry-specific software*—As in many countries, industry-specific applications are increasingly preferred over generic solution applications.

- *Network growth*—There is increasing emphasis on the development of nationwide networks to support EDI and E-mail services. The government has recognized the need to improve the national telecommunications infrastructure and is moving toward private ownership to speed investment. The current telecommunications system has significant inadequacies that must be overcome to support a modern, nationwide information services market.

a. Driving Forces

Driving forces positively impacting the development of the information services industry in Mexico include the following:

- *Trade liberalization*—Liberalization of trade policies and the reduction in licensing fees are expected to stimulate a higher rate of importation of information services technology. The free trade agreement signed with the United States in 1991 will provide new impetus to the importation of information technology products.

- *U.S. influence*—Trends and directions in Mexico are strongly influenced by U.S. information services industry trends, which have a stimulating effect on the decisions of Mexican companies. Most of the international relationships of Mexican information services vendors are with U.S.-based companies.

- *Personal computer availability*—Continuing growth of lower-cost personal computer products acts as an encouragement to small and medium-sized businesses to make greater use of information services solutions.

- *Latin American entree*—An established market in Mexico is seen by many Latin American countries as an indication of a company's interest in Latin America. A number of South American firms are turning to Mexico as a source of supply and expertise. And Mexican information services vendors are looking towards market opportunities in their neighboring countries to the south.

- *Computer literacy*—Emphasis on education and use of computing capabilities is increasing the computer literacy of the working class. Over time, this will strengthen the resources of the native information services industry, making it both more attractive and independent.

b. Inhibiting Factors

Inhibiting factors are:

- *Recognition of IS value*—As in most Latin American countries, the value of information technology remains undervalued in Mexico. However, this will change as its role in international trade continues to grow.

- *Inflation rate*—Closely related to stability is the trend in inflation rates. A resurgence of inflation will slow growth in information services.

- *Weak infrastructure*—Overall, the national infrastructure is weak and unable to support extensive use of technology. A weak infrastructure has a tendency to reduce the use of information services. Changes are under way and by the middle of the 1990s this should no longer be a significant inhibitor.

- *Local consultants*—With minimal resources, many companies turn to local, poorly trained consultants who are not knowledgeable about the most up-to-date methods and procedures. There is a significant need for education and training of information services professionals.

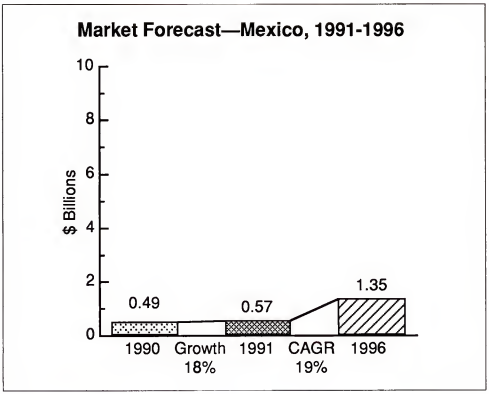
2. Information Services Market Forecast

Exhibit VIII-59 shows that the market for information services in Mexico is expected to grow at an annual rate of 19% for the next several years, from an estimated $570 million in 1991 to $1.3 billion by 1996.

The market is believed to offer significant potential, but as with many Latin American countries, will require a more stable economy for the full potential to be realized over the long term. The level of use of information technology as a percent of the gross national economy remains well below the average, suggesting significantly greater growth potential later in the decade.

Exhibit VIII-60 provides the forecast by delivery mode. Exhibit VIII-62, at the end of this profile, provides the detail behind this forecast.

EXHIBIT VIII-59

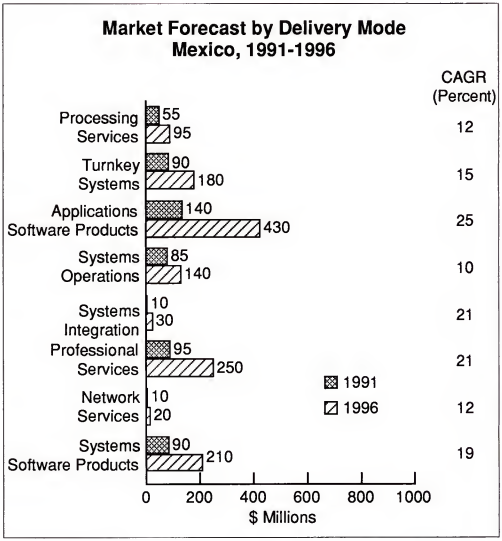


The relatively modest market for processing services (less than 10% of the total market) is expected to grow at a 12% CAGR from $55 million to $95 million over the next five years, as shown in Exhibit VIII-60.

- As in most countries, the key processing services requirement will be increasingly for transaction services, as the country begins to develop and expand its national network services capabilities. Processing services and systems operations should both represent long-term potential to speed the use of information technology while minimizing capital investment for companies.

- In Mexico, utility processing is expected to show growth. This growth results to a great extent from efforts of companies to develop in-house systems, frequently in anticipation of the availability of hardware and other support services.

EXHIBIT VIII-60



Turnkey systems are also expected to show strong growth, because of the number of growing companies that need short-term solutions. Exhibit VIII-60 illustrates that the market is expected to grow from $90 million in 1991 to at least $180 million by 1996.

- There is a need for customized software. However, as indicated by the growth rate of turnkey systems, there is greater acceptance of packaged solutions than in other countries.

Software products (applications and systems) are in great demand in Mexico.

- The highest demand is for applications software, which is generally in short supply due to high duties and tariffs. Declining tariffs under new trade agreements should increase the demand.

- Applications development products are a growing need as companies begin to develop more comprehensive systems. New systems will be needed to meet the requirements of a growing economy.

- Applications software products are projected to grow at a 25% rate to $430 million in 1996.

- Systems software products will grow at a somewhat slower rate of 19%, to reach about $210 million by 1996. This growth is primarily tied to the availability of computer hardware and the adoption of applications development tools at the minicomputer and personal computer levels.

There is currently little demand for systems integration services. The information services industry remains small and fragmented. However as the use of professional services grows, some portion of that demand will shift to the systems integration type of relationship.

- There is demand for systems integration services in the governmental sector.

The professional services market is expected to show strong growth as companies search for alternatives to modernize their industries. Overall, growth is expected to be from approximately $95 million in 1991 to about $250 million in 1996, a growth rate of 21%.

- The key requirement for professional services is for consulting. The consulting market in Mexico is considered to be quiet and underdeveloped. Local consultants have little training and frequently provide poor information. They need relationships with U.S. firms to gain access to the required expertise.

- The need for quality consulting service is expected to be greater as companies seek to modernize. Following years of neglect, major changes are needed in most major companies. And as these companies seek membership in the international community, they will require significant advice on establishing supporting information infrastructures.

The network services market is very small and will remain small for at least the next several years. The telecommunications infrastructure to support the development of this delivery mode is lacking. Increasing interaction with U.S. manufacturing corporations may speed this growth somewhat.

- There is a high degree of interest in Mexico for network-based services. Foreign firms have an interest in E-mail and EDI services and there is interest in data base and other on-line services.

- Network services could grow at a higher rate near the end of the five-year period if the telecommunications infrastructure is improved.

- INPUT expects EDI capabilities to become a key ingredient in future information systems activities of all larger Mexican companies as they expand their international trading activities.

Growth of markets in Mexico is highly dependent on a stable political environment and economic development. The reasonably stable business environment now being experienced is expected to continue through the middle of the decade. If this happens, the information services industry could experience growth above that projected by INPUT.

3. Market Considerations

Exhibit VIII-61 lists leading Mexico-based vendors and the delivery modes in which they primarily operate. Many of them have well-established relationships with U.S.-based information services companies. Many international vendors are also active and are identified in Chapter V on Latin America.

The key opportunities for companies entering or expanding in Mexico are in the personal computer, workstation and LAN product areas.

- Opportunities also exist in consulting and after-sales support for companies willing to invest in development of qualified local staff. Providing local education and training is essential to any market entry in Mexico, and is fundamental to establishing a long-term business.

- In the short term, a relationship with a local representative is expected to be the best method of entry. If progress continues to be made in economic stability, investment in establishing a well-trained local staff is expected to be of significant benefit within the next three to five years.

- The leading vendors of information services hardware are IBM, Hewlett-Packard, and Unisys. DEC, NCR, Honeywell, Olivetti, and Wang are also represented, but have limited market shares. There are few relationships with Japanese IT vendors.

- Leading providers of software include Ashton-Tate, Computer Associates, and Microsoft.

- Nearly all the largest accounting firms are represented and have information services practices.

EXHIBIT VIII-61

Selected Vendors by Delivery Mode
Mexico, 1990

Vendor	Processing/ Network Services/ Systems Operations	Professional Services/ Systems Integration	Software Products	Turnkey Systems
Bertex	x			
Casas Alatristes		x		
CCS	x	x	x	
Dicom	x		x	
Execuplan		x	x	
Gama	x	x		x
Grupo Tea		x	x	
Intertec de Mexico	x			
Kronos	x		x	
Lanix	x	x		x
Mancera Hermanas		x		
Megaplan			x	
MPS	x			
Sistemas Erickson			x	
Tecnovision	x		x	
Zylog			x	

EXHIBIT VIII-62

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Mexico

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Mexico Information Services Market	488	18	574	684	813	973	1,157	1,355	19
Processing Services	47	13	53	58	67	74	84	95	12
-Transaction Processing Services	25	12	28	31	36	40	45	52	13
-Utility Processing	18	11	20	22	25	28	32	36	12
-Other Processing	4	25	5	5	6	6	7	7	7
Turnkey Systems	80	15	92	106	120	138	160	183	15
-Equipment	38	11	42	47	51	56	63	70	11
-Package Software Products	18	17	21	24	28	32	37	43	15
-Professional Services	24	21	29	35	41	50	60	70	19
Applications Software Products	112	25	140	180	230	295	365	430	25
Systems Operations	75	11	83	91	100	110	121	134	10
-Platform Systems Operations	45	11	50	55	60	66	72	80	10
-Applications Systems Operations	30	10	33	36	40	44	49	54	10
Systems Integration	9	22	11	13	16	19	23	28	21
-Equipment	3	10	4	4	5	5	6	7	12
-Packaged Software Products	1	10	1	1	1	2	2	3	25
-Professional Services	5	20	6	8	10	12	15	18	25
-Other Services	0	0	0	0	0	0	0	0	0
Professional Services	80	20	96	117	140	170	205	254	21
-Consulting	30	30	39	49	60	75	95	115	24
-Software Development	40	13	45	55	65	78	90	115	21
-Education and Training	10	20	12	13	15	17	20	24	15
Network Services	10	20	10	12	13	15	16	18	12
-Electronic Information Services	8	20	8	9	10	11	12	13	10
-Network Applications	2	20	2	3	3	4	4	5	20
Systems Software Products	75	19	89	107	127	152	183	213	19
-Systems Control	30	17	35	42	50	60	73	86	20
-Oper Mgmt	15	13	17	20	23	27	32	35	16
-Appl Dev	30	23	37	45	54	65	78	92	20

R
Netherlands

1. National Overview

The Netherlands (Holland), one of the founding members of the European Community (EC), has a population of 15 million. The information services market in the Netherlands is the fifth largest in Europe and is forecast to be $4.6 billion for 1991.

The Netherlands has the highest population density in Europe and spends a higher proportion (over 25%) of its GDP on social services than any other EC country. The economy grew at 3.5% in 1990 compared to 4.3% in 1989. Inflation rose to 2.4% in 1990 and is projected to rise further. Over 75% of all exports in 1990 were to the EC.

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

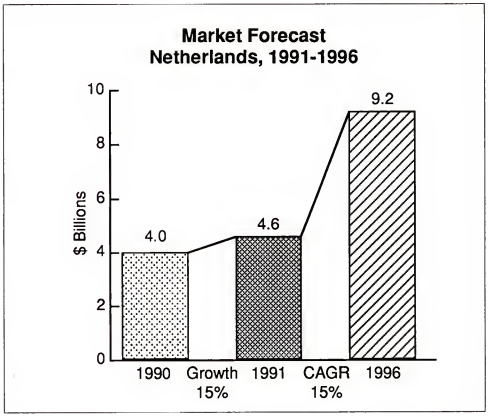
The Netherlands is a country of big businesses. There have been many mergers and acquisitions among the largest Dutch industrial and commercial companies in preparation for the single European market. The country's labor conventions have encouraged this as a means of protecting Dutch jobs. The government is trying to limit takeovers by foreign companies in the face of new, more liberal EC legislation.

The Netherlands is expecting to benefit considerably from the removal of trading restrictions between member EC countries and has a lead position in pushing the necessary new legislation through the European parliament. The Dutch banking community is still looking for a strong role in the financing of Eastern European development and the stock market is expecting further deregulation to improve its competitive position.

2. Information Services Market Forecast

The Dutch information services market is forecast by INPUT to grow from $4.6 billion to $9.2 billion between 1991 and 1996. This is a growth rate averaging 15% per year over the period. The overall market forecast is shown in Exhibit VIII-63.

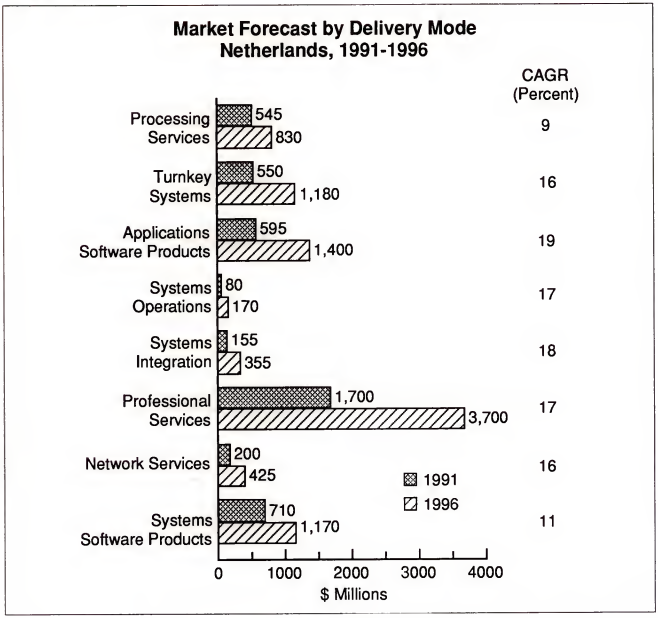
EXHIBIT VIII-63



The Netherlands market represents about 6% of the overall Western European information services market. Exhibit VIII-64 gives the breakdown of the market by delivery mode as defined by INPUT. The professional services sector remains the strongest, growing faster than the market as a whole, reflecting a continued strong demand for advanced skills and the development of custom software.

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

EXHIBIT VIII-64



3. Market Considerations

Exhibit VIII-65 lists the top ten vendors in the Dutch market during 1990. It was compiled using only the information services revenues attributable to the domestic market within the Netherlands, excluding exports and excluding revenues from any parent group companies.

EXHIBIT VIII-65

Leading Information Services Vendors Netherlands, 1990

Vendor	Country of Origin	Estimated Sector Revenues ($ Millions)
Volmac	Netherlands	325
IBM	U.S.	250
Raet	Netherlands	200
BSO	Netherlands	175
Cap Gemini Sogeti	France	145
CMG (Computer Mgmt. Group)	U.K.	90
Digital	U.S.	83
Multihouse	Netherlands	70
Unisys	U.S.	65
Bouwfonds Informatica	Netherlands	65

Dutch company Volmac Software Groep N.V. is the information services market leader in the Netherlands. It is a group of 24 operating companies with a wide variety of primarily professional services specializations. Ninety percent of 1990's revenues came from within the Netherlands; most of the rest came from neighboring Belgium. Active in most industry sectors, some 28% of Volmac's business is in banking and insurance, and 15% in the public sector. The company continues to expand by acquisitions and joint ventures and sees its total solutions and systems integration approach as providing major opportunities.

The second largest Dutch vendor is Raet N.V., which has averaged 33% revenue growth for the last five years. Some 20% per year is through an active acquisition policy; the remainder is through organic growth. Just over 10% of business is international, with subsidiaries in Switzerland, Belgium and Cyprus. The company offers a wide range of products and services to practically all industry sectors.

BSO/Beheer bv has four companies (including Origin/Technology in Business) operating in different market sectors. Origin was previously a 50-50 joint ownership between BSO and Philips, which now owns only 20%. Origin was formed from the international systems operations of both companies.

Multihouse NV specializes in information services for industrial automation. The company merged with another major Dutch services vendor, Bouwfonds Informatica during 1991, which will increase its ranking in the domestic market. CMG operates primarily in the Netherlands and the U.K., and has a strong specialization in financial services.

EXHIBIT VIII-66

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Netherlands

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Netherlands Information Services Market	3,960	15	4,560	5,210	6,040	6,920	8,050	9,230	15
Processing Services	503	8	546	593	644	699	765	831	9
-Transaction Processing Services	447	9	485	527	574	621	681	740	9
-Utility Processing	15	8	16	17	17	18	20	20	5
-Other Processing	41	7	44	50	53	59	65	71	10
Turnkey Systems	476	16	553	648	760	891	1,038	1,183	16
-Equipment	243	15	278	320	367	420	479	544	14
-Applications Software Products	89	20	107	130	160	195	237	290	22
-Systems Software Products	30	10	33	39	44	50	56	59	13
-Professional Services	115	18	136	160	189	225	266	290	16
Applications Software Products	509	17	595	701	834	1,009	1,172	1,399	19
-Mainframe	59	5	62	62	65	68	71	74	4
-Minicomputer	160	15	183	213	249	290	331	379	16
-Workstation/PC	290	20	349	426	521	651	769	947	22
Systems Operations	68	17	80	92	109	130	148	172	17
-Platform Systems Operations	44	20	53	59	71	83	95	112	16
-Applications Systems Operations	24	13	27	33	38	47	53	59	17
Systems Integration	127	21	154	176	208	253	302	355	18
-Equipment	53	11	59	65	77	89	104	118	15
-Applications Software Products	5	50	7	8	10	15	18	21	24
-Systems Software Products	4	33	5	7	8	9	12	15	26
-Professional Services	62	29	80	92	110	136	163	195	20
-Other Services	3	0	3	4	4	5	6	6	15
Professional Services	1,491	16	1,701	1,982	2,320	2,675	3,169	3,692	17
-Consulting	201	18	237	278	343	420	509	621	21
-Software Development	1,124	13	1,272	1,479	1,716	1,953	2,308	2,663	16
-Education and Training	166	16	192	225	260	302	352	408	16
Network Services	178	17	207	243	284	331	373	426	16
-Electronic Information Services	121	15	139	160	183	207	231	254	13
-Network Applications	56	21	68	83	101	124	142	172	20
Systems Software Products	645	10	710	787	870	959	1,053	1,172	11
-Mainframe	343	5	361	373	391	408	426	444	4
-Minicomputer	189	13	213	243	272	302	331	367	11
-Workstation/PC	112	21	136	172	207	249	296	361	22

S
New Zealand

1. National Overview

A member of the British Commonwealth, New Zealand has often been considered on the edge of international business. Its economy is based significantly on agriculture (primarily sheep and dairy products) and a strong orientation toward centralized social planning. New Zealand has been characterized as having a centrally oriented economy, with the government exerting strong direction over a predominantly private business sector.

Changes during the mid- to late-1980s positioned New Zealand to be a more balanced member of the international trade community and made it a more attractive market. Results of political and economic reforms have begun to transform New Zealand into an increasingly free market economy.

- Inflation has been reduced and investment has begun to result in solid, repeatable growth.

- The telecommunications industry, long centrally controlled, has become largely unregulated.

Over the past two years the New Zealand economy has been relatively soft, leading to a slowdown in growth internally, internationally and within the information services industry.

Although there have been a number of positive trends in the information services industry, the rate of growth has declined and the market has been relatively quiet since early 1990. Key trends include:

- *Productivity tools*—There has been an increase in the use of productivity tools for installed systems. With more emphasis on competitiveness, companies are beginning to make investments in tools to increase processing efficiency. The trend is expected to continue for some time.

- *4GLs/DBMSs*—There is an increasing interest in 4GLs and DBMSs. As a result of increased funds for investment, companies are beginning to make investments in new technologies.

- *Mini/Personal computer systems*—There has been a growing demand for minicomputer- and personal computer-based applications. With the increasing capability of minis and micros, more organizations are investing in smaller computer systems.

- *Reduction in packaged systems*—With the increase in the number of mini and personal computer applications, there has been a decline in the use of packaged systems. Organizations are tending toward tailored applications as an alternative to generalized applications.

- *Reduced use of service bureaus*—New Zealand is following the worldwide trend in the reduced use of service bureaus for traditional processing services. As a result, service bureau companies are looking to new services such as videotex as new areas of opportunity.

- *Consulting services increase*—There has been a significant increase in the use of consultancy services. After years of neglect, organizations are turning to consulting services to assist them in identifying and implementing enhanced systems and services.

The trend toward increased use of consultants, the focus on mini- and PC-based applications, and the use of productivity tools are expected to continue well into the 1990s. Data indicate that significant effort is required to update or replace outdated systems.

a. Driving Forces

Driving forces identified in the 1990 report continue to influence the information services market in New Zealand.

- *Economic/Political reform*—Reforms have begun to provide significant incentive for companies to invest in technology.

- *Limited labor supply*—As a result of neglect over the years, there is a need to invest in upgrading skills. In addition, there is a need to turn to outside consultants to provide short-term expertise. Training and education opportunities exist.

- *Increased competitiveness*—Increased competition—resulting from a freer economy—is forcing organizations to become more competitive.

b. Inhibiting Factors

Although changes have stimulated growth of the information services industry, there are a number of inhibiting forces.

- *Economic uncertainty*—Uncertainty about the effects of change are having an inhibiting effect on some companies. The uncertainty has resulted in some companies' adopting a wait-and-see attitude that reduces investment. Two years of recession and an outlook for more has taken its toll on the economy as a whole, including the information services sector.

Major industries including manufacturing, distribution and banking are undergoing restructuring, which impacts information services opportunities negatively in the short term. It may generate significant opportunities in the long term.

- *World economy*—Shifts in the world economy are driving the country to make changes. Until several years ago, there was little need for some of the changes that have been made. However, loss of world product position for some of New Zealand's products forced the country to consider changes. There remains a concern that this small but industrious country continues to be on the fringe of the world economy and is not able to capture its share of world trade.

- *Limited infrastructure*—Due to the years of neglect and the focus on agriculture, there is only a small installed base of systems.

- *Geographic location*—New Zealand's distant location tends to retard investment considerations.

- *Social focus*—The country has traditionally placed emphasis on the development of government-sponsored social systems. There is uncertainty about whether this focus will restrict investment opportunities.

2. Information Services Market Forecast

INPUT has measurably decreased its forecast for the New Zealand market for the next five years. Exhibit VIII-67 illustrates projected market growth from over $800 million in 1991 to $1.5 billion in 1996. The growth rate of 12% compares with a CAGR of 20% from the prior worldwide forecast reports.

The size of the market seems stable, but significant growth is not on the near-term horizon and may actually turn out to be less than that projected. Some information services vendors have suffered significant reductions over the past couple of years and may contract further in the near term.

EXHIBIT VIII-67

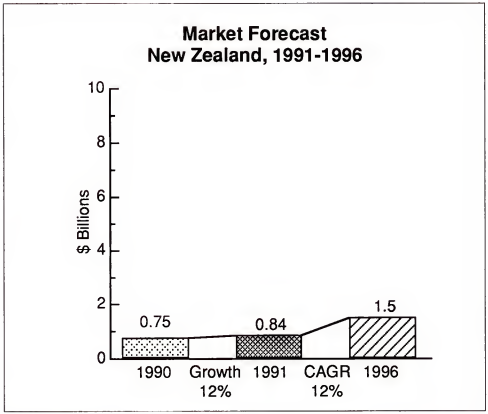


Exhibit VIII-68 provides the forecast by delivery mode. Exhibit VIII-70, at the end of this profile of New Zealand, provides the detail behind this forecast.

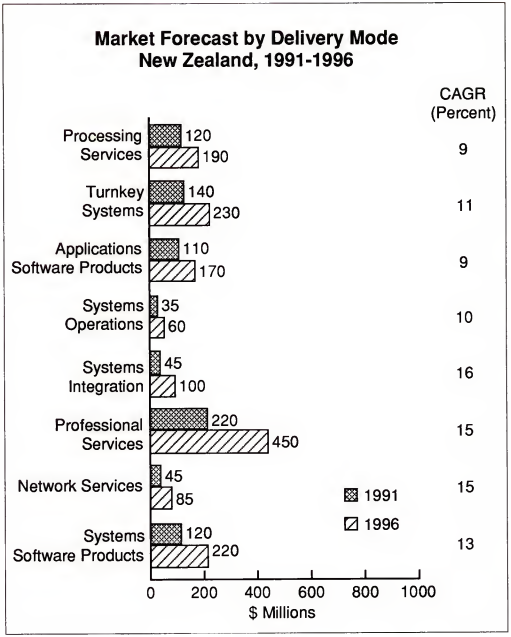
Exhibit VIII-68 shows that processing services in New Zealand are projected to grow from an estimated $120 million in 1991 to $190 million in 1991, a growth rate of 9%.

- Processing services have been strong in New Zealand for a number of years, but the decline in the economy has created a significant reduction in expected growth. Industry consolidation is reducing the number of large clients and prospects.

- Note is made that some of the revenues shown as a part of processing services may, in fact, be more properly shown as part of network services or systems operations. Many of the services traditionally associated with network services and now systems operations are performed by processing services companies in New Zealand and the splitting of the revenues may not have been precise.

Network services in New Zealand are projected to grow at a rate of 15% for the next several years, from over $45 million in 1991 to $85 million in 1996.

EXHIBIT VIII-68



- Network services are expected to become increasingly important over the next several years as a result of privatization. An increasing number of companies are using network services to provide financial transaction (EFT, POS, ATM, etc.) and other (E-mail, EDI) services.

- Until early 1988, the telecommunication services market was tightly controlled by the New Zealand Post Office. With the privatization of the telecommunications authority, all value-added services may be provided by private vendors.

The two software product delivery modes will experience less aggressive growth through 1996 than typically projected elsewhere.

- Applications software products will grow from $110 million in 1991 to $170 million in 1996 at only a 9% growth rate. The key reasons that applications software products are not growing faster is that many requirements have been met and there are extensive unique national reporting requirements that cannot be satisfied by generally available products.

- Systems software products, with roughly the same current market size—$120 million—should grow at a 13% CAGR to $220 million. The growth in systems software will result from the need to develop more complex systems as privatization progresses and business develops.

The overall market for turnkey systems is expected to grow from an estimated $140 million in 1991 to $230 million in 1996. The growth rate will be a modest 11%. The primary cause of turnkey systems growth will be the need for customized software to meet unique local requirements.

The markets for systems integration and systems operations in New Zealand are small and are expected to remain comparatively small for the next several years.

Professional services are expected to show somewhat stronger than average growth in New Zealand. Exhibit VIII-70 illustrates that needs in all submodes will result in a growth rate of about 15%. The market will increase from $220 million in 1991 to about $450 million in 1996.

- Previous forecasts had projected much greater growth; however, new research in late 1991 indicated that this was not likely and that the market was not likely to grow to the previously forecasted level of $800 million in the current forecast period.

- Certainly the changes occurring in New Zealand's industrial market will generate measurable opportunities to provide professional services for qualified firms, but it will not be a market of excessive growth.

Growth of the New Zealand market is highly dependent on the success of privatization and the government's emphasis on business expansion. At present, these policies are not causing an expansion in the economy and thus there is much slower growth in demand for information services.

3. Market Considerations

There are few barriers to entry into the New Zealand market. Many of the leading providers are foreign companies that have established New Zealand business operations. However, users indicate a preference for firms that have established a local presence over a long period of time.

Because of a preference for local firms, organizations considering entering the New Zealand market are advised to seek partnership arrangements to provide services that are not generally available.

The information services industry is generally characterized by many smaller companies that hold specialty niches. This characterization is particularly true in the software services delivery mode, where there are a significant number of companies.

Exhibit VIII-69 lists local vendors identified in INPUT's research during 1991. The primary delivery modes in which they offer services are also indicated.

In addition, IBM and DEC, as well as many of the major U.S.-based accounting firms, have active offices in New Zealand. Andersen Consulting however, does not have a local office, but conducts its New Zealand business from Australia.

EXHIBIT VIII-69

Selected Vendors by Delivery Mode
New Zealand, 1990

Vendor	Processing/ Network Services/ Systems Operations	Professional Services/ Systems Integration	Software Products	Turnkey Systems
Azimuth		x		
CCL	x			
Campbell Software		x	x	x
Centron	x			
Creative Solutions	x	x	x	
Databanks	x			
GCS	x			
Mycrift Systems			x	
Netways	x			
PAXUS	x	x		x
Renaissance Software		x		
SDI			x	
Vogel Computing	x			

EXHIBIT VIII-70

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
New Zealand

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total New Zealand Information Services Market	752	12	843	949	1,065	1,207	1,347	1,506	12
Processing Services	117	8	126	136	149	161	175	190	9
-Transaction Processing Services	100	8	108	116	126	136	148	160	8
-Utility Processing	0	10	11	12	14	15	16	18	10
-Other Processing	7	0	7	8	9	10	11	12	11
Turnkey Systems	121	12	136	150	165	187	205	228	11
-Equipment	55	13	62	68	75	84	92	100	10
-Packaged Software Products	32	13	36	40	44	50	55	60	11
-Professional Services	34	12	38	42	46	53	58	68	12
Applications Software Products	105	10	115	128	140	155	160	175	9
Systems Operations	33	12	37	40	44	49	54	60	10
-Platform Systems Operations	18	11	20	22	24	27	30	34	11
-Applications Systems Operations	15	13	17	18	20	22	24	26	9
Systems Integration	44	7	47	57	64	76	87	100	16
-Equipment	18	11	20	22	24	27	30	34	11
-Packaged Software Products	5	-60	2	6	6	7	7	8	32
-Professional Services	19	21	23	27	32	39	47	55	19
-Other Services	2	0	2	2	2	3	3	3	8
Professional Services	190	16	221	254	293	339	393	447	15
-Consulting	50	20	60	70	83	99	112	120	15
-Software Development	120	15	138	158	180	205	240	280	15
-Education and Training	20	15	23	26	30	35	41	47	15
Network Services	37	16	43	50	57	65	76	86	15
-Electronic Information Services	28	18	33	39	45	51	60	68	16
-Network Applications	9	11	10	11	12	14	16	18	12
Systems Software Products	105	12	118	134	153	175	197	220	13
-Systems Control	40	10	44	50	57	65	74	85	14
-Operations Management	25	12	28	31	35	40	45	50	12
-Applications Development	40	15	46	53	61	70	78	85	13

T
Norway

1. National Overview

Norway has a population of 4.25 million and is a member of the European Free Trade Association (EFTA). In common with other EFTA members, it seems likely that the country will become incorporated as a member of the European Community.

Norway is the seventh largest information services market in Western Europe, estimated at $1.6 billion in 1991.

Gross domestic product (GDP) rose by 1.8% in 1990, compared with 1.2% in 1989. GDP per capita in the country was just over $25,000 in 1990, compared with $21,500 in 1989. Consumer price inflation was 4.1% in 1990, down from 4.6% in 1989, and unemployment in 1990 was 5.4%.

Norway's central banks are taking an optimistic view of the country's economic prospects for 1991, forecasting GDP growth in 1991 at 2.3%. Forecasts for 1992 indicate a further slight rise to around 2.5%. Also, forecasts indicated that inflation would fall below 4% for 1991.

Unemployment in Norway is relatively low by European standards, at 5.4%, but this figure represents the highest level of unemployment in the country since the 1930s. Unemployment is expected to fall to 4.5% in 1992.

County NatWest Woodmac (CNWM) has estimated that in 1991, Norway overtook the United Kingdom to become Europe's largest oil producer, with an estimated oil and natural gas liquids production of 1.94 million barrels a day. This level of production represents a 13% increase over 1990.

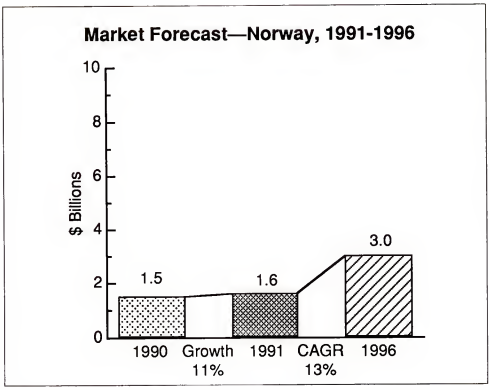
The largest Norwegian companies listed in the European top 100 are the two state-owned energy companies, Statoil and Norsk Hydro.

2. Information Services Market Forecast

INPUT forecasts that the Norwegian market for software and services will be $1.6 billion in 1991, growing at 13% per annum to reach almost $3.0 billion by 1996. See Exhibit VIII-71.

Exhibit VIII-72 shows the forecast by delivery mode, and Exhibit VIII-74 provides a detailed forecast by INPUT delivery mode. In Exhibit VIII-74, the actual market size is shown for 1991, 1992 and 1996.

EXHIBIT VIII-71



In Norway, the largest sector of the information services market in 1991 is represented by processing services, accounting for about 30% of the total market. However, growth in the processing services sector is forecast at a low level, just 5% per annum, between 1991 and 1996.

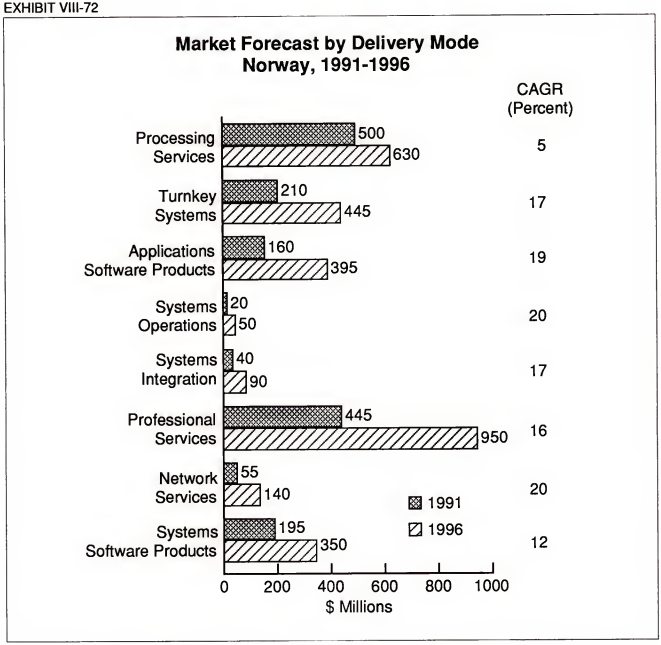
As a consequence of the low growth forecast for processing services, and the significantly higher growth rate forecast for the professional services sector, the largest market sector in 1996 will be professional services. By 1996, professional services are forecast to represent 30% of the total information services market in Norway. User expectation for software development services represents the largest portion of the professional services market, accounting for about 75% of user expenditure in this sector.

The primary growth opportunities in the Norwegian market lie in the areas of application solutions, especially software products, workstation/PC applications and systems software, and network applications.

3. Market Considerations

Exhibit VIII-73 lists the leading information services vendors in the Norwegian market during 1990. This listing was compiled using only the information services revenues attributable to the domestic market in Norway, excluding exports and excluding revenues from any parent group or subsidiaries.

EXHIBIT VIII-72



Unlike most European markets, IBM is not the leading vendor in the information services market. In Norway, IBM is relegated to third place behind NIT, an indigenous company, and Scanvest Olivetti, a company of Italian parentage.

Within the Norwegian information services market, seven of the leading ten vendors are indigenous companies.

The leading information services vendor in Norway, NIT, commands an 8.5% share of the market. The primary activity of this company is the provision of processing services, which account for about 75% of its revenue. The second major activity of the company is professional services, which contributes about 22% of revenue, and the remainder is derived from network services. In 1990, the company's total revenue was just over $120 million and the company employed a total of almost 1,100 staff. All 1990 activities of NIT were within the Norwegian market.

EXHIBIT VIII-73

Leading Information Services Vendors
Norway, 1990

Vendor	Country of Origin	Estimated Sector Revenues ($ Millions)
NIT	Norway	123
Scanvest Olivetti	Italy	100
IBM	U.S.	100
Fellesdata	Norway	92
Bankenes Betalings-sentral	Norway	80
Novit	Norway	67
Norsk Data	Norway	43
EDB	Norway	38
Rogalandsdata	Norway	34
Reuters	U.K.	17

The second largest information services vendor in Norway is Scanvest Olivetti. In January 1990, Olivetti Holding acquired 97% of the shares in Scanvest Ring A/S to form the company now renamed Scanvest Olivetti A/S. At the time of the Olivetti acquisition, the telecommunications division of the original Scanvest Ring was sold to Alcatel. The group now consists of Scanvest Olivetti and the wholly owned subsidiary Skrivervik Data A/S.

Scanvest Olivetti provides enhanced solutions for materials and capital equipment management, banking and finance systems, processing services, network systems and customer software applications. The wholly owned subsidiary Skrivervik Data supplies UNIX systems and network solutions to the technical and scientific market. This subsidiary is also a distributor for Sun Microsystems in Norway.

IBM is following a vigorous policy of pursuing additional information services revenues in a move to counter decreasing revenue and margins from equipment sales. During 1991, IBM consolidated operations in the Scandinavian market by reorganizing operations in the region to report into a central office in Sweden. In addition, IBM has been particularly successful in establishing a Europe-wide systems integration business. This sector of the information services market in Norway accounts for almost 7% of the total, compared with the overall European average of 4%.

EXHIBIT VIII-74

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Norway

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Norway Information Services Market	1,460	11	1,620	1,820	2,050	2,340	2,670	3,040	13
Processing Services	469	5	495	521	539	573	608	629	5
-Transaction Processing Services	431	5	455	478	493	524	555	570	5
-Utility Processing	9	3	10	10	10	10	11	11	3
-Other Processing	29	8	31	34	35	39	43	48	9
Turnkey Systems	185	13	211	245	281	331	381	445	17
-Equipment	99	13	111	126	142	165	185	216	14
-Applications Software Products	31	20	37	45	54	66	82	97	21
-Systems Software Products	12	13	14	15	18	21	24	27	14
-Professional Services	43	14	49	59	68	79	91	105	16
Applications Software Products	134	24	161	193	232	278	332	394	19
-Mainframe	17	5	18	19	19	21	22	23	5
-Minicomputer	42	19	49	59	69	80	94	109	17
-Workstation/PC	76	24	94	116	143	177	216	262	23
Systems Operations	17	18	20	24	29	35	42	49	20
-Platform Systems Operations	9	17	11	13	15	18	22	26	19
-Applications Systems Operations	8	20	9	11	13	16	19	23	20
Systems Integration	33	24	40	45	52	63	74	87	17
-Equipment	14	11	15	17	19	22	25	29	14
-ApplicationsSoftware Products	1	29	1	2	2	3	4	6	33
-Systems Software Products	1	20	1	1	1	2	2	3	25
-Professional Services	16	33	22	24	29	35	41	48	17
-Other Services	1	0	1	1	1	1	2	2	15
Professional Services	382	16	444	509	600	695	803	946	16
-Consulting	52	18	62	74	88	105	125	148	19
-Software Development	293	16	339	385	455	524	601	709	16
-Education and Training	37	17	43	50	58	66	77	89	16
Network Services	46	20	55	64	77	93	113	139	20
-Electronic Information Services	32	14	37	42	49	57	67	79	16
-Network Applications	14	28	18	22	29	36	46	60	28
Systems Software Products	191	0	193	214	242	276	310	350	12
-Mainframe	97	-2	96	100	106	113	119	125	5
-Minicomputer	62	-5	59	66	76	89	102	116	15
-Workstation/PC	32	19	39	48	60	74	89	109	23

U
Other Asia/Pacific

1. National Overview

For the purpose of INPUT's worldwide forecast, the Other Asia area consists mainly of China (PRC), Indonesia, Malaysia, the Philippines, and Thailand. The Other Asia area also includes Burma, Cambodia, Pakistan, Sri Lanka, and Vietnam, by virtue of their geographic location. Because these latter countries are believed to represent only minimal revenues, they are not addressed specifically.

The outlook for economic growth and the information services market in this diverse set of countries remains unchanged from the 1990 report. This profile generally contains the same analysis.

The Other Asia area is believed to represent the next major area of economic development. With a population of 1.4 billion and a national interest in technology by nearly all developing countries in the area, the market for information services is virtually limitless.

The economic and political setting of the Other Asia area is extremely fragmented.

- The area can be characterized as economically weak and as having only a limited technological infrastructure. Most of the countries in the Other Asia area must continually divide national resources between technology investment, which can aid industrial development, and development of basic national resources (such as through education).

- Economic growth in the region will vary by country. A number of countries will continue to grow at rates that exceed the world average—5% to 6% or more. However, some countries will find it difficult to maintain their rates of growth without changes in political and economic structures.

- Politically, the region appears to be reasonably stable; however, as evidenced by the continuing events in mainland China, situations can change quickly and often. In a number of countries, underlying weaknesses could result in rapid change.

- A somewhat fragile political infrastructure suggests caution about making extensive, long-term commitments in many countries of the Other Asia area.

Technology trends vary by country. However, several trends are common to the majority of the countries of the area as well as to many other developing countries of the world.

- *Industrial sector development*—Development of a competitive industrial infrastructure is a leading requirement of the majority of the countries in Asia. Having historically relied on low-cost labor, most countries recognize that development of their industrial sector is necessary to be able to compete in the next century. These countries also recognize that automation is necessary to the development of the industrial sector.

- *Network development*—The ability to communicate domestically and internationally is increasingly recognized as critical to a country's development. Recognizing this need, many countries are allocating larger portions of their national budgets to the development of national telecommunications networks and services.

- *Mini/personal computer systems*—With comparatively small industrial organizations and increasingly powerful mini and personal computer systems, organizations in many countries are placing primary emphasis on the development of low-end systems.

- *Industry-specific applications*—Organizations are looking increasingly to industry-specific, mini/micro-based applications to manage their businesses. Specific applications are needed, as an alternative to integrated spreadsheet-type systems.

a. Driving Forces

Some driving forces are unique to a specific country; some are more universal.

- *International competition*—Countries increasingly recognize that they must invest in technology if they are to be able to compete in the international business arena. Countries that continue to rely solely on low-cost labor as a national resource will not be competitive in the next century.

- *National education*—Education is increasingly important to competitiveness. Many countries have placed primary emphasis on education as a means of increasing their competitiveness, and consider technology a means of educating the greatest number in the shortest period.

- *Organizational control*—As organizations increase their emphasis on industrial development, they recognize that information technology is necessary to control the enterprise. The increased size and complexity of organizations requires replacement of manual systems with automated systems.

- *Network access*—Communication with suppliers and customers domestically and globally is an increasingly significant need. The speed of competitive developments necessitates the ability to communicate quickly and effectively.

b. Inhibiting Factors

There are a number of inhibiting forces in each of the countries. The following inhibiting forces are considered critical to the success of information technology development in all of the countries in the area.

- *Global economy*—With trade in natural resources or low-cost labor the primary source of revenues, most countries are heavily dependent on global economic trends. A global recession can adversely affect a country for a number of years, curtail national development projects, and impede the ability to invest in new technology.

- *National development priorities*—With limited national revenues to allocate, most countries have difficulty determining the best use of resources. Most countries recognize that technology investment will contribute to future development, but must continue to provide for national social requirements.

- *Political instability*—Political instability is a concern in many countries. Frequent change in government structure and direction has an adverse effect on investment. With each change, national priorities must be reassessed and new directions set. During the reassessment, few investments are made. In countries with frequent changes, foreign companies are frequently reluctant to make long-term investments.

2. Information Services Market Forecast

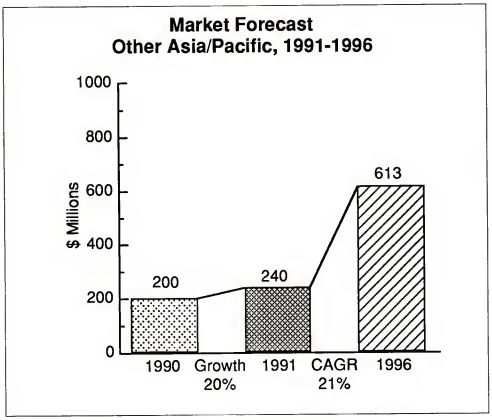
Exhibit VIII-75 shows that although the market for information services is small, the Other Asia area is expected to grow an estimated 21% per year for at least the next several years. Assuming continued stable and growing economies, the markets should grow from an estimated $240 million in 1991 to over $600 million by 1996.

Exhibit VIII-76 provides the forecast by delivery mode. Exhibit VIII-77, at the end of this profile, provides the detail behind this forecast.

Relative to the markets in the Other Asia area, please note the following:

- Although representing a small part of the overall market, the need for network services will create the highest growth rate (25%).

EXHIBIT VIII-75



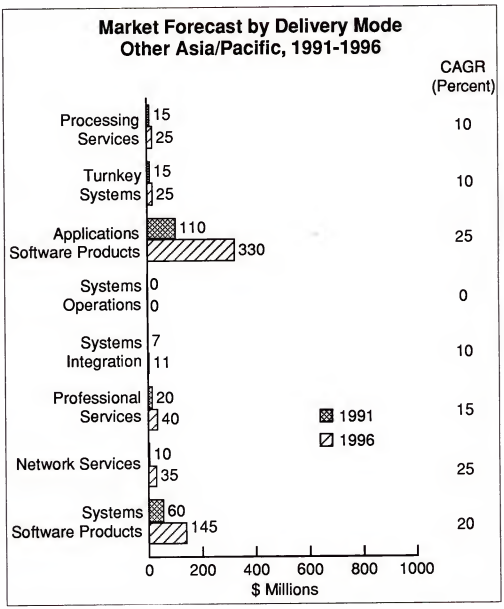
- Applications and systems software products represent the largest portions of the market. This dominance is not expected to change for a number of years. There is an increasing need for software products for nearly all areas of the economy in most countries. However, the greatest need will be for industry-specific applications software products.

- Due primarily to a lack of infrastructure, growth in other delivery modes is not expected to be as great. Most countries do not have a sufficiently large installed base to be able to support major information services investments. However, this situation could change in a number of countries.

- Indonesia, Malaysia, and Thailand are providing incentives for information technology investment and are aggressively encouraging information service investments. Long term, these countries could develop into markets of interest.

In general, the services modes, processing services, professional services and systems integration are of modest importance.

EXHIBIT VIII-76



3. Market Considerations

Entry into Asian markets can be a lengthy process. Even though many manufacturers have offices in the key countries, most successful companies align with organizations that have established relationships in a specific country.

A key to success in Asian markets is the ability to demonstrate a presence over the long term, which in turn requires a significant investment in staff. Historically, Asian firms have experienced dissatisfaction with foreign software firms that have not provided the support necessary to ensure product success.

For companies considering initiating or expanding operations, a strong business relationship with a local company is necessary to success.
In the majority of the Other Asia area, the leading vendors are large hardware manufacturers such as IBM, DEC, Wang, and NEC. Leaders in software include Ashton-Tate and Microsoft. The leading providers of professional services are primarily the major professional services firms, such as the Big 6 from the United States and PRC from the United Kingdom.

EXHIBIT VIII-77

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Other Asia/Pacific

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Other Asia/Pacific Information Services Market	200	20	240	291	358	438	519	613	21
Processing Services	14	14	16	17	18	19	21	26	10
Turnkey Systems	12	17	14	16	17	19	21	23	10
Applications Software Products	90	22	110	140	180	230	280	330	25
Systems Operations	0	0	0	0	0	0	0	0	0
Systems Integration	6	0	7	7	8	9	10	11	10
Professional Services	18	17	21	24	28	32	37	42	5
Network/Electronic Information Services	10	20	12	15	19	24	30	36	25
Systems Software Products	50	20	60	72	88	105	120	145	20

V
Other Europe

1. National Overview

The market designated as the Rest of Europe is valued at just over $1 billion for 1991. It primarily consists of three member countries of the EEC: Eire or (Southern) Ireland, Greece, and Portugal. Portugal and Greece have populations of around 10 million, whereas Ireland has only 3.5 million.

Portugal continued to experience GDP growth of nearly 4% in 1990, well above the European average of 2.8%. Inflation remained high at 13%, though the following forecasts assume that it falls to an average of 8% in the period to 1996.

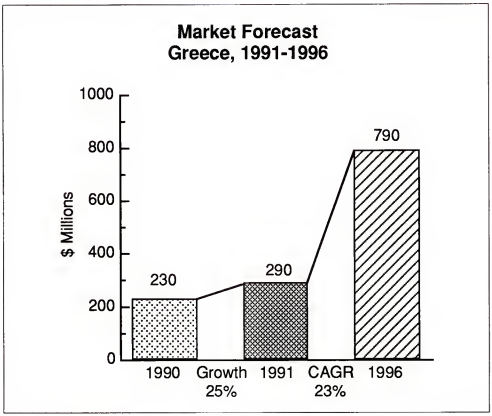
Greece is experiencing average GDP growth, but inflation in 1990 was a high 20%. For the purposes of these forecasts, this is assumed to fall to an average 12% between 1991 and 1996.

Ireland has unusually high unemployment rates of around 20%, but growth and inflation are close to the average for Europe. The government has actively encouraged investment in the software industry, especially in businesses with a European or global business mission.

2. Information Services Market Forecast

The information services market is healthy in all three countries. The following exhibits give forecasts based on available economic data for each country. Portugal is expected to grow overall from $120 million in 1991 to $290 million by 1996, a CAGR of 20%. In the same period, Greece will increase at a 23% CAGR from $290 million to $790 million, while Ireland is forecast to grow from $640 million to $1,200 million, a CAGR of 13%.

EXHIBIT VIII-78



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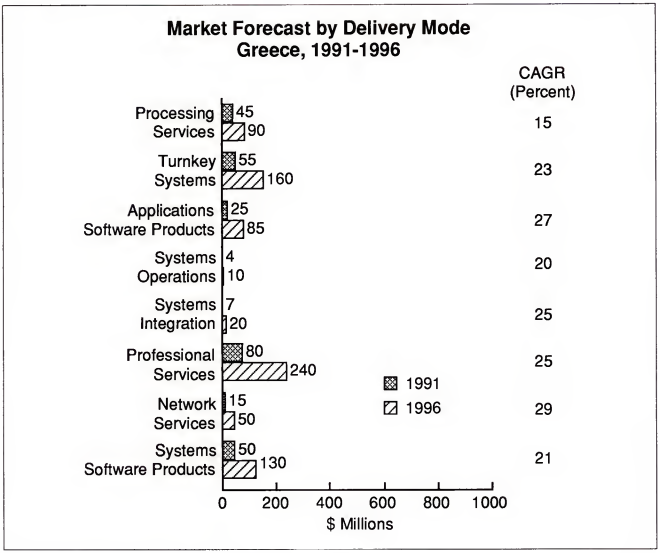


EXHIBIT VIII-80

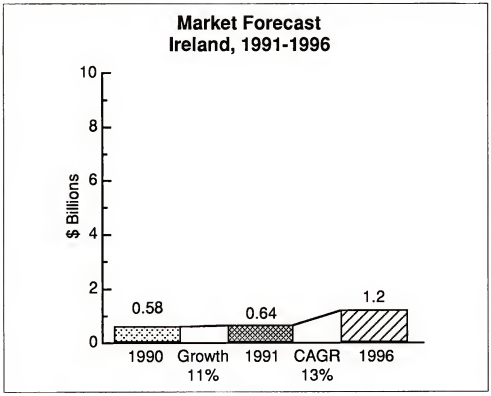


EXHIBIT VIII-81

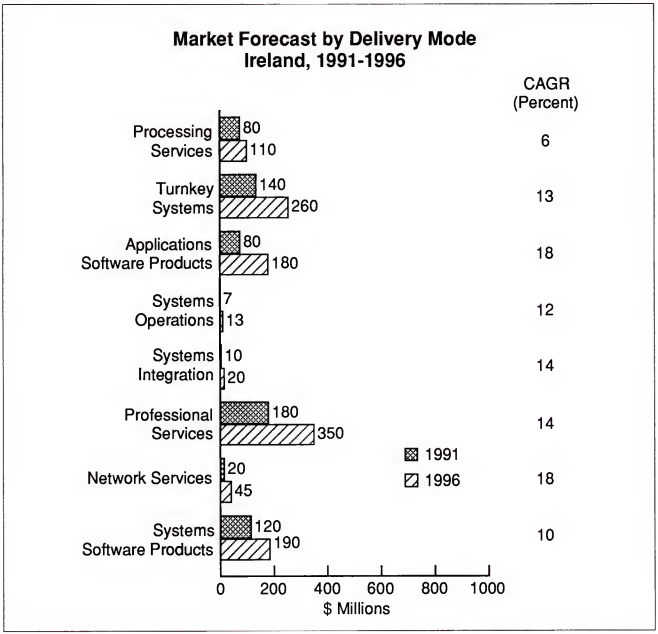
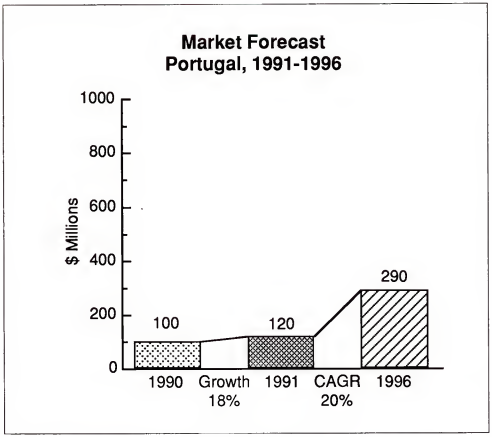


EXHIBIT VIII-82



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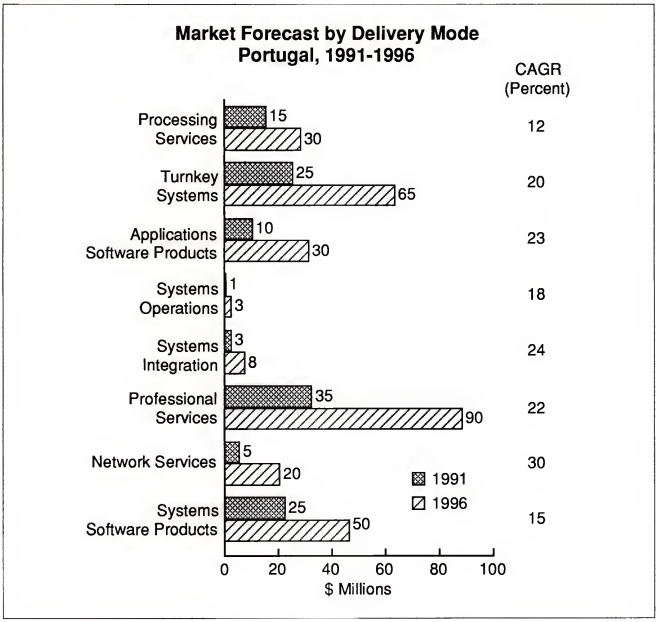


EXHIBIT VIII-84

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Greece

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Greece Information Services Market	230	25	290	350	430	530	640	790	23
Processing Services	37	20	44	52	58	68	77	90	15
-Transaction Processing Services	32	20	38	45	51	60	69	80	16
-Utility Processing	2	17	2	4	3	3	3	3	11
-Other Processing	3	20	3	4	5	5	6	7	15
Turnkey Systems	46	23	57	70	87	106	130	160	23
-Equipment	24	19	29	34	41	50	60	71	20
-Applications Software Products	8	29	10	13	17	21	27	34	27
-Systems Software Products	3	22	3	4	5	5	6	7	19
-Professional Services	11	30	15	19	24	30	37	47	26
Applications Software Products	21	26	26	33	42	53	68	86	27
-Mainframe	3	10	3	3	4	5	5	5	10
-Minicomputer	6	18	7	9	11	14	17	21	23
-Workstation/PC	11	35	15	20	26	34	46	60	31
Systems Operations	3	20	4	5	6	7	9	10	20
-Platform Systems Operations	2	17	2	3	3	3	4	5	19
-Applications Systems Operations	2	23	2	3	3	4	5	5	21
Systems Integration	6	26	7	9	11	13	16	21	25
-Equipment	3	21	3	4	4	5	6	7	17
-Applications Software Products	0	33	0	0	0	1	1	1	30
-Systems Software Products	0	17	0	0	0	0	0	0	19
-Professional Services	3	29	3	4	6	7	9	12	30
-Other Services	0	20	0	0	0	0	0	0	15
Professional Services	62	28	80	100	128	156	196	244	25
-Consulting	7	25	9	10	13	15	17	21	20
-Software Development	49	29	63	80	103	126	160	200	26
-Education and Training	7	25	9	10	13	15	19	23	22
Network Services	11	32	14	18	23	30	40	51	29
-Electronic Information Services	8	29	10	13	16	20	26	31	25
-Network Applications	3	40	4	5	7	10	14	20	38
Systems Software Products	43	18	51	63	74	89	108	131	21
-Mainframe	23	13	26	29	31	35	40	44	11
-Minicomputer	13	22	16	21	25	31	38	47	24
-Workstation/PC	7	31	10	13	17	23	30	40	33

EXHIBIT VIII-85

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Ireland

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Ireland Information Services Market	580	11	640	710	800	910	1,020	1,170	13
Processing Services	75	5	79	83	89	93	97	103	6
-Transaction Processing Services	61	3	63	65	69	71	73	77	4
-Utility Processing	2	0	2	2	2	2	2	2	0
-Other Processing	12	17	14	16	18	20	22	24	11
Turnkey Systems	126	11	140	160	176	201	231	258	13
-Equipment	71	9	77	85	91	101	112	122	10
-Applications Software Products	20	20	24	28	33	39	47	55	18
-Systems Software Products	6	0	6	8	8	8	10	10	11
-Professional Services	28	14	33	39	45	53	63	71	17
Applications Software Products	71	14	81	97	110	134	158	185	18
-Mainframe	10	0	10	10	10	10	10	10	0
-Minicomputer	20	10	22	26	28	33	37	43	14
-Workstation/PC	41	20	49	61	71	91	112	132	22
Systems Operations	6	9	7	8	9	10	11	13	12
-Platform Systems Operations	4	10	5	5	6	7	8	9	13
-Applications Systems Operations	2	9	2	3	3	3	4	4	11
Systems Integration	9	12	10	11	13	14	16	19	14
-Equipment	4	6	4	4	5	5	5	6	9
-ApplicationsSoftware Products	1	33	1	1	1	1	1	2	15
-Systems Software Products	1	0	1	1	1	1	1	1	11
-Professional Services	4	17	4	5	6	7	8	10	18
-Other Services	0	0	0	0	0	0	0	0	25
Professional Services	158	13	183	207	233	270	306	355	14
-Consulting	20	10	22	24	28	30	35	39	12
-Software Development	122	17	142	162	183	213	243	284	15
-Education and Training	16	13	18	20	22	26	28	33	12
Network Services	14	29	18	20	24	28	34	43	18
-Electronic Information Services	10	20	12	14	16	18	20	24	15
-Network Applications	4	50	6	6	8	10	14	18	25
Systems Software Products	112	7	120	132	142	154	170	189	10
-Mainframe	61	0	61	63	63	63	65	65	1
-Minicomputer	30	13	35	39	43	49	53	61	12
-Workstation/PC	20	20	24	30	37	43	53	63	21

EXHIBIT VIII-86

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Portugal

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Portugal Information Services Market	100	18	120	420	170	270	240	290	20
Processing Services	15	10	16	18	21	23	26	29	12
-Transaction Processing Services	13	10	14	16	19	20	23	26	13
-Utility Processing	1	10	1	1	1	1	1	1	8
-Other Processing	1	10	1	2	2	2	2	2	12
Turnkey Systems	22	17	26	31	38	45	53	64	20
-Equipment	12	16	14	16	18	20	24	27	15
-Applications Software Products	4	25	5	6	8	10	12	15	26
-Systems Software Products	1	15	1	2	2	2	3	3	16
-Professional Services	5	22	7	8	10	12	15	19	23
Applications Software Products	9	24	11	14	17	22	26	32	23
-Mainframe	1	6	1	1	1	2	2	2	7
-Minicomputer	3	20	3	4	5	6	7	8	20
-Workstation/PC	5	29	7	9	11	14	17	22	27
Systems Operations	1	20	1	2	2	2	3	3	18
-Platform Systems Operations	1	20	1	1	1	1	1	2	19
-Applications Systems Operations	1	20	1	1	1	1	1	2	18
Systems Integration	2	22	3	4	4	5	7	8	24
-Equipment	1	19	1	1	2	2	2	3	18
-Applications Software Products	0	27	0	0	0	0	0	0	29
-Systems Software Products	0	18	0	0	0	0	0	0	22
-Professional Services	1	28	1	2	2	3	4	5	28
-Other Services	0	20	0	0	0	0	0	0	15
Professional Services	27	20	33	40	49	59	72	89	22
-Consulting	4	17	4	5	6	7	9	11	19
-Software Development	20	21	25	30	37	45	55	68	22
-Education and Training	3	20	4	5	5	7	8	10	22
Network Services	4	29	6	7	9	12	17	21	30
-Electronic Information Services	3	24	4	5	6	7	9	11	24
-Network Applications	1	42	2	2	3	5	7	10	43
Systems Software Products	20	16	23	27	32	37	41	47	15
-Mainframe	10	9	11	12	14	14	15	16	8
-Minicomputer	6	20	7	9	11	13	15	17	18
-Workstation/PC	3	25	4	5	7	9	11	14	26

W
Other Latin America

1. National Overview

The remainder of the region of Latin America consists of many smaller countries and economies such as Panama, El Salvador, Peru, and Columbia. Although each country has some information services activity, each is relatively modest on its own. Only Chile might be considered a market of some size and stability.

Most if not all of these countries suffer from economic instability, some level of civil unrest and inflationary problems of significant magnitude. All of these are inhibiting factors in the development of the local information services industry and to entry by international vendors.

Some improvement in stability was recorded in 1991 in some of the countries. If it proves lasting, these countries will develop into attractive secondary markets for the information services vendors gaining success in the larger Latin American countries.

2. Information Services Market Forecast

Taken in total, the Other Latin America region represents revenues of $630 million in 1991, which will grow at 18% to $1.4 billion in 1996, as shown in Exhibit VIII-87. This growth rate presumes continued progress in the creation of stable, balanced economies and improved conditions that will attract international vendors.

Exhibit VIII-88 provides the forecast by delivery mode. Exhibit VIII-90, at the end of this profile, provides the detail behind this forecast.

Chile, while still a small market, does have a number of well-established vendors. They are listed in Exhibit VIII-89.

EXHIBIT VIII-87

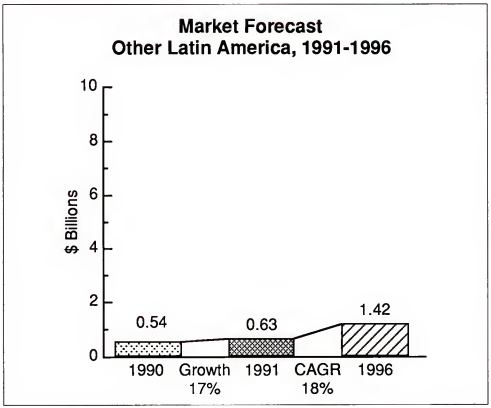


EXHIBIT VIII-88

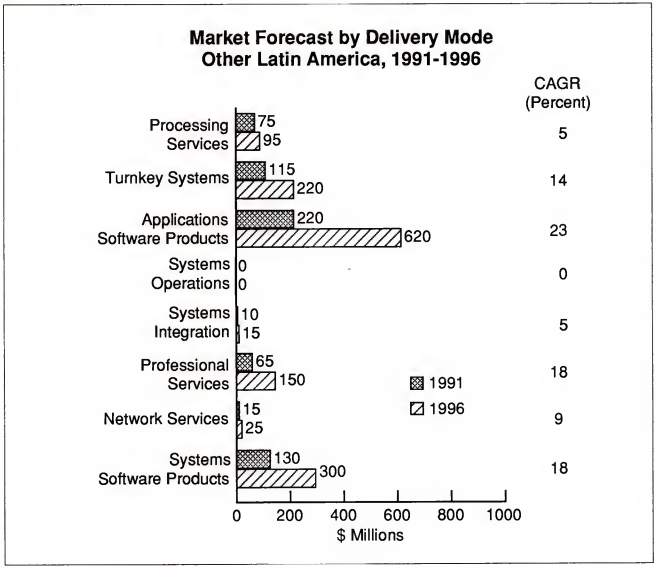


EXHIBIT VIII-89

Selected Vendors by Delivery Mode
Chile, 1990

Vendor	Processing/ Network Services/ Systems Operations	Professional Services/ Systems Integration	Software Products	Turnkey Systems
Abesco	x	x		
Asicom		x	x	
Edicon	x			
Entel	x			
Logica	x	x		
Orden	x		x	
Sinapsis	x		x	
Siscom			x	
Sisteco			x	x
Sonda	x	x	x	x
Tecnos	x			

EXHIBIT VIII-90

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Other Latin America

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Other Latin America Information Services Market	537	17	629	743	879	1,041	1,224	1,421	18
Processing Services	70	6	74	77	80	85	90	95	5
Turnkey Systems	100	15	115	130	150	175	190	220	14
Applications Software Products	180	22	220	275	340	420	520	620	23
Systems Operations	0	0	0	0	0	0	0	0	0
Systems Integration	9	11	10	10	11	12	13	13	5
Professional Services	55	18	65	80	95	110	130	150	18
Network Services	13	15	15	16	18	19	21	23	9
Systems Software Products	110	18	130	155	185	220	260	300	18

X
Singapore

1. National Overview

The market situation in Singapore remains relatively unchanged from the 1990 report. The economy of Singapore remains reasonably strong and is benefiting from the concerns in Hong Kong.

Singapore is a leading country in the Asia/Pacific area and vies with Hong Kong as the financial center of Southeast Asia. Politically, Singapore has been one of the more stable countries in the region. However, there are recurring difficulties that could affect its stability over the next several years.

Following years of being in a highly controlled environment, an increasing number in the growing, affluent middle class have been seeking an increased role in the country's development policies and increased freedom. This tightly governed nation may have to ease controls to continue its record of success and growth.

In the approximately thirty years since its independence, Singapore has developed from a minor country with fewer than three million people on an island of approximately 200 square miles into a major trading nation.

Singapore is one of the more developed countries in Asia and is the leading country in Southeast Asia. Its economy is heavily dependent on the direction of the U.S. economy.

A key event within the next few years will be the transition of power from Mr. Lee, who has maintained exceptionally strong control, to his successor. The ability of his successor to balance traditional policies and values with the changing values of the middle class and demands for increased freedoms will set the stage for continued growth or for a period of disruption in the development process.

Key trends in the development of the information services infrastructure in Singapore include the following:

- *Regional technology center*—With the stimulus of the government, Singapore has been working aggressively to become the technology center of Southeast Asia. Significant investment is being made in education and to provide the technological infrastructure to ensure development.

- *Network services hub*—Because Singapore serves as a financial and manufacturing hub, it is logical for it to develop the ability to provide interconnection with worldwide information network services. The country has a national objective: to replace Hong Kong as the center for telecommunications services in Southeast Asia.

- *Software development center*—With a high concern for education and development of skilled jobs, Singapore is implementing a program to speed the creation of a software development industry. There are government incentives, and investment in education and training is encouraged by the government.

- *High-tech manufacturing*—This country is well established as a center for the manufacture of computer components, which provides it with links to major computer firms in the U.S. and Europe.

a. Driving Forces

Driving forces impacting the economy and information services industry include:

- *Regional growth*—Overall growth in the region has a significant effect on the information services market. It is a key part of the industrial sector and quickly impacted by changes in the economic environment.

- *Educational quality*—National emphasis on education and the resultant highly educated population helps to attract high-technology firms. This is a major advantage over other countries in Southeast Asia.

- *Free-port country*—As a free-port country there are no duties on technology products. This stimulates the use of computing capabilities by local industry and government organizations.

- *Software law*—The recently passed copyright law removes a concern about piracy and brings this market into the international software products market.

b. Inhibiting Factors

- *Labor costs*—This very successful economy now has labor costs above most of its neighboring countries.

- *Labor supply*—Singapore is a small country with a limited labor supply, which is causing higher labor costs.

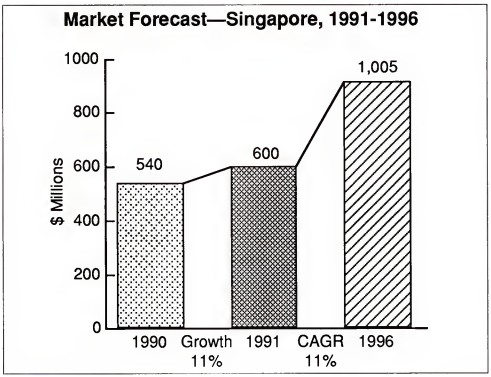
- *Political transition*—There is some concern that political instability will occur in this decade as the long-time leader relinquishes control.

2. Information Services Forecast

INPUT has lowered its forecast for this market in the near term, based on 1991 research, from a growth rate of 18% per year to 11% for the 1991-1996 period. Concern that the market may be becoming saturated is the primary reason.

Exhibit VIII-91 provides the overall forecast. Exhibit VIII-92 provides the forecast by delivery mode and VIII-94, at the end of this profile, gives the detail behind this forecast.

EXHIBIT VIII-91



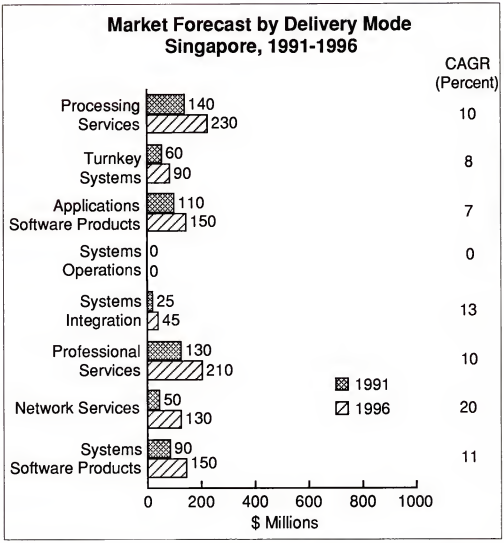
All of the delivery mode forecasts have been reduced, with only network services expected to exhibit above-average growth of 20%. Professional services and systems integration will see steady growth, continuing Singapore's tradition of developing customized solutions.

The growth in the applications software products and turnkey systems areas are primarily at the personal computer and LAN levels.

3. Market Considerations

Local presence is an absolute requirement in the Singapore information services market. Entry is relatively easy, as there are few legal or financial restrictions. There are a number of well-established distributors for software products that have quality support reputations, and a new copyright law provides enhanced protection.

EXHIBIT VIII-92



There is a strong interest in customizing systems in this market, giving rise to an established professional services industry.

The Singapore government does have a number of very strict business regulations that apply to local and international companies. It is a highly disciplined environment, requiring time to develop and gain acceptance.

The market is big enough to offer affordable opportunities, but which must often be taken through a local relationship, except for the largest vendors. Exhibit VIII-93 lists local vendors identified in INPUT's 1991 research and the delivery modes in which they are active.

As would be expected, a number of major international computer manufacturers are present and offering software products and services in the Singapore market. Included are IBM, DEC, HP, Computer Associates, Microsoft, Fujitsu, NEC, Xerox, and Hitachi Data Systems. This is one country market in which a number of Japanese vendors have a presence.

EXHIBIT VIII-93

Selected Vendors by Delivery Mode
Singapore, 1990

Vendor	Processing/ Network Services/ Systems Operations	Professional Services/ Systems Integration	Software Products	Turnkey Systems
Acer			x	
Asian Computer Services	x	x		
CAD-IT Consultants				x
Computer Engineering Systems	x			
Datamini		x		
Digitech	x			
Ermca-Wonny		x		
IPC	x			
Samsung			x	
Singapore Computer Systems				x
Singapore Technologies	x			
Sonica	x			
Syspro Systems				x
Unify Software		x		

EXHIBIT VIII-94

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Singapore

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Singapore Information Services Market	542	11	602	671	741	821	917	1,005	11
Processing Services	130	12	145	160	175	190	210	230	10
Turnkey Systems	55	9	60	65	70	76	82	90	8
Applications Software Products	90	17	105	112	120	130	140	150	7
Systems Operations	0	0	0	0	0	0	0	0	0
Systems Integration	22	9	24	27	31	35	40	45	13
Professional Services	120	8	130	142	155	170	190	210	10
Network/Electronic Information Services	45	11	50	70	85	100	120	130	20
Systems Software Products	80	10	88	95	105	120	135	150	11

Y
South Korea

1. National Overview

South Korea remains one of the fastest growing economies in the Asia/Pacific area and worldwide. It is one of the Four Tigers (Hong Kong, South Korea, Singapore and Taiwan). It is a leader in industrial development and is becoming a force in the information technology area.

The country has an economy built on exportation that has moved from low-cost goods to automobiles and information technology components. Korea has become a champion at automating industrial production and is successfully expanding its worldwide trade presence.

South Korea's population is over 43 million, and the economy continues to experience strong growth. The GDP grew over 7% in 1990, following a 6.3% increase in 1989.

In the past two years export growth has started to drop, but still remains a favorable impact on the overall economy. South Korea has escaped much of the industrial slowdown caused by recessions in the U.S. and Europe. And while there has been some governmental unrest, there is general stability as the South Korean government approaches North Korea about improved, closer relationships.

Key areas of information technology activity currently include:

- *UNIX*—The acceptance of UNIX is quite strong, supported by the success of workstation technology in industry and the ever-increasing use of CAD/CAM technology.

- *Shift to distributed IS*—As in many other countries, the highly centralized information systems organization is starting to give way to decentralized structures and the use of newer, downsized computing technology.

- *Networking*—Most CAD/CAM workstations and PCs are connected to multilevel networks providing access to information at each level. Most IS architectures are multilevel, using mainframes, minicomputers and PCs as processors. The final level is a PC or workstation acting as an intelligent terminal. There is very little use of LAN technology at this time.

a. Driving Forces

Driving forces behind the changes and growth in the information services market in South Korea continue to include:

- *Industrial modernization*—Industrial growth is the foundation for the economic growth and success in the world market for South Korea. This success has come from intense use of automation, which requires progressive use of information technology.

- *Network development*—The government is deregulating the network services market, permitting it to experience greater growth and competition.

- *Decentralization*—Many organizations are being forced to decentralize to achieve necessary control as they become much larger. As authority is pushed down, automation necessary for control is being implemented.

b. Inhibiting Forces

Working against the driving forces are a number of inhibiting forces.

- *Political uncertainty*—Politcal stability continues to be a long-term question. Efforts to improve ties with North Korea and to balance the internal factions lead to periodic demonstrations and disruptions.

- *Language requirement*—The Korean language, like Japanese, creates unique computing requirements that affect the use of imported information systems.

- *Shortage of IT professionals*—As in all fast-developing countries, the ability to develop enough information systems professionals is lacking. The government has placed a high priority on this requirement and is funding IT education.

- *Self-sufficiency*—The general tendency of the larger Korean businesses is to be self-sufficient and not to rely on outside expertise.

- *Software piracy*—In spite of new laws, software piracy remains a deterrent to importation of software from the U.S. and other countries.

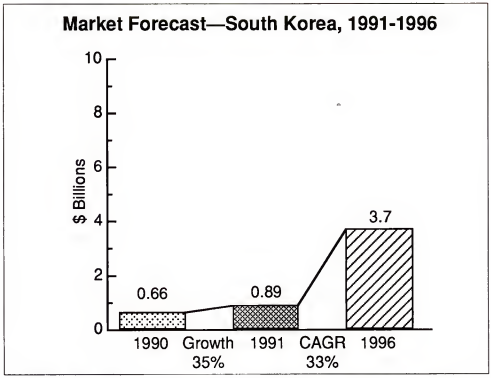
2. Information Services Market Forecast

Exhibit VIII-95 shows that the market for information services in South Korea continues to grow very rapidly. It is quickly approaching $1 billion in size and is projected to reach $3.7 billion by 1996.

Exhibit VIII-96 provides the forecast by delivery mode. Exhibit VIII-98, at the end of this profile, provides the detail behind this forecast.

In a market of strong growth projected at 33% compounded average growth over the next five years, every delivery mode offers opportunities.

EXHIBIT VIII-95



- Some of the strongest growth will be experienced in turnkey systems and applications software products. For buyers to keep up with new technology, they must buy more of the solution.

- For turnkey systems vendors, the solutions offered are typically PC based and use locally developed and customized software.

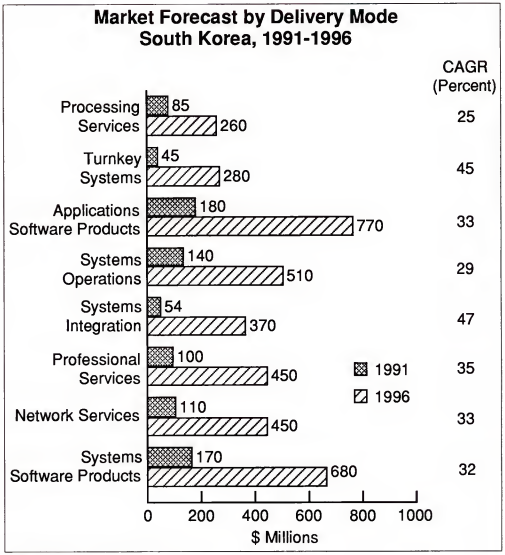
- The software products market size was increased for 1991, following the unbundling of some software and services by IBM in the South Korean market. Projected growth is generally unchanged at about 32% CAGR through 1996.

- Professional services is also getting increasing attention. The decline in hardware prices and revenues is impacting hardware vendors in South Korea, as they are elsewhere, and causing a shift in focus. INPUT increased its growth projection to 35% for professional services, based on larger vendor plans and a belief that larger companies are becoming more accustomed to using outside services.

- The same belief exists for systems integration. The reliance of major corporations on automation will continue to drive opportunities to implement expansive systems and technology.

- As previously mentioned, the deregulation of the network services market is expected to permit much improved growth. By 1996, the market is expected to reach $450 million in expenditures.

EXHIBIT VIII-96



3. Market Considerations

Entry into the South Korean market can be difficult because the government protects favored industries. The two sectors for which there is demand and limited protectionism are software and professional services. Although there remains the cloud of piracy, the software products market is attractive.

In the systems software products segment there are a number of highly regarded distributors. Distribution agreements are the favored method of marketing.

As the list of local vendors suggests, there are a number of companies with which relationships can be formed. Exhibit VIII-97 lists the leading information services vendors in South Korea. Of the top 20 vendors only four are international (U.S.)-based firms. The other 16 are all local South Korean firms.

EXHIBIT VIII-97

Leading Information Services Vendors
South Korea, 1990

Vendor	Revenue ($ Billions)	Market Share (Percent)
DACOM	100	15
IBM	95	14
STM	75	11
KOSCOM	70	11
Samsung Data Systems	35	5
Ssangyong Computer	21	3
POSDATA	18	3
Unisys	18	3
Goldstar	17	3
Fujitsu	15	2
Korea Information Systems	14	2
Hewlett-Packard	13	2
DEC	12	2
Union Systems	11	2
Hyosung Data Systems	8	1
Daewoo Information	8	1
KICO	7	1
Sammi	7	1
New Computer Service	5	1
Seoul Systems	5	1

EXHIBIT VIII-98

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
South Korea

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total South Korea Information Services Market	658	35	888	1,192	1,582	2,118	2,842	3,760	33
Processing Services	70	21	85	105	130	165	208	264	25
-Transaction Processing Services	40	33	53	71	94	125	166	220	33
-Utility Processing	15	7	16	17	18	20	21	22	7
-Other Processing	15	7	16	17	18	20	21	22	7
Turnkey Systems	30	43	43	61	89	130	191	275	45
-Equipment	17	41	24	34	47	67	94	130	40
-Packaged Software Products	5	20	6	7	9	11	13	15	20
-Professional Services	8	63	13	20	33	52	84	130	58
Applications Software Products	136	35	184	248	335	453	611	770	33
Systems Operations	105	35	142	192	250	310	390	510	29
Systems Integration	37	46	54	79	116	170	252	368	47
-Equipment	15	47	22	32	45	65	94	135	44
-Packaged Software Products	4	50	6	9	14	20	30	45	50
-Professional Services	16	50	24	36	55	83	126	186	51
-Other Services	2	0	2	2	2	2	2	2	0
Professional Services	71	41	100	137	182	245	335	450	35
-Consulting	17	76	30	45	65	90	125	175	42
-Software Development	10	30	13	17	22	30	45	60	36
-Education and Training	44	30	57	75	95	125	165	215	30
Network Services	82	34	110	150	200	265	345	450	33
-Electronic Information Services	60	33	80	110	145	190	245	315	32
-Network Applications	22	36	30	40	55	75	100	135	35
Systems Software Products	127	34	170	220	280	380	510	673	32
-Systems Control	60	33	80	103	135	180	240	315	32
-Operations Management	22	36	30	36	40	52	70	88	24
-Applications Development	45	33	60	81	105	148	200	270	35

Z
Spain

1. National Overview

Spain has a population of over 39 million in a land area of over 500 thousand square kilometers, making it the second largest country in Europe after France.

Spain was one of the last countries to join the European Community (EC) in 1986. Since then, the country has exhibited the most expansive economy among the larger nations of the community, although it is catching up from a less developed position within the club of industrial nations.

The Spanish gross domestic product (GDP) rose in real terms by 3.6% in 1990, compared to a 5.2% growth in 1989. This increase in GDP was in the face of persistently high inflation (at 6.7% in 1990 compared with 6.8% in 1989), which resisted government and central bank attempts to reduce it significantly by the maintenance of high interest rates.

The Spanish economy has started to feel the effects of the current recessionary climate. Car sales, for instance, at the start of 1991 were 20% down from those of a year previously. Nevertheless, the economy is expected to grow by at least 2.5% in real terms in 1991. Unemployment in Spain at 16% is one of the highest rates in Europe, but has started to fall—it was 16.9% in 1989.

Since the country joined the ERM (Exchange Rate Mechanism) of the European Monetary Union (EMU) in 1986, the Spanish currency, the peseta, has persisted in trading at the top of its allowable 6% band, making it the strongest currency in the ERM "basket of currencies." This has been caused by the strong growth in the economy. Because of the country's high inflation it is difficult for the government to curb the current strength of the peseta by lowering interest rates. Meanwhile, the country's balance of payments worsens as imports grow faster than exports.

The main centers of wealth in Spain are Madrid, the capital, and Barcelona, the provincial capital of Catalonia, a province which has its own fiercely guarded Catalan language. The Madrid region has a population of 4.9 million, Barcelona has 4.6 million, and Catalonia as a whole has over 6 million. Seville is the third largest city, with a population of over one and a half million in its conurbation.

A big influx of visitors to Spain—with Barcelona hosting the 1992 Olympic Games in the summer and Seville the World Expo '92—is expected throughout most of 1992. Spaniards see all this as only just and fitting after their years under the Franco regime. It is all in line with their determination to become a major nation and economy in Europe in the 1990s. The danger seen by political and business leaders is one of overconfidence, with no signs of inflation being cured and the lending and spending spree still fueling the domestic money supply.

2. Information Services Market Forecast

The information services industry in Spain is sharing in the generally strong growth of the economy. INPUT forecasts that the Spanish market will reach over $2.7 billion in 1991, and will grow at an average of 18% per annum to reach approximately $6.3 billion by 1996 (see Exhibit VIII-99).

EXHIBIT VIII-99

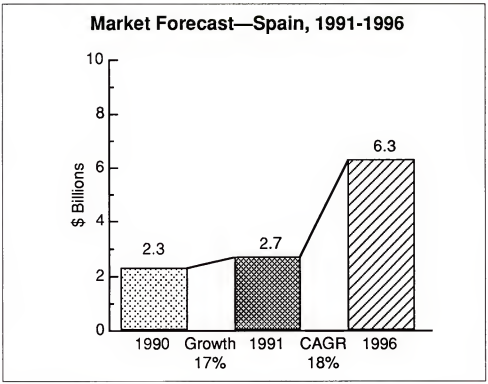
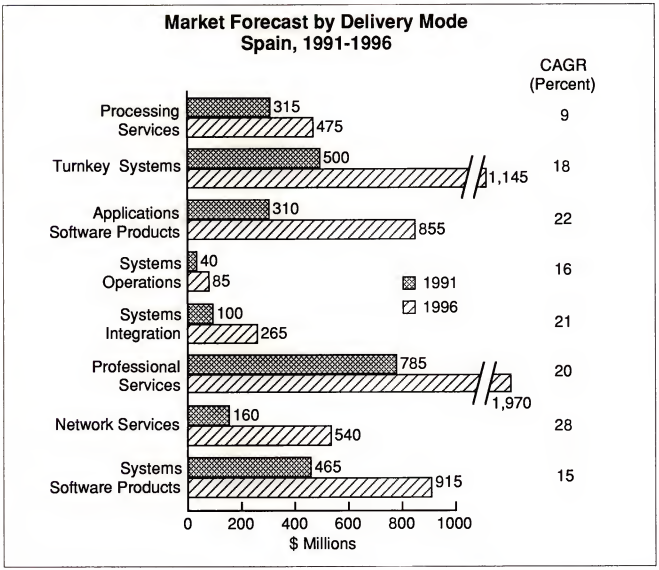


Exhibit VIII-100 shows the detailed forecast by INPUT delivery mode.

The Spanish market is strong in professional services and turnkey systems, and processing services and applications software exhibit strong markets behind the third largest component, systems software.

EXHIBIT VIII-100



The main opportunity markets (all with forecast growth rates of over 20%) are in network services, applications software and systems integration, as well as in the information systems consultancy and custom software development elements of the professional services sector.

Processing services constitutes some 12% of the 1991 market, which is equal to the Western European average but is forecast to grow faster (at 9%) than the Western European market (7%). Processing services in Spain are still important especially in the financial services sectors of banking, securities and insurance.

Turnkey systems has always been a strong sector in Spain due to the number of small systems platforms being sold into the country's large number of relatively small companies. It is expected to continue with good growth as many small enterprises install their first company systems. Average prices for new installations are expected to fall.

Applications software in Spain is a strong market at the lower end of the system price range, where multiuser or networked microcomputers are being installed with proprietary software products from multinational vendors. The attractiveness of the pre-built solution is likely over the forecast period to increase in the mainframe and minicomputer sectors, as open systems based on UNIX and networks are installed to replace older and larger systems (downsizing).

Systems software products shows a 15% CAGR—a higher growth rate than the Western European average of 11%—representing the standard software component of the country's rapidly growing installed base.

All three elements of the professional services sector show good growth rates. This sector will by 1996 have reached the same level of penetration as the overall Western European market (32%), whereas now (1991) it only represents 29% of the Spanish market. The propensity of Spanish companies to opt for a custom-developed solution will only give way slowly to the use of pre-built application products.

Network services is expected to show the highest growth rate (28%) over the five-year period of any of the subsectors. Electronic information (EI) services and network applications are forecast to grow faster than the overall Western European average. In both cases the use of the services is less highly developed in Spain than in the larger country markets, but Spain is intent on catching up in this and many other areas. The public telecommunications operator (PTO), Telefonica SA, is making considerable investments in the country's infrastructure and also has a strong presence in the software and services industry.

Systems operations is less favored in Spain than in the more advanced markets of Northern Europe. It is expected to grow at a relatively modest rate (for Spain) of 16%, with public sector contracts likely to be the most promising opportunities.

Systems integration, on the other hand, is all the rage at the present time in Spain. Its growth rate of 21% is above the WE average of 19% and would probably be larger except that the equipment component is subject to the impact of downsizing.

3. Market Considerations

Exhibit VIII-101 lists the top ten vendors in the Spanish market as measured by their 1990 (or equivalent 1990) revenues. It has been compiled using only the software and services revenues attributable to the domestic market in Spain, and excludes exports and revenues gained from any parent group companies.

EXHIBIT VIII-101

Leading Information Services Vendors
Spain, 1990

Vendor	Country of Origin	Estimated Sector Revenues ($ Millions)
IBM	U.S.	200
Eritel	Spain	150
Andersen Consulting	U.S.	147
Siemens-Nixdorf	Germany	118
Logic Control	Spain	97
CISI	France	66
Software AG	Germany	58
Reuters	U.K.	54
Ibermatica	Spain	52
Sema Group	France	48

As in most other countries, IBM heads the list in software and services revenues, strongly assisted by its large component of systems software product revenues. IBM's strengths in Spain include also PC-level product sales, systems integration, processing and network services.

Eritel is now the largest of the indigenous computer services vendors, having been formed as a merger of Entel and Eria, the latter having previously acquired a third company, Ceninsa, of comparable size. Eritel is owned by the INI state holding company and Telefonica, the Spanish PTO. Its strategic thrusts are in the areas of systems integration, consultancy and other professional services.

Andersen Consulting, placed third, is an active participant in the professional services, systems integration and software product sectors.

Of the remaining seven vendors listed only two—Logic Control, a market leader in the standard microcomputer hardware and software markets, and Ibermatica, which is part-owned by Eritel and specializes in financial services applications—are Spanish-owned. The dominance of foreign vendors (two German, two French and one British besides the two U.S.) illustrates the eagerness of the large players in Europe to participate in the buoyant Spanish market.

EXHIBIT VIII-102

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Spain

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Spain Information Services Market	2,280	17	2,670	3,170	3,750	4,450	5,290	6,250	18
Processing Services	287	9	314	343	373	402	437	473	9
-Transaction Processing Services	245	9	268	295	321	347	379	411	9
-Utility Processing	19	6	20	21	22	23	24	25	5
-Other Processing	23	9	25	27	30	32	34	37	8
Turnkey Systems	421	18	498	593	708	836	985	1,145	18
-Equipment	221	14	253	295	337	379	432	484	14
-Applications Software Products	74	26	93	116	147	184	226	274	24
-Systems Software Products	26	16	31	35	40	46	54	61	15
-Professional Services	100	22	122	147	184	226	274	326	22
Applications Software Products	256	22	313	382	469	576	699	854	22
-Mainframe	31	7	33	35	37	39	41	43	6
-Minicomputer	81	19	97	116	138	168	195	232	19
-Workstation/PC	144	27	183	232	295	368	463	579	26
Systems Operations	35	17	41	47	55	63	73	85	16
-Platform Systems Operations	17	16	19	23	27	31	35	41	16
-Applications Systems Operations	18	18	21	24	28	33	38	44	16
Systems Integration	84	20	101	122	148	179	215	263	21
-Equipment	37	11	41	47	55	63	73	84	15
-Applications Software Products	2	30	3	4	5	7	9	11	28
-Systems Software Products	2	36	3	4	5	6	8	10	26
-Professional Services	40	29	52	64	80	99	121	153	24
-Other Services	2	10	2	3	3	4	4	5	18
Professional Services	662	19	785	948	1,140	1,378	1,665	1,973	20
-Consulting	95	17	111	132	158	184	216	253	18
-Software Development	495	19	590	716	863	1,053	1,284	1,526	21
-Education and Training	73	17	85	101	119	141	165	194	18
Network Services	126	26	159	201	254	325	416	537	28
-Electronic Information Services	94	20	113	134	158	188	221	263	18
-Network Applications	33	42	46	67	96	137	195	274	43
Systems Software Products	408	14	464	532	605	695	800	916	15
-Mainframe	210	6	221	237	253	274	295	305	7
-Minicomputer	127	20	153	179	211	242	284	337	17
-Workstation/PC	72	26	91	116	142	179	221	274	25

AA
Sweden

1. National Overview

Sweden has a population of around 8.5 million and is a member of the European Free Trade Association (EFTA). Plans are under consideration for Sweden and other EFTA member countries to be incorporated as members of the European Community.

Sweden is the fifth largest software and services market in Western Europe, estimated at $3.4 billion in 1991.

Gross domestic product fell by 1.9% in the twelve-month period up to the end of quarter 2 1991, and fell by 2.9% in the three-month period prior to the end of quarter 2.

Uncertainty over the new government's economic plans caused the Stockholm share index to fall by 4.1% in one week in October 1991. Over the twelve-month period prior to this fall the Stockholm share index had risen by only 1.2% compared with a worldwide average of +14%.

A general election in Sweden on September 15, 1991 signalled a dramatic change occurring. The Social Democratic Party, which has been in power for all but six years out of the past 59, was replaced. This change has resulted in a four-party coalition being set up between the Moderate Party, the Liberals Centreparty and the Christian Democrats. The new Prime Minister is Mr. Carl Bildt, leader of the Moderate Party.

This recent election is claimed to herald a new era with rapid movement toward a free market economy. Between the time of the recent general election and 1994, when the next election is due, the government plans to hold a national referendum on full EC membership.

It is too early to predict, with any degree of accuracy, the likely effects of what is a fragmented government on the future economy of Sweden. However, confidence in reaching final agreement to join the EC seems apparent from study of the investment behavior of companies in the Nordic region. In three years, direct corporate investment in the EC by Sweden, Norway and Finland had risen from $5 billion in 1988 to almost $12 billion by 1990.

The largest Swedish companies that are listed among the European top 100 include Volvo and Saab-Scania, and the Swedish-Swiss company ASEA Brown Boveri (ABB).

2. Information Services Market Forecast

INPUT forecasts that the Swedish market for software and services will be almost $3.4 billion in 1991, growing at an average 15% per annum to $6.7 billion by 1996 (see Exhibit VIII-103).

EXHIBIT VIII-103

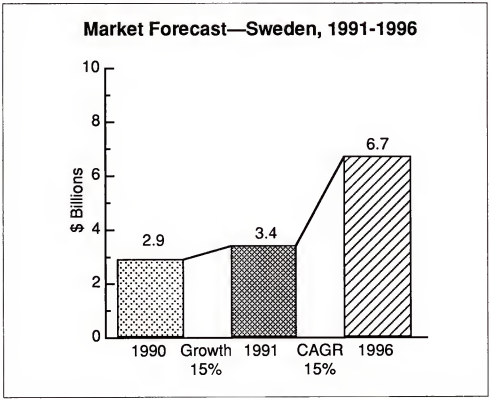
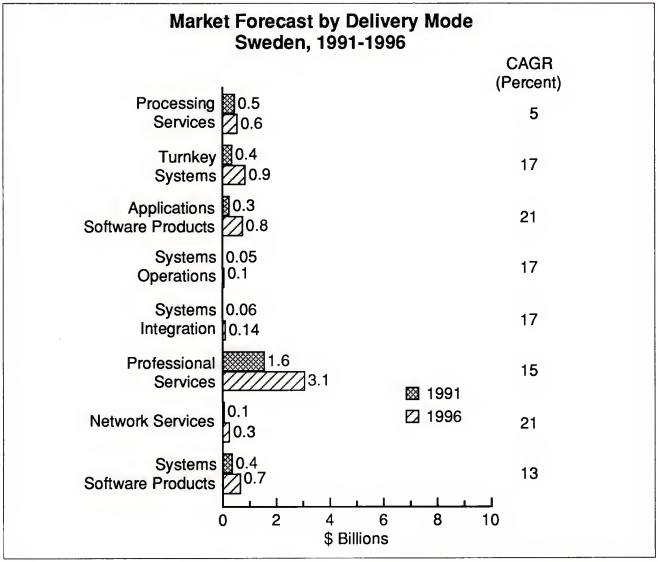


Exhibit VIII-104 provides a detailed forecast by INPUT delivery mode. Professional services forms the largest sector of the Swedish software and services market, accounting for over 45% of the total in 1991. This factor indicates the strength of the professional services market in Sweden when compared with the overall European average figure for professional services market share of 32%.

Software development services comprise the largest portion of the Swed ish professional services market, accounting for about 82% of total user expenditure for professional services. The primary growth opportunities in the Swedish market lie in the areas of application solutions, especially software products, workstation and PC applications and system software, and network applications.

EXHIBIT VIII-104



3. Market Considerations

Exhibit VIII-105 lists the leading ten software and services vendors in the Swedish market during 1990. This listing was compiled using only the software and services revenues attributable to the domestic market within Sweden, excluding exports and excluding revenues from within any parent group companies or subsidiaries.

Unlike in most European country markets, the leading vendor, AB Programator, is an indigenous company. In most other European country markets, IBM is the leading provider of software and services; however, IBM is relegated to second place in the Swedish market.

EXHIBIT VIII-105

Leading Information Services Vendors Sweden, 1990

Vendor	Country of Origin	Estimated Sector Revenues ($ Millions)
AB Programator	Sweden	245
IBM	U.S.	195
Sapia	Sweden	185
Cap Gemini Sogeti	France	135
SKD Foretagen	Sweden	125
WM Data Nordic	Sweden	105
Enator	Sweden	105
Tietotehdas Nordic	Finland	62
Digital	U.S.	50
Lantbruksdata	Sweden	57

Of the leading ten software and services vendors in Sweden six are indigenous companies.

AB Programator is primarily active in the professional services sector and in 1990 achieved just over 80% of its IT revenues from this sector. The remainder of revenue was obtained from the processing services and systems operations sectors. In 1990, AB Programator acquired share holding in eight additional companies, three of which were in Sweden. The company has operations in six European country markets, including Sweden. The largest IT revenue contribution, however (83%), is derived from the Swedish market. In 1991, the overall revenue of AB Programator was reduced by just over 20%, primarily as a consequence of the company divesting its 50% shareholding in Datacentergruppen, a hardware distribution company.

In a move to counter decreasing revenue and margins from equipment sales, IBM is vigorously pursuing additional business in software and services. During 1991, IBM consolidated operations in the Scandinavian market by reorganizing these operations to report into a central office in the region. Further, IBM has been particularly successful in establishing a Europe-wide systems integration business, represented by its 20% share of the Swedish SI market.

The third largest software and services vendor in Sweden is Sapia AB. The key software and services activities of this company are in the areas of data processing services, consultancy and turnkey systems.

Cap Gemini Sogeti is the fourth largest supplier of software and services in Sweden. The strength of its presence in the Swedish market demonstrates its strong pan-European coverage in the software and services market. Cap Gemini Sogeti revenues derived from the Swedish market are estimated to account for almost 10% of its total European revenues.

The leading ten software and services vendors have between them about a 45% share of the total market.

EXHIBIT VIII-106

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Sweden

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Sweden Information Services Market	2,940	15	3,370	3,830	4,390	5,030	5,780	6,650	15
Processing Services	457	6	478	500	523	556	577	603	5
-Transaction Processing Services	419	4	437	455	472	499	517	535	4
-Utility Processing	9	4	9	10	10	10	11	11	3
-Other Processing	29	9	32	36	41	46	50	57	12
Turnkey Systems	343	15	405	467	544	640	752	881	17
-Equipment	178	15	205	223	250	285	321	357	12
-Applications Software Products	59	21	71	89	107	128	155	187	21
-Systems Software Products	24	11	27	30	34	39	45	52	14
-Professional Services	82	24	102	125	153	187	232	285	23
Applications Software Products	243	22	296	356	431	527	652	774	21
-Mainframe	31	3	32	33	36	38	41	43	6
-Minicomputer	71	20	86	100	119	141	166	196	18
-Workstation/PC	141	27	178	223	276	348	446	535	25
Systems Operations	41	17	48	57	67	78	90	103	17
-Platform Systems Operations	30	18	36	43	50	59	68	78	17
-Applications Systems Operations	11	17	12	14	17	20	22	25	15
Systems Integration	51	25	62	72	85	100	117	137	17
-Equipment	20	18	23	26	29	33	37	41	12
-Applications Software Products	2	30	2	3	4	5	6	8	28
-Systems Software Products	2	22	2	2	3	3	4	4	18
-Professional Services	27	27	34	40	48	58	69	82	19
-Other Services	1	0	1	1	1	1	2	2	15
Professional Services	1,366	15	1,564	1,790	2,068	2,365	2,701	3,100	15
-Consulting	143	16	166	187	223	259	303	357	17
-Software Development	1,132	14	1,292	1,480	1,702	1,943	2,210	2,531	14
-Education and Training	92	16	106	123	143	164	187	212	15
Network Services	105	17	123	148	178	216	265	323	21
-Electronic Information Services	71	11	79	89	100	112	128	144	13
-Network Applications	34	29	44	59	78	103	137	178	32
Systems Software Products	340	13	387	439	490	554	626	713	13
-Mainframe	196	9	214	232	241	259	276	303	7
-Minicomputer	87	16	102	118	137	157	178	205	15
-Workstation/PC	57	25	71	89	112	139	171	205	24

BB
Switzerland

1. National Overview

Switzerland has a population of 6.6 million and is a member of the European Free Trade Association (EFTA). There is an estimated immigrant population of about one million. The software and services market is the seventh largest in Europe, with a total size of $2.7 billion in 1991.

Inflation for Switzerland is forecast to average 3.3% through 1996. This is against a background of GDP growth falling from 3.5% in 1989 to 2.7% in 1990. Switzerland is no longer the generally stable autonomous economy it has been in the past.

Some vulnerability has appeared as interest rates and inflation rise, on occasion above those of nearby trading partners Germany and France. However, the economy still looks very healthy, the currency is strong, employment is high (for Swiss nationals), and the federal budget continues to show a surplus.

As Switzerland passes its 700th anniversary, it is negotiating terms of entry into the European Community. Economists are warning that investment in innovative new products and re-skilling the labor force must take priority if Switzerland is to retain its high competitive ranking in industrial Europe.

2. Information Services Market Forecast

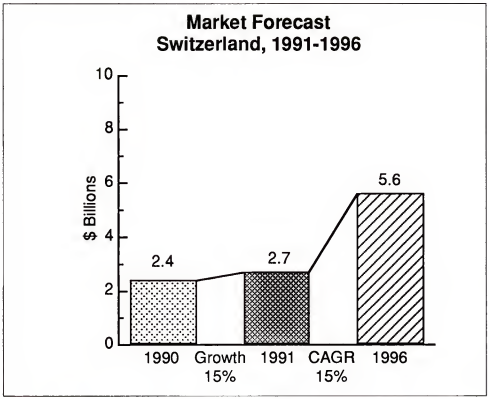
The Swiss software and services market is forecast by INPUT to grow from $2.7 billion in 1991 to $5.6 billion in 1996. This is an average annual growth rate of 15%, equivalent to that of the European market as a whole. This forecast is shown in Exhibit VIII-107.

Exhibit VIII-108 illustrates the breakdown of the market into INPUT's eight software and service delivery modes. As one would expect of a predominantly German-speaking nation, the pattern of business is very similar to Germany's, with turnkey sytems and application products larger than is usual.

3. Market Considerations

The top ten vendors in the Swiss market for 1990 are listed in Exhibit VIII-109.

EXHIBIT VIII-107



Three Swiss vendors feature in the list. Telekurs is by far the market leader. This domestically owned company is a major European electronic information services vendor to the banking and finance sector. It sells on-line financial information, trading systems, processing services and related professional services.

An association of largely Swiss banks own Telekurs, which is also responsible for the Swiss computer center where all payment transfers between Swiss banks are executed. Despite some difficulties with development projects during 1989, the company had overall revenues of around $180 million in 1990.

Fides Informatics is part of the Fides Group, which also includes a trust division and a management consultancy. The company specializes in banking, insurance, health care, communications and industrial automation.

EXHIBIT VIII-108

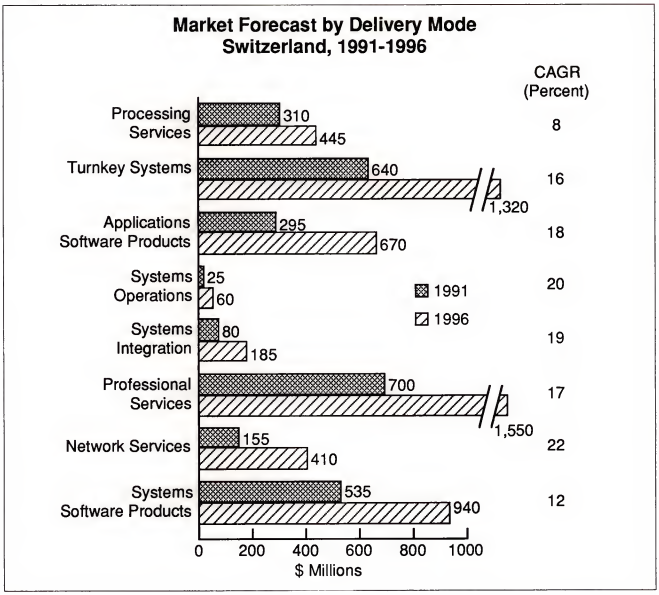


EXHIBIT VIII-109

Leading Information Services Vendors Switzerland, 1990

Vendor	Country of Origin	Estimated Sector Revenues ($ Millions)
Telekurs	Switzerland	180
IBM	U.S.	94
Fides	Switzerland	87
Digital	U.S.	78
Reuters	U.K.	70
Unisys	U.S.	70
Siemens-Nixdorf	Germany	39
DATAG (Ernst & Young)	Switzerland	35
Cap Gemini Sogeti	France	31
Mannesmann Kienzle	Germany	28

EXHIBIT VIII-110

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Switzerland

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Switzerland Information Services Market	2,380	15	2,740	3,170	3,650	4,200	4,890	5,570	15
Processing Services	283	8	308	327	354	387	415	447	8
-Transaction Processing Services	248	8	268	284	307	335	366	386	8
-Utility Processing	12	7	13	13	13	14	15	16	5
-Other Processing	24	17	28	30	34	39	34	46	11
Turnkey Systems	555	14	638	754	886	1,028	1,169	1,323	16
-Equipment	199	13	339	386	449	512	567	638	14
-Applications Software Products	95	17	110	142	173	205	236	276	20
-Systems Software Products	35	11	39	46	51	59	67	71	12
-Professional Services	126	19	150	181	213	252	299	339	18
Applications Software Products	252	16	294	343	409	482	571	669	18
-Mainframe	47	7	50	52	54	57	59	63	5
-Minicomputer	75	16	87	102	118	142	165	189	17
-Workstation/PC	130	21	158	189	236	284	347	417	22
Systems Operations	41	17	48	57	67	78	90	103	17
-Platform Systems Operations	30	18	36	43	50	59	68	78	17
-Applications Systems Operations	11	17	12	14	17	20	22	25	15
Systems Operations	21	19	25	31	37	44	53	63	20
-Equipment	28	20	33	38	45	51	61	71	16
-Applications Software Products	2	100	3	4	5	6	7	9	25
-Professional Services	32	25	39	47	55	67	79	95	19
-Other Services	1	100	2	2	2	2	4	4	20
Professional Services	591	20	701	831	949	1114	1323	1547	17
-Consulting	71	11	79	95	110	134	158	189	19
-Software Development	409	21	496	591	669	787	945	1,102	17
-Education and Training	110	14	126	146	169	193	221	256	15
Network Services	130	18	154	185	228	283	343	413	22
-Electronic Information Services	110	14	126	146	173	205	236	276	17
-Network Applications	20	40	28	39	55	79	106	138	38
Systems Software Products	480	11	535	598	677	748	843	937	12
-Mainframe	268	6	284	299	323	339	354	370	5
-Minicomputer	138	14	158	181	213	236	276	315	15
-Workstation/PC	75	26	95	118	142	173	213	252	22

CC
Taiwan

1. National Overview

Taiwan continues as a leading provider and user of information technology in the Far East. One of the "four tigers," Taiwan continues to exhibit a vibrant economy and to explore expanded roles in the worldwide market.

Since the late 1970s Taiwan has followed a policy of slowly removing its isolationist practices as it sought to expand trade and to assume a role free of impact from mainland China in the world economy. It has increased its political and economical liberalization and in the early 1990s re-emerged as a country independent of the People's Republic of China. As long as it can maintain its independence, it retains the ability to grow quickly.

Rapid growth has created and continues to create requirements for information technology and services. Government policy favors education R&D activities and computerization in general.

Key technology trends include the following:

- *Software development*—A number of large and medium-sized firms are working to increase there participation in software development projects.

- *Network development*—Development of the country's networking capabilities and telecommunications infrastructure is of increasing importance in building the overall economy; thus it is receiving governmental support.

a. Driving Forces

Driving forces for the local information services market include:

- *Factory automation and manufacturing investment*—Taiwan continues to expand its cost competitive manufacturing capability both for low- and high-tech products.

- *Regulatory liberalization*—To stimulate investment by foreign firms, steps have been taken to liberalize regulations in the financial services and telecommunications sectors.

- *Economic growth*—Steady growth and apparent economic stability, in the shadow of the People's Republic of China, has favored continued investment in information technology.

b. Inhibiting Factors

Factors inhibiting growth of information services include:

- *Software piracy*—International copyright laws continue to be ignored for computer software and hardware. This makes the market extremely unattractive for major international software products vendors.

- *Trade restrictions*—The local industry is controlled by a small number of major firms that favor trade restrictions.

- *Shadow of the PRC*—Although mainland China has turned inwards in the past few years it continues to have a world presence that overshadows Taiwan. The long-term independence of Taiwan remains under somewhat of a cloud.

2. Information Services Market Forecast

Rapid growth for information services in Taiwan has begun to slow down. Exhibit VIII-111 shows that the overall market is about $430 million in 1991 and should grow at a 16% CAGR over the 1991 to 1996 period. This growth projection is down from 18% in the 1990 report.

EXHIBIT VIII-111

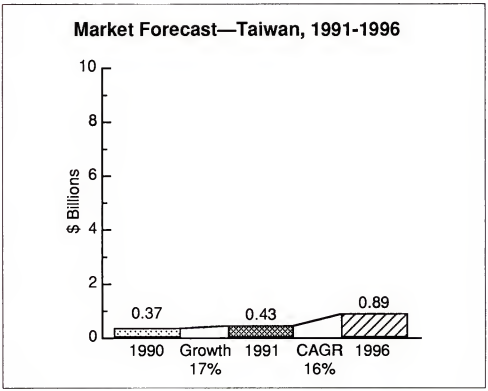
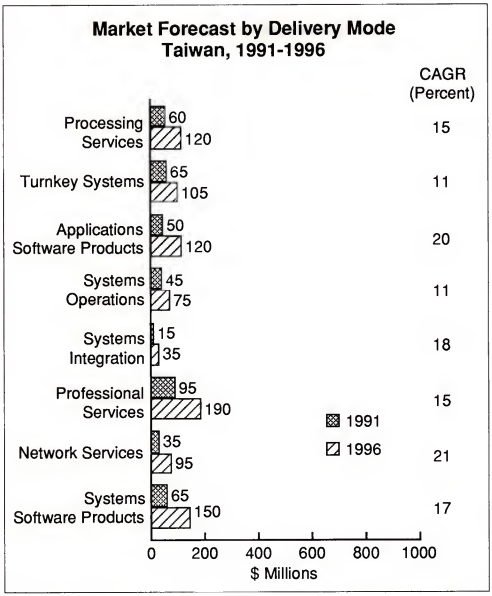


Exhibit VIII-112 provides the 1991-1996 forecast by delivery mode and Exhibit VIII-114, at the end of this profile, provides the detail behind this forecast.

All delivery modes represent business development opportunities.

- Processing services, with a 15% CAGR, is projected to grow faster than in other Far East countries and faster as the small systems operations segment. The use of vendors to provide full data center operations services is established but growing only modestly.

EXHIBIT VIII-112



- Software products, both applications and systems software products, will show strong growth for both local and international developers, in spite of the piracy concerns. The weakness would be at the personal computer level, where piracy is easiest and the greatest threat.

- The turnkey systems market is relatively large due to the existence of a local hardware industry. A market over $60 million will reach over $100 million in 1996, growing at 11% per year.

- The market for systems integration is modest, but there is a sizeable professional services market of close to $100 million, growing at 15% CAGR to reach over $190 million in 1996. As Exhibit VIII-113 shows, there are a number of key vendors providing professional services and systems integration services to the Taiwan market.

3. Market Considerations

Entry into this market can be difficult. Government policies and procedures are complex and cause delays. And there is a local bias toward locally provided goods and services.

The least risky opportunities are for professional services such as consulting and software development. Entering the market through the offering of consulting services can provide a knowledge of this market and a means to build the required relationships.

For companies considering product opportunities, the selection of an established company as a Taiwan representative is the recommended approach.

Most of the international vendors that are active in Taiwan are U.S.-based companies. Japanese vendors are generally not present, and major trade relationships exist with the U.S. IBM, HP, DEC, Oracle and Informix are all present.

There is also a very active local vendor community. Exhibit VIII-113 lists major local vendors within the Taiwanese information services identified by INPUT's research in 1991.

EXHIBIT VIII-113

Selected Vendors by Delivery Mode
Taiwan, 1990

Vendor	Processing/ Network Services/ Systems Operations	Professional Services/ Systems Integration	Software Products	Turnkey Systems
Action Information		x		
Bonanea Int'l Computer			x	
Chimat	x		x	
Chung-Mei	x			
Comet Software		x		
D.M.A.	x		x	
Datex Systems		x	x	
Egen		x	x	
Eten	x	x	x	
Fortune Information	x			
Four Dimension Computer		x		
Golden	x			
M.I.C.		x		
Newton Net Technology		x		
Norton	x			
Soft Union		x	x	
Syntai		x	x	

EXHIBIT VIII-114

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Taiwan

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Taiwan Information Services Market	368	17	432	501	580	676	782	890	16
Processing Services	50	18	59	68	78	89	104	119	15
-Transaction Processing Services	25	20	30	35	42	50	60	70	18
-Utility Processing	15	20	18	20	22	24	27	30	11
-Other Processing	10	10	11	13	14	15	17	19	12
Turnkey Systems	57	11	63	70	76	85	94	104	11
-Equipment	30	10	33	36	39	43	47	51	9
-Packaged Software Products	12	8	13	15	16	18	19	21	10
-Professional Services	15	13	17	19	21	24	28	32	13
Applications Software Products	40	20	48	57	68	83	100	120	20
Systems Operations	40	15	46	52	57	63	70	76	11
-Platform Systems Operations	25	12	28	32	35	39	43	47	11
-Applications Systems Operations	15	20	18	20	22	24	27	29	10
Systems Integration	14	14	16	20	23	28	32	36	18
-Equipment	7	14	8	10	11	13	15	17	16
-Packaged Software Products	1	0	1	1	1	2	2	2	15
-Professional Services	1	100	1	1	1	1	1	1	0
-Other Services	5	20	6	8	10	12	14	16	22
Professional Services	82	18	97	110	130	152	174	192	15
-Consulting	20	20	24	28	33	38	43	49	15
-Software Development	52	19	62	70	84	100	115	125	15
-Education and Training	10	10	11	12	13	14	16	18	10
Network Services	30	20	36	45	55	66	79	93	21
-Electronic Information Services	25	20	30	38	47	57	68	80	22
-Network Applications	5	20	6	7	8	9	11	13	17
Systems Software Products	55	22	67	79	93	110	129	150	17
-Systems Control	30	27	38	46	55	65	77	90	19
-Operations Management	10	10	11	12	13	15	17	20	13
-Application Development	15	20	18	21	25	30	35	40	17

DD
United Kingdom

1. National Overview

The United Kingdom has a total population of 57 million and has been a member of the European Community since 1973.

The information services market is the third largest in Europe, totaling $14 billion in 1991.

In 1990, the gross domestic product of the United Kingdom was $246 billion or $15,660 per capita. The country is markedly in recession, with real gross domestic product growth of 0.4% in 1990 and a fall in gross domestic product of 1.9% forecast for 1991. Unemployment in 1990 averaged 5.8% of the working population, but has been steadily increasing throughout 1991.

The one encouraging sign has been the fall in the level of inflation during 1991, from 9% in January to 4.7% by August, giving the government some scope to reduce interest rates, which had been acting as a deterrent to new investment by U.K. industry.

The share of output accounted for by manufacturing industry continued to fall in 1990, and overall, imports exceeded exports by $36 billion.

A significant feature of the last ten years has been the privatization of a number of publicly owned enterprises, including BT (formerly British Telecom), the water authorities, and the electricity generation and distribution companies. This has typically led to heavy levels of software and services spending by these organizations. Remaining public sector organizations such as local government and the health sector have also been encouraged to subcontract activities to the private sector, resulting in much systems operations activity in these sectors in recent years.

Even the financial services sector, which prospered during much of the 1980s, is facing financial difficulties in 1991 with many of the major organizations looking to reduce their staff headcounts considerably. These pressures have also led to a reduction in in-house IS spending in the financial services and a greater propensity to use external software and services vendors. The proportion of total software and services spend incurred by the financial services sector in the United Kingdom is significantly higher than the Western European average. The breakdown by sector of the U.K. spend on software and services is shown in Exhibit VIII-116.

2. Information Services Market Forecast

INPUT forecasts that the U.K. market for software and services will be $14.2 billion in 1991, growing at an average of 13% per annum to $26.4 billion by 1996. This is shown in Exhibit VIII-115. The U.K. has the third largest software and services market, following France and Germany, accounting for some 18% of the total Western European market.

EXHIBIT VIII-115

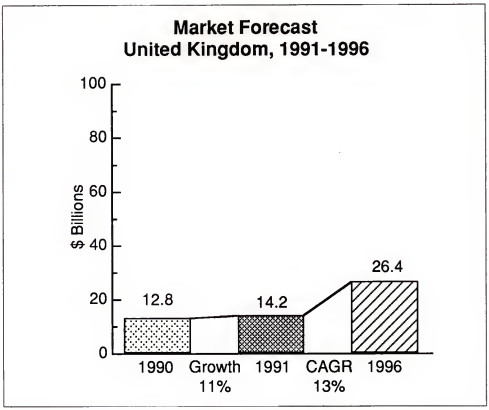
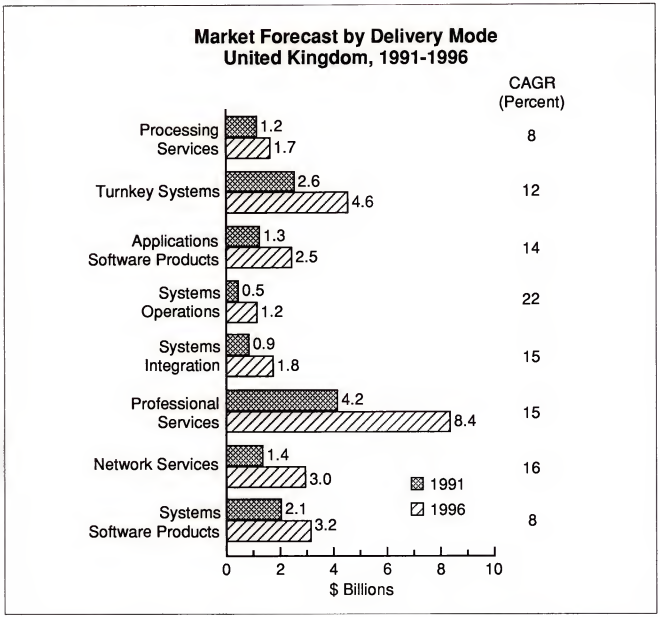


Exhibit VIII-116 gives the forecast by INPUT delivery mode. Exhibit VIII-118 gives a more detailed forecast. The 1990 actual market size is shown with predictions for 1991, 1992 and 1996. Overall, the U.K. market for software and services is forecast to grow more slowly than the European average, reflecting the impact of the continuing recession.

The U.K. still 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., and 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.

EXHIBIT VIII-116



INPUT forecasts that the growth of network services in the U.K. will be slower than the European average, at 16% per annum. This is due to the lead that the U.K. has already built up in this sector combined with the effect of the recession. The U.K. has the largest national market for network services in Western Europe, representing some 30% of the total 1991 Western European network services market.

The systems integration market is also forecast to show comparatively low levels of growth in the U.K., because of the postponement of major projects resulting from the recession.

The U.K. is estimated to account for 31% of the Western European market for systems operations. This leadership position is forecast to be even further fueled by the impact of the recession, with users keen to fix their computing costs for a period of years. The culture of the U.K. also has a greater propensity for outsourcing than is typically found in continental Europe.

3. Market Considerations

Exhibit VIII-117 lists the top vendors of software and services in the United Kingdom during 1990. It was compiled using only the software and services revenues attributable to the domestic market in the U.K., excluding exports and excluding revenues from within any parent group companies.

As in nearly every European country, IBM leads in software and services revenues. In the U.K., IBM is followed by ICL, currently one of the most profitable European equipment vendors, which has gained new respect following its acquisition by Fujitsu. ICL is particularly strong in the public sector in the United Kingdom. Like most other equipment manufacturers, ICL is endeavoring to increase its focus on software and services and is increasingly active in the systems integration and systems operations delivery modes.

Following the recent acquisition of SD-Scicon by EDS and the acquisition of Hoskyns by CGS, only 22% of the revenues shown in Exhibit VIII-117 originate within U.K.-owned vendors. Overall, the U.K. software and services market is dominated by U.S.-owned organizations, which account for 58% of the revenues shown.

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.

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.

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

EXHIBIT VIII-117

Leading Information Services Vendors
United Kingdom, 1990

Vendor	Country of Origin	Estimated Sector Revenues ($ Millions)
IBM	U.S.	785
ICL (Fujitsu)	U.K. (Japan)	420
Reuters	U.K.	420
Hoskyns (CGS)	U.K. (F)	400
Digital	U.S.	295
AT&T Istel	U.S.	250
SD-Scicon	U.K.	220
McDonnell Douglas	U.S.	210
Sema Group	France	210
Andersen Consulting	U.S.	200
Data Sciences (Thorn EMI)	U.K.	190
Prime	U.S.	190

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 realized that Istel could never offer internationally competitive services on its own and in late 1989 accepted a bid by AT&T. The company is now looking to acquisitions elsewhere in Europe to increase its overall presence in Western Europe.

SD-Scicon ran into financial problems following losses incurred on large public sector systems integration projects and has recently been acquired by EDS, which was attracted by the company's systems integration skills and its considerable systems operations presence in France.

EXHIBIT VIII-118

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
United Kingdom

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total United Kingdom Information Services Market	12,820	11	14,170	15,920	18,060	20,580	23,300	26,410	13
Processing Services	1,078	8	1,167	1,266	1,375	1,501	1,619	1,738	8
-Transaction Processing Services	913	9	990	1,068	1,155	1,262	1,359	1,456	8
-Utility Processing	29	7	31	33	35	35	37	39	5
-Other Processing	136	7	146	165	185	204	223	243	11
Turnkey Systems	2,330	11	2,594	2,887	3,241	3,650	4,080	4,569	12
-Equipment	1,243	6	1,320	1,437	1,515	1,651	1,767	1,884	7
-Applications Software Products	476	14	544	641	777	893	1,049	1,223	18
-Systems Software Products	29	7	31	33	37	39	41	45	8
-Professional Services	583	20	699	777	913	1,068	1,223	1,418	15
Applications Software Products	1,146	14	1,311	1,485	1,728	1,981	2,214	2,544	14
-Mainframe	146	0	146	146	155	155	155	155	1
-Minicomputer	359	8	388	447	505	563	602	641	11
-Workstation/PC	641	21	777	893	1,068	1,262	1,456	1,748	18
Systems Operations	369	24	460	575	689	854	1,039	1,243	22
-Platform Systems Operations	272	25	340	427	505	621	757	903	22
-Applications Systems Operations	97	24	120	148	184	233	282	340	23
Systems Integration	771	14	874	1,006	1,161	1,330	1,538	1,773	15
-Equipment	282	7	301	340	379	427	485	655	13
-Applications Software Products	29	13	33	45	54	62	78	97	24
-Systems Software Products	19	10	21	23	29	35	39	49	18
-Professional Services	418	19	495	573	670	777	903	1,049	16
-Other Services	23	0	23	25	29	29	33	35	8
Professional Services	3,913	8	4,194	4,786	5,524	6,427	7,282	8,359	15
-Consulting	777	5	816	971	1,165	1,320	1,515	1,709	16
-Software Development	2,718	7	2,913	3,301	3,786	4,466	5,049	5,825	15
-Education and Training	418	12	466	515	573	641	718	825	12
Network Services	1,243	13	1,408	1,612	1,845	2,136	2,505	2,951	16
-Electronic Information Services	942	9	1,029	1,126	1,223	1,330	1,456	1,612	9
-Network Applications	301	26	379	485	621	806	1,049	1,340	29
Systems Software Products	1,990	7	2,136	2,291	2,495	2,748	2,971	3,204	8
-Mainframe	1,029	2	1,049	1,068	1,078	1,078	1,068	1,068	0
-Minicomputer	592	8	641	699	757	854	932	971	9
-Workstation/PC	369	21	447	524	660	816	971	1,165	21

EE
United States

1. National Overview

In 1990, overall United States information services user expenditures reached $100 billion, as INPUT had projected. Growth during 1990 was 10%, increasing from the $90 billion level in 1989.

The economic slowdown and recession of 1990 and 1991 have caused a significant decrease in the year-to-year growth rates for the information services industry. Rates have decreased from typical annual rates of over 15% to just over 10% growth in 1991.

- The information services industry is still growing much faster than the overall economy, but the exciting growth of the 1980s is not expected in the near term.

- When the economy recovers in 1992 or beyond, the information services industry will see some improvement, but will not experience the quick recovery that followed prior recessions.

The market has reached some level of maturity, with $100 billion in expenditures in 1990 and a projected market size of $111 billion in 1991. An industry of this size finds it harder to grow, but also benefits from increased stability in downturns.

The largest vendors continue to increase in size at least as quickly as the industry grows. Through acquisition and merger as well as true revenue growth, the larger vendors are increasing their dominance. This dominance results in slower change within the industry as the smaller, more nimble vendors are absorbed.

- The recent and continuing efforts by IBM to find a new organizational formula for growth exemplify this belief.

- Slower growth by Andersen Consulting and other large services firms in 1991 is a further measure of the challenge.

The newest major force in the U.S. information technology area is downsizing. Downsizing has numerous meanings, but in general relates to a fundamental shift within the information technology foundation from a singular large processing capability to distributed but integrated processors of all sizes.

- In the immediate term, the apparent benefits of downsizing are very attractive and are causing many information systems organizations to rethink overall IT strategies. But gaining full benefit can require major reengineering of key application systems and their underlying data bases, which takes time and resources in a period of economic recession.

- Over the next five years, INPUT believes that downsizing—or rightsizing—will become a revolution within the U.S. market and cause major changes in the information systems function and process, and in the information software and services industry.

Throughout the 1980s, business managers at all levels became more involved in the information systems processes of their organizations. A direct result—which will have significant impact in the early 1990s—is that general management is now deeply involved in major information systems decisions. General management often totally controls the budget decision.

- For the using organization, this control means that the decision criteria change.

- For the information services vendor, this control means that there are often two buyers with different priorities and needs.

Outsourcing will be the fastest growing sector of the market for the next five years. Buyers and vendors have much to learn about how this type of relationship evolves and brings financial benefit to both organizations.

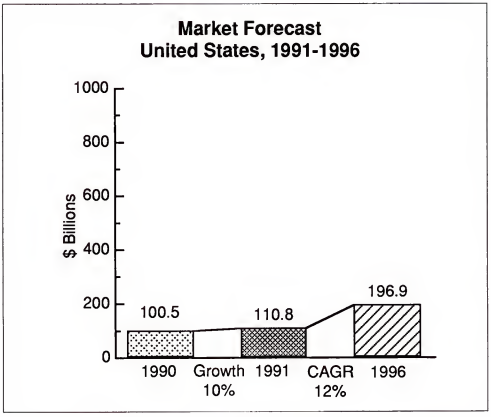
2. Information Services Market Forecast

The growth rate during 1991 is anticipated to have been 10%, with expenditures reaching nearly $111 billion. This rate represents the second year of much more modest growth for the U.S. information services industry. For the five-year forecast period, INPUT projects a 12% CAGR, resulting in a $197 billion market in 1996, as shown in Exhibit VIII-119. This CAGR is down from the 13% forecasted for the 1990-1995 period one year ago and 15% forecasted in 1989.

The revision in the five-year forecast reflects a downward revision in growth expectations for the information services industry.

The size and growth rates of the eight delivery modes tracked by INPUT are shown in Exhibit VIII-120. Systems operations, systems integration, and network services reflect the highest CAGRs for the 1991-1996 period. The growth rate projections are lower than last year's projections for all delivery modes except systems operations, where the growth rate increased from 16% to 17%.

EXHIBIT VIII-119



Overall, the information services industry remains stable and is growing much faster than the U.S. economy as a whole. However, the rate of growth continues to decline. Opportunities remain numerous, but a number of underlying revolutions are causing significant disruption.

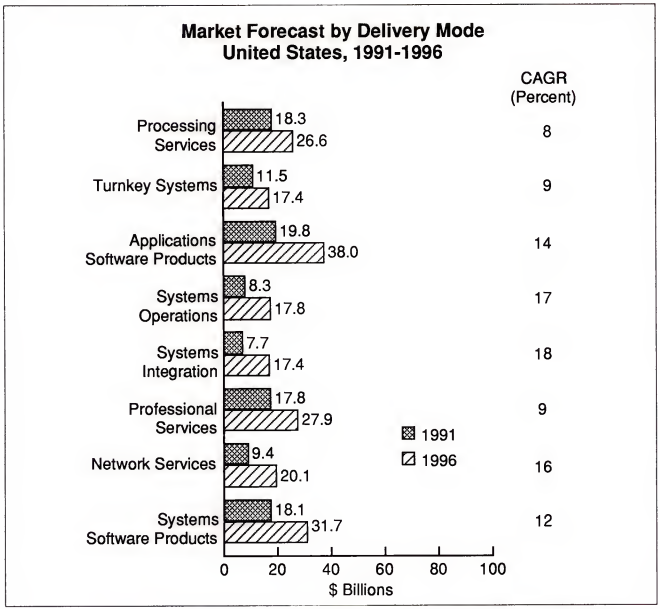
Processing services—INPUT has sized the U.S. 1991 processing services market at $18 billion and projects that it will grow at a modest compound annual rate of 8% to about $27 billion in 1996. This growth rate compares to a 9% CAGR forecasted in 1990. A significant factor in the conservative growth estimate is the effect of the recession, which has decreased growth in transaction volumes and increased price competition.

- The dominant submode is transaction processing, where growth is projected at only a 7% CAGR, resulting in an almost $21 billion market in 1996. In 1990, INPUT projected a growth rate of 9% per year for the next five years.

In addition to the economy, the processing services sector is impacted by general budgetary constraints and the growing use of systems operations or lower cost downsized-technology solutions.

- Some application services traditionally sourced from processing services vendors are being reviewed for conversion to internal approaches.

EXHIBIT VIII-120



- The strong growth experienced in the systems operations area has a downward impact on transaction processing services. The result is that most processing services firms are already or will soon consider offering services under the framework of platform or application systems operations.

Turnkey systems—Growth for turnkey systems, on the other hand, will be markedly lower—expanding from $11.5 billion in 1991 to $17.4 billion in 1996 at a CAGR of 9%, as shown in Exhibit VIII-120. The lower growth is tied to the continuing shift of traditional turnkey systems vendors to only applications software products. The strength in this market is at the workstation/PC and low-end client/server levels, where unit sales are relatively low and the contribution of the hardware to the total sale modest.

In general, the applications software products and turnkey systems markets have felt few, if any, effects of a slowed economy and recession. The fact that hardware sales will slow further in the short term due to the economy is offset by pressure on profits at end-user organizations; expensive in-house development projects are put on hold, thus enhancing the possibility for additional external purchases of applications software products.

Turnkey systems vendors are experiencing moderately adverse effects from the slowed economy, principally because of slower hardware sales and because a significant part of their customer base—manufacturing industry sectors and small companies—is feeling adverse effects from the slowdown.

Applications software products—The applications software products market will expand from $19.8 billion in 1991 user expenditures to $38 billion by 1996, a CAGR of 14%, which is unchanged from the 1990 projection.

- The mainframe sector will experience the least growth with a five-year CAGR of only 6%. This submode will grow from $5.3 billion in 1991 to $7.3 billion by 1996.

- The minicomputer submode, with $5.7 billion in 1991, will see growth of 10% per year to $9.2 billion by 1996. Much of this growth will be on larger client/servers.

- The workstation/PC submode will see the greatest growth, increasing from $8.8 billion in 1991 to $21.6 billion by 1996. In spite of strong growth over the past few years, this platform level continues to command significant expenditure as processors upgrade and the movement to Windows grows.

In addition to the economy, other forces impacting growth in applications software products markets include:

- Computer shipments will continue to fuel application solutions growth—albeit at a slower rate—over the next five years. Lower cost client/server processors will soon be supported by new applications software product offerings, which will help sustain growth in these delivery modes.

- The product transition to client/server architectures is a growth inhibitor in the short term. Client/server products from most leading vendors will enter the market in 1992 and 1993. The growth benefits will follow, but until products are available, confusion in the applications software products and turnkey markets restrains growth.

Systems operations—This delivery component has two submodes:

- Platform systems operations will grow at a compound annual rate of 13%, with revenues increasing from $3.6 billion in 1991 to $6.5 billion in 1996. The platform systems operations growth rate varies significantly within each industry market, however, because of forces in each sector.

- Applications systems operations will grow at a compound annual rate of 19%, from $4.8 billion in 1991 to $11.3 billion in 1996. This compares with an 18% CAGR projected in 1990.

The accelerated growth in the applications sector reflects an increasing desire by users to offload applications development and maintenance, and industry specialization by many of the systems operations vendors to meet users' needs. As a result, vendors are developing proprietary software to apply to specific industry problems.

The development and growth of this market sector has not been hampered by the recession and, in fact, has more likely been positively impacted. The opportunity to offload the investment decision and capital costs to the vendors is very attractive to companies of all sizes.

Systems integration—U.S. businesses, more than ever, are feeling the pressure of competition from domestic and foreign companies. This pressure has forced organizations to look closely at their core businesses to identify solutions that differentiate their products and services from the competition's products and services. In many cases, the application of information technology can make the difference in offering a superior service faster or reducing the length of product development cycles.

The result has been the continuing willingness to turn to systems integrators to find complex solutions to key information systems requirements.

An increasing amount of information systems expenditures is no longer controlled by internal information systems organizations. The organizations are, in many cases, becoming the buyers of solutions and are controlling the solution budgets.

The economic recession has had some impact on the systems integration market. In the near term, existing projects are being completed faster than planned and new projects are both smaller and taking longer to be contracted. INPUT has lowered its systems integration forecast by 1% for the U.S., but continues to see a strong and viable market for vendors that are capable of assuming the risk of total project responsibility and have a record of demonstrated success.

Professional services—The professional services segment of the information services market has suffered the most from the current recession. As a result, INPUT has lowered the five-year forecast for professional services to just 9% CAGR from 12% in 1990.

- The consulting services submode will experience the strongest growth with a CAGR of 13% reaching $7.8 billion in 1996. There remains a strong willingness to look outside to identify new approaches to past and future information technology requirements.

- Software development is the largest submode, representing over 60% of the total professional services market. At the same time, software development is experiencing the greatest decline in growth because of the recession and the turn to systems integration. A 7% CAGR will increase a $10.9 billion market in 1991 to $15.5 billion in 1996.

The current environment for professional services is marked by an increasing impact from the economic downturn. Also listed are other factors inhibiting growth.

The traditional professional services vendor is learning to compete increasingly with the alternatives of purchased software products and systems integration. In many instances, this competition is leading such vendors to form significant alliances and to broaden offerings to include systems integration in areas of specific strength.

Increasing price competition within the software development submode is leading to decreased margins in the near term.

Network services—The network services market will increase at a CAGR of 16% between 1991 and 1996, growing to a level of $20 billion in user expenditures in 1996.

The growth rate for network services is down slightly from the 1990 forecast of 17%, continuing a small year-to-year decrease from rates of 20% in the late 1980s.

- The smaller segment, network applications, will see the greatest growth with a 18% CAGR driven by the continuing increase in use of EDI, electronic mail, and other value-added network services.

- The electronic information services submode will grow at 16% during the 1991-1996 period.

Systems software products—The overall systems software products market will expand from $18.1 billion in 1991 to $31.7 billion by 1996, at a compound annual growth rate of 12%. This rate is down from the 14% forecast in 1990.

The growth rates by platform level range from a low of 10% for the mainframe level to 19% for the workstation/PC level.

There are three submodes within systems software products: systems control products, applications development tools, and operations management tools. The growth rates range from 10% for systems control to 14% for applications development tools.

The market for systems software products is being affected by both the economic environment and the shifting technology environment. The market is primarily driven by hardware sales, which have declining growth rates even for personal computers. The current consolidation in data centers both drives and inhibits systems software demand, as does the emphasis on network integration.

Another inhibiting factor is the beginning movement to client/server technology. As with any new technology, a learning curve slows purchases early in a technology's life.

Other technology issues impacting growth are the standards process, confusion about open systems, and a tendency to wait for true interoperability.

3. Market Considerations

Exhibit VIII-121 lists the leading vendors and their 1990 market share.

In the next five years, growth will come from different sources, the winning vendors will change, and the characteristics of computer manufacturers—such as IBM, DEC, and Unisys—will change.

EXHIBIT VIII-121

Selected Leading U.S. Information Services Vendors, 1990

Vendor	Revenue ($ Billions)	Market Share (Percent)
IBM	5.8	6
EDS (excluding GM)	2.4	2
ADP	1.7	2
Computer Sciences	1.5	2
Digital Equipment	1.3	1
Andersen Consulting	1.2	1
Unisys	0.9	1
First Financial Mgmt.	0.9	1
Microsoft	0.8	1
Computer Associates	0.7	1
American Express ISC	0.7	1
PRC	0.7	1
Total	18.6	20

INPUT believes some revolutions are under way—outsourcing, downsizing, networking, and re-engineering of the information systems process. These revolutions are just becoming apparent, and the depth and degree of their influence remains to be fully understood but it will be significant in the U.S. market.

The bright spots are outsourcing and the rush to downsize, but confusion about technology alternatives slows growth and the buyer is changing from the IS professional to the general manager. This requires vendors to relearn how to sell.

Once these conditions are understood, the information services industry in the United States may see a new beginning in the next five years. The successful vendor will be more flexible, with closer ties to its customers and a solution versus technology orientation to its customer offerings, whether service- or software products-based.

EXHIBIT VIII-122

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
United States

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total United States Information Services Mkt.	100,495	10	110,781	123,415	138,036	154,829	173,940	196,936	12
Processing Services	17,024	7	18,274	19,661	21,210	22,857	24,650	26,639	8
-Transaction Processing Services	14,096	7	15,020	16,014	17,115	18,256	19,469	20,795	7
-Utility Processing Svc.	898	5	943	990	1,040	1,091	1,146	1,204	5
-Other Processing Svc.	2,030	14	2,311	2,657	3,055	3,510	4,035	4,640	15
Turnkey Systems	10,434	10	11,474	12,530	13,571	14,686	15,888	17,411	9
-Equipment	5,008	10	5,508	6,014	6,514	7,049	7,626	8,357	9
-Software Products	3,756	10	4,131	4,511	4,886	5,287	5,720	6,268	9
-Applications	3,235	10	3,557	3,884	4,207	4,553	4,925	5,397	9
-Systems	522	10	574	627	679	734	794	871	9
-Professional Services	1,669	10	1,836	2,005	2,171	2,350	2,542	2,786	9
Applications Software Products	17,676	12	19,842	22,352	25,314	28,839	32,993	38,030	14
-Mainframe	5,017	6	5,315	5,630	5,989	6,382	6,800	7,260	6
-Minicomputer	5,221	10	5,749	6,288	6,889	7,576	8,340	9,155	10
-Workstation/PC	7,438	18	8,778	10,434	12,436	14,881	17,853	21,615	20
Systems Operations	7,237	15	8,300	9,658	11,311	13,169	15,309	17,818	17
-Platform Systems Operations	3,114	14	3,550	4,098	4,680	5,261	5,847	6,497	13
-Applications Systems Operations	4,123	15	4,750	5,560	6,631	7,908	9,462	11,321	19
Systems Integration	6,884	12	7,684	9,060	10,682	12,666	14,735	17,394	18
-Equipment	2,822	12	3,150	3,715	4,380	5,193	6,041	7,132	18
-Software Products	482	12	538	634	748	887	1,031	1,218	18
-Applications	310	12	346	408	481	570	663	783	18
-Systems	172	12	192	227	267	317	368	435	18
-Professional Services	3,304	12	3,688	4,349	5,127	6,080	7,073	8,349	18
-Other Services	275	12	307	362	427	507	589	696	18
Professional Services	16,761	6	17,757	19,412	21,236	23,244	25,454	27,892	9
-Consulting	3,900	9	4,234	4,790	5,419	6,132	6,934	7,848	13
-Software Development	10,401	5	10,872	11,675	12,536	13,642	14,457	15,525	7
-Education and Training	2,460	8	2,651	2,947	3,281	3,650	4,063	4,519	11
Network Services	8,089	16	9,350	10,782	12,552	14,648	17,141	20,052	16
-Electronic Information Services	6,420	16	7,419	8,527	9,908	11,519	13,408	15,615	16
-Network Applications	1,669	16	1,931	2,255	2,644	3,129	3,733	4,437	18
Systems SW Products	16,390	10	18,100	19,960	22,160	24,720	27,770	31,700	12
-Mainframe	7,800	8	8,400	9,140	10,000	10,970	12,050	13,350	10
-Minicomputer	5,460	10	6,000	6,520	7,110	7,780	8,540	9,500	10
-Workstation/PC	3,130	18	3,700	4,300	5,050	5,970	7,180	8,850	19

FF
Venezuela

1. National Overview

Although smaller in population and gross national product than its neighbor Argentina, Venezuela's information services industry is well established and approaches Argentina's in size. Its economy is about two-thirds, but its information services industry is about 85% the size of Argentina's.

The economic climate has been reasonably stable until recently. In general it is expected to remain stable over the longer term in spite of occasional disruptions.

Inflation, as in all Latin American countries, can be a problem; however, Venezuela has done better than the others in keeping inflation in balance with economic growth.

Recognizing the potential occurrence of further trade deficits, the government has taken steps to improve the current trade balance. The country has adopted an exchange rate unification program that is expected to improve the country's relationship with multinational firms. Venezuela has plans to eleminate import monopolies and to increase competition.

The adoption of information technology remains strong and an element of government emphasis. Areas of focus include UNIX, LANs, computer education, and locally developed applications software products. Venezuela has a fairly well-developed community of locally owned information services companies. (See Exhibit VIII-125 in the Market Considerations section of this profile.)

a. Driving Forces

The primary driving forces include the following:

- *IT emphasis*—Venezuela has a strong record of utilizing current and leading-edge information technology.
- *Computer literacy*—The exposure to computing at all levels of the education system is a government priority.
- *Local IT industry*—There is a large local community of vendors developing and deploying IT successfully.

- *Economic reform*—Focus on the stimulaitn of a free-enterprise market is expected to increase the demands for technology-based products and services.

b. Inhibiting Forces

Key inhibiting forces include the following:

- *Telecommunications system*—The country needs to elevate the priority of developing a modern telephone system.

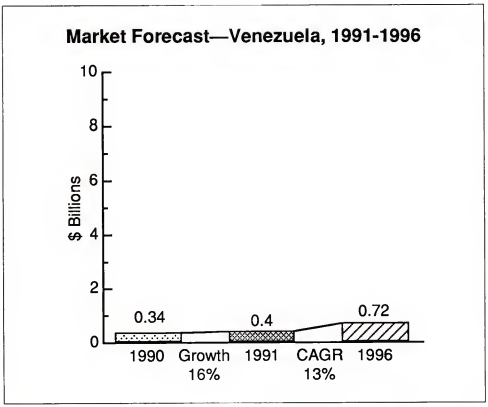
- *Software piracy*—The lack of effective action against software piracy reduces the ability of international firms to import products profitably.

- *Competition*—The large number of local and international information services firms increases competition and reduces profitability, which decreases investment by vendors.

2. Information Services Market Forecast

Exhibit VIII-123 shows the market for information services to be about $400 million in 1991, with a projected five-year compound growth rate of 13%, resulting in a market exceeding $700 million in 1996.

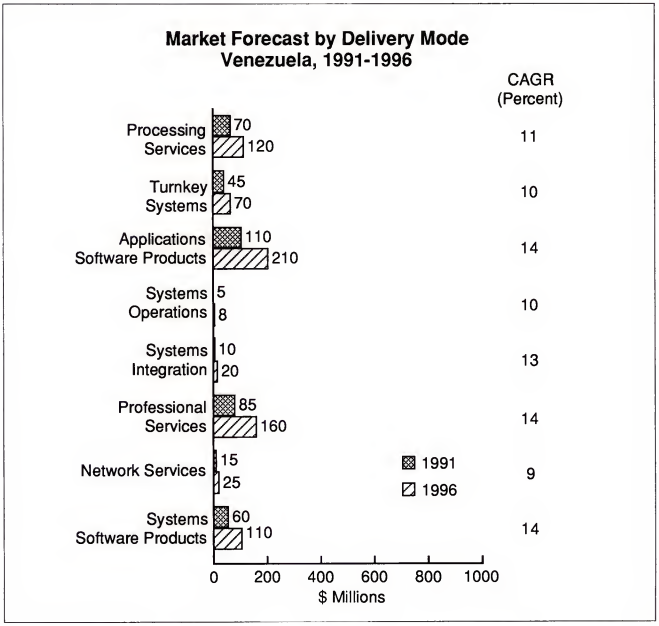
EXHIBIT VIII-123



INPUT has lowered its forecast for Venezuela from a 16% CAGR to 13%. The reduction is tied to the slowdown in economic growth in general and some signs of instability in the government. There is a presidential election set for 1993 that will be critical to continued stability.

Exhibit VIII-124 provides the forecast by delivery mode, and Exhibit VIII-126, at the end of this profile, provides the delivery mode forecast in more detail.

EXHIBIT VIII-124



The processing services market in Venezuela is better established than in the other major Latin American markets, representing almost 20% of the total information services industry. Systems operations, on the other hand, is just getting established as a delivery mode.

Software products is the biggest sector. Applications and systems software products combine to be over 40% of the industry. The applications software market is quite well established and will exceed $200 million by 1996.

Professional services is the other well-developed sector. There are a large number of firms, primarily local to Venezuela, offering these services.

As with other Latin America markets, the turnkey systems segment is reasonably large and strong. The emphasis is on PC- and LAN-based applications.

The network services market is modest, but growing.

3. Market Considerations

Exhibit VIII-125 lists leading Venezuela-based vendors and the delivery modes in which they primarily operate. Many international vendors are also active and are identified in Chapter V on Latin America.

Entering the Venezuelan market can be difficult. There are a number of local regulations that protect the local companies; and there are import exposures, including software piracy.

Business is dominated by a number of well-established families with whom business relationships must be developed for business success.

The market is highly competitive, the skill levels relatively high and the local applications software products market well developed. Successful entry requires a relationship with a well-established and connected locally based company, such as those listed in Exhibit VIII-125.

EXHIBIT VIII-125

Selected Vendors by Delivery Mode
Venezuela, 1990

Vendor	Processing/ Network Services/ Systems Operations	Professional Services/ Systems Integration	Software Products	Turnkey Systems
BDT		x		x
Caracas Dataclub	x			
Contadata	x			
Consis Int.			x	
Datamax			x	
Grupo Tea (Mexico)			x	
Infogesa		x		x
Infotec		x	x	
Kriegier, Mentilla & Assoc.	x	x		
Manapro		x	x	
Perez, Mena & Assoc. (E&Y)		x	x	
Spineira, Sheldon (Price Waterhouse)	x			
T&G Int.			x	
Telares Maracay	x			
Tercer Medio		x	x	

EXHIBIT VIII-126

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Venezuela

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Venezuela Information Services Market	343	16	398	464	511	581	646	726	13
Processing Services	65	8	70	82	90	100	110	120	11
Turnkey Systems	40	10	44	58	53	59	65	70	10
Applications Software Products	90	22	11	125	140	165	185	21	14
Systems Operations	5	0	5	6	6	7	7	8	10
Systems Integration	10	10	11	12	14	16	18	20	13
Professional Services	70	21	85	100	115	130	145	165	14
Network/Electronic Information Services	13	15	15	16	18	19	21	23	9
Systems Software Products	50	16	58	65	75	85	95	110	14

IX

Conclusions and Recommendations

INPUT's third assessment of the worldwide market for information software and services reaffirms that a number of the underlying trends for this industry are applicable on a worldwide basis.

Slowing growth rates in almost all countries and all five regions suggest the following:

- The economic impacts are truly worldwide, which reinforces the fact that the information services market is becoming a worldwide market. Vendor strategies must be built on a worldwide basis.
- The revolutions now present in the North American and Western European markets—downsizing, outsourcing, networking and re-engineering—are already having worldwide impacts.

A
Conclusions

The first conclusion must be that the information services industry will be very different by the beginning of the second half of the decade.

Key underlying trends are the following:

- *Client/server and personal computing*—In the smaller developing markets, the cost effectiveness of personal computers and their more powerful relatives, the client server, are allowing companies to leverage information technology. In the established markets, client/server technology is launching a revolution of application re-engineering and network integration. In both cases, the ability to use information technology is moving closer to the user.

  This shift is not without impact on the information services market. It causes many vendors to rethink their strategies and re-engineer their products and services. Users must also rethink their strategies and architectures. The result is a pause in spending in some instances and expansion in others, as well as reinvestment by vendors.

By the end of 1992, client/server software products will be established in the market and the challenges of this shift will begin to be understood and met.

- *Outsourcing*—The trend to outsource—whether software products or professional services, or complete systems integration, data center operations or network management—is growing and becoming a *revolution.*

  - Systems operations is an established market in North America, growing quickly in Japan, and emerging in Europe. Network management is following close behind. Strong growth will continue for the foreseeable future.

  - Systems integration is the fastest growing sector of the industry in all of the established markets, and the tendency to contract for the full solution with a single vendor is becoming common worldwide.

- *Relationships and organization*—Undertaking partnerships, alliances, acquisitions, and reorganization has become an underlying element of information services vendors' strategies worldwide. The channels of distribution are changing and the role of the large vendor is growing.

  - Digital, IBM and others are reorganizing and rethinking their structural strategies for the 1990s. Alliances, emphasis on services and independence of business units will distinguish the information services vendors of the 1990s.

  IBM is in the process of revolutionizing the structure of its organization.

  EDS has organized into numerous vertical organizations to provide market focus and specialized services.

  International firms are looking ever more closely at the U.S. market.

  Systems operations firms are striving to provide full applications support services to maintain competitiveness. Just running data centers is not enough for today's outsourcing revolution.

  - Acquisitions by many of the large services firms are turning them into full-service companies, while software products companies speed growth by acquisition rather than by new product development.

- *International markets*—Today's largest users of information technology operate worldwide and require information services support at that level. The 1990s will see a true worldwide information services market develop.

- The European market is quickly becoming integrated, with vendors wanting to be active throughout that market.

- Latin American countries are addressing their inadequate laws relative to the importation of technology and their lack of a telecommunications infrastructure.

- Even the Japanese market is becoming somewhat more open as the Japanese vendors seek worldwide opportunities.

B
Recommendations

INPUT makes the following recommendations to information services vendors striving for worldwide market opportunities and presence. These recommendations remain relatively unchanged from the 1990 report. They are, however, more applicable than they were one year ago.

- *Know the real buyer*—Today's vendors all want to market solutions. The buyer of a solution is the general manager, not the information systems executive. You must teach your sales forces to sell to the buyer of the 1990s to achieve success.

- *Relationships*—Form relationships with real purpose and work to make them successful. Too many alliances seem to be marriages of convenience and therefore are short lived. The result is mistrust by the user (both information systems and general management). As users focus more on a single vendor for complete service, they will inspect that vendor's dependence on relationships with other vendors.

- *Commitment*—Outsourcing, long-term contracts, and relationships with clients and other vendors all require an increased level of commitment. Information services vendors must recognize the length and degree of commitment required when they enter a new geographic market, offer a new service or product, or form a relationship. Commitment will become an aspect of performance measurement in the 1990s and will include:

  - Commitment to the local market
  - Commitment to the specific product
  - Commitment to after-sale service
  - Commitment to partners
  - Commitment to providing a full-support environment

- *Flexibility*—The 1990s will see a number of revolutions—outsourcing, downsizing, rightsizing, true network integration, and even open systems. None of these revolutions are clearly defined, nor will their foundations become fixed. Only vendors that balance commitment and service with flexibility will survive.

- *International and country focus*—The large multinational vendors will have to have strategies for both the international and local country markets. Smaller vendors must adapt their strategies to the specific countries they choose to enter.

The next 10 years will be years of great change and great opportunity for the aggressive but wise vendor.

A

Definition of Terms

A
Introduction

INPUT's *Definition of Terms* provides the framework for all of INPUT's market analyses and forecasts of the information services industry. It is used for all U.S. programs. The structure defined in Exhibit 1 is also used in Europe and for the worldwide forecast.

One of the strengths of INPUT's market analysis services is the consistency of the underlying market sizing and forecast data. Each year INPUT reviews its industry structure and makes changes if they are required. When changes are made they are carefully documented and the new definitions and forecasts reconciled to the prior definitions and forecasts. INPUT clients have the benefit of being able to track market forecast data from year to year against a proven and consistent foundation of definitions.

The changes made in INPUT definitions this year are as follows:

- *Systems Operations Submodes* - the submodes of systems operations have been redefined from processing services and professional services to platform systems operations and applications systems operations.
- *Business Services Industry* - the industry sectors of business services and personal services have been combined into a single business services sector.
- *Transportation Industry* - the information services expenditures relating to airline reservation systems have been returned to the transportation sector where they resided prior to 1990.

B
Overall Definitions and Analytical Framework

1. Information Services

Information Services are computer/telecommunications-related products and services that are oriented toward the development or use of information systems. Information services typically involve one or more of the following:

- Processing of specific applications using vendor-provided systems (called *Processing Services*)
- A combination of hardware, packaged software and associated support services which will meet a specific application processing need (called *Turnkey Systems*)
- Packaged software products, either systems software or applications software products (called *Software Products*)
- People services that support users in developing and operating their own information systems (called *Professional Services*)
- Bundled combinations of products and services where the vendor assumes total responsibility for the development of a custom solution to an information systems problem (called *Systems Integration*)
- Services that provide operation and management of all or a significant part of a user's information systems functions under a long-term contract (called *Systems Operations*)
- Services associated with the delivery of information in electronic form—typically network-oriented services such as value-added networks, electronic mail and document interchange, on-line data bases, on-line news and data feeds, etc. (called *Network Services*)

In general, the market for information services does not involve providing equipment to users. The exception is where the equipment is bundled as part of an overall service offering such as a turnkey system, a systems operations contract, or a systems integration project.

The information services market also excludes pure data transport services (i.e., data or voice communications circuits). However, where information transport is associated with a network-based service (e.g., EDI or VAN services), or cannot be feasibly separated from other bundled services (e.g., some systems operations contracts), the transport costs are included as part of the services market.

The analytical framework of the information services industry consists of the following interacting factors: overall and industry-specific business environment (trends, events and issues); technology environment; user information system requirements; size and structure of information services markets; vendors and their products, services and revenues; distribution channels; and competitive issues.

2. Market Forecasts/User Expenditures

All information services market forecasts are estimates of *User Expenditures* for information services. When questions arise about the proper place to count these expenditures, INPUT addresses them from the user's viewpoint: expenditures are categorized according to what users perceive they are buying.

By focusing on user expenditures, INPUT avoids two problems which are related to the distribution channels for various categories of services:

- Double counting, which can occur by estimating total vendor revenues when there is significant reselling within the industry (e.g., software sales to turnkey vendors for repackaging and resale to end users)

- Missed counting, which can occur when sales to end users go through indirect channels such as mail order retailers

Captive Information Services User Expenditures are expenditures for products and services provided by a vendor that is part of the same parent corporation as the user. These expenditures are not included in INPUT forecasts.

Non-captive Information Services User Expenditures are expenditures that go to vendors that have a different parent corporation than the user. It is these expenditures which constitute the information services market analyzed by INPUT and that are included in INPUT forecasts.

3. Delivery Modes

Delivery Modes are defined as specific products and services that satisfy a given user need. While *Market Sectors* specify *who* the buyer is, *Delivery Modes* specify *what* the user is buying.

Of the eight delivery modes defined by INPUT, five are considered primary products or services:

- *Processing Services*
- *Network Services*
- *Professional Services*

- *Applications Software Products*
- *Systems Software Products*

The remaining three delivery modes represent combinations of these products and services, bundled together with equipment, management and/or other services:

- *Turnkey Systems*
- *Systems Operations*
- *Systems Integration*

Section C describes the delivery modes and their structure in more detail.

4. Market Sectors

Market Sectors or markets are groupings or categories of the users who purchase information services. There are three types of user markets:

- *Vertical Industry* markets, such as Banking, Transportation, Utilities, etc. These are called "industry-specific" markets.

- *Functional Application* markets, such as Human Resources, Accounting, etc. These are called "cross-industry" markets.

- *Other* markets, which are neither industry- nor application-specific, such as the market for systems software products and much of the on-line data base market.

Specific market sectors used by INPUT are defined in Section E, below.

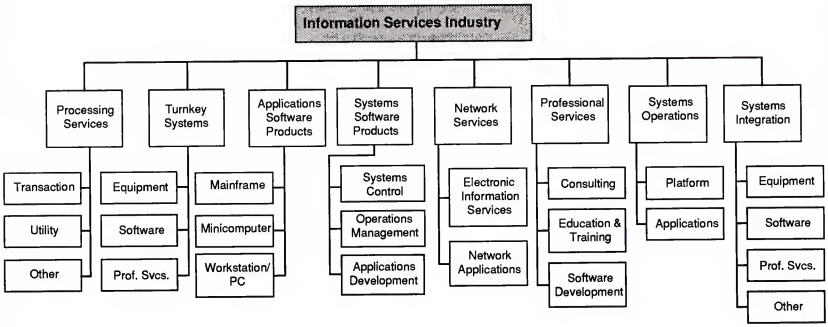
5. Other

Outsourcing is defined as the contracting of information systems functions to outside vendors. Outsourcing should be viewed as the opposite of *insourcing*: anything that information systems management has considered feasible to do internally (e.g., data center operations, applications development and maintenance, network management, training, etc.) is a potential candidate for outsourcing.

Information systems has always bought systems software, as it is infeasible for companies to develop it internally. However, all other delivery modes represent functions or products that information systems management could choose to perform or develop in-house. Viewed this way, outsourcing is the result of a make-or-buy decision, and the outsourcing market covers any product or service where the vendor must compete against the client firm's own internal resources. Therefore, the entire information services industry can be considered an outsourcing market.

EXHIBIT A-1

Information Services Industry Structure—1991



Source: INPUT

C

Delivery Modes and Submodes

Exhibit A-1, above, provides the overall structure of the information services industry as defined and used by INPUT. This section of *Definition of Terms* provides definitions for each of the delivery modes and their submodes or components.

1. Software Products

INPUT divides the software products market into two delivery modes: systems software and applications software.

The two delivery modes have many similarities. Both involve user purchases of software packages for in-house computer systems. Included are both lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the user's sites. Vendor-provided training or support in operation and use of the package, if bundled in the software pricing, is also included here.

Expenditures for work performed by organizations other than the package vendor are counted in the professional services delivery mode. Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself.

a. Systems Software Products

Systems software products enable the computer/communications system to perform basic machine-oriented or user interface functions. INPUT divides systems software products into three submodes.

- *Systems Control Products* - Software programs that function during application program execution to manage computer system resources and control the execution of the application program. These products include operating systems, emulators, network control, library control, windowing, access control, and spoolers.

- *Operations Management Tools* - Software programs used by operations personnel to manage the computer system and/or network resources and personnel more effectively. Included are performance measurement, job accounting, computer operation scheduling, disk management utilities, and capacity management.

- *Applications Development Tools* - Software programs used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Included are traditional programming languages, 4GLs, data dictionaries, data base management systems, report writers, project control systems, CASE systems and other development productivity aids. Also included are system utilities (e.g., sorts) which are directly invoked by an applications program.

INPUT also forecasts the systems software products delivery mode by platform level: mainframe, minicomputer and workstation/PC.

b. Applications Software Products

Applications software products enable a user or group of users to support an operational or administrative process within an organization. Examples include accounts payable, order entry, project management and office systems. INPUT categorizes applications software products into two submodes.

- *Industry-Specific Applications Software Products* - Software products that perform functions related to fulfilling business or organizational needs unique to a specific industry (vertical) market and sold to that market only. Examples include demand deposit accounting, MRPII, medical record keeping, automobile dealer parts inventory, etc.

- *Cross-Industry Applications Software Products* - Software products that perform a specific function that is applicable to a wide range of industry sectors. Examples include payroll and human resource systems, accounting systems, word processing and graphics systems, spreadsheets, etc.

INPUT also forecasts the applications software products delivery mode by platform level: mainframe, minicomputer and workstation/PC.

2. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.), systems software, and packaged or custom application software into a single product developed to meet a specific set of user requirements. Value added by the turnkey system vendor is primarily in the software and support services provided. Most CAD/CAM systems and many small business systems are turnkey systems. Turnkey systems utilize standard computers and do not include specialized hardware such as word processors, cash registers, process control systems, or embedded computer systems for military applications.

Computer manufacturers (e.g., IBM or DEC) that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included in the appropriate software category.

Most turnkey systems are sold through channels known as value-added resellers.

- *Value-Added Reseller (VAR):* A VAR adds value to computer hardware and/or software and then resells it to an end user. The major value added is usually applications software for a vertical or cross-industry market, but also includes many of the other components of a turnkey systems solution, such as professional services.

Turnkey systems have three components:

- Equipment - computer hardware supplied as part of the turnkey system
- Software products - prepackaged systems and applications software products
- Professional services - services to install or customize the system or train the user, provided as part of the turnkey system sale

3. Processing Services

This delivery mode includes three submodes: transaction processing, utility processing, and "other" processing services.

- *Transaction Processing* - Client uses vendor-provided information systems—including hardware, software and/or data networks—at the vendor site or customer site to process transactions and update client data bases. Transactions may be entered in one of four modes:

  - *Interactive* - Characterized by the interaction of the user with the system for data entry, transaction processing, problem solving and report preparation: the user is on-line to the programs/files stored on the vendor's system.

  - *Remote Batch* - Where the user transmits batches of transaction data to the vendor's system, allowing the vendor to schedule job execution according to overall client priorities and resource requirements.

  - *Distributed Services* - Where users maintain portions of an application data base and enter or process some transaction data at their own site, while also being connected through communications networks to the vendor's central systems for processing other parts of the application.

- *Carry-in Batch* - Where users physically deliver work to a processing services vendor.

- *Utility Processing* - Vendor provides basic software tools (language compilers, assemblers, DBMSs, graphics packages, mathematical models, scientific library routines, etc.), generic applications programs and/or data bases, enabling clients to develop their own programs or process data on the vendor's system.

- *Other Processing Services* - Vendor provides service—usually at the vendor site—such as scanning and other data entry services, laser printing, computer output microfilm (COM), CD preparation and other data output services, backup and disaster recovery, etc.

4. Systems Operations

Systems operations was a new delivery mode introduced in the 1990 Market Analysis and Systems Operations programs. It was created by taking the Systems Operations submode out of both Processing Services and Professional Services. For 1991 the submodes have been redefined as indicated below.

Systems operations involves the operation and management of all or a significant part of the user's information systems functions under a long-term contract. These services can be provided in either of two distinct submodes where the difference is whether the support of applications, as well as data center operations, is included.

- *Platform systems operations* - the vendor manages and operates the computer systems, often including telecommunications networks, without taking responsibility for the user's application systems.

- *Applications systems operations* - the vendor manages and operates the computer systems, often including telecommunications networks, and is also responsible for maintaining, or developing and maintaining, the user's application systems.

In the federal government market, systems operation services are also defined by equipment ownership with the terms "COCO" (Contractor-Owned, Contractor-Operated), and "GOCO" (Government-Owned, Contractor-Operated).

The ownership of the equipment, which was the previous basis for the systems operations submodes, is no longer considered critical to the commercial market. Most of the market consists of systems operations relationships using vendor-owned hardware. What is now critical is the breadth of the vendor/client relationship as it expands beyond data center management to applications management.

Systems operations vendors now provide a wide variety of services in support of existing information systems. The vendor can plan, control, provide, operate, maintain and manage any or all components of the user's information systems (equipment, networks, systems and/or application software), either at the client's site or the vendor's site. Systems operations can also be referred to as "resource management" or "facilities management."

5. Systems Integration (SI)

Systems integration is a vendor service that provides a complete solution to an information system, networking or automation requirement through the custom selection and implementation of a variety of information system products and services. A systems integrator is responsible for the overall management of a systems integration contract and is the single point of contact and responsibility to the buyer for the delivery of the specified system function, on schedule and at the contracted price.

To be included in the information services market, systems integration projects must involve some application processing component. In addition, the majority of cost must be associated with information systems products and/or services.

- *Equipment* - information processing and communications equipment required to build the systems solution. This component may include custom as well as off-the-shelf equipment to meet the unique needs of the project. The systems integration equipment category excludes turnkey systems by definition.

- *Software products* - prepackaged applications and systems software products.

- *Professional services* - the value-added component that adapts the equipment and develops, assembles, or modifies the software and hardware to meet the system's requirements. It includes all of the professional services activities required to develop, and if included in the contract, operate an information system, including consulting, program/project management, design and integration, software development, education and training, documentation, and systems operations and maintenance.

- *Other services* - most systems integration contracts include other services and product expenditures that are not easily classified elsewhere. This category includes miscellaneous items such as engineering services, automation equipment, computer supplies, business support services and supplies, and other items required for a smooth development effort.

Systems integrators perform, or manage others who perform, most or all of the following functions:

- Program management, including subcontractor management
- Needs analysis
- Specification development
- Conceptual and detailed systems design and architecture
- System component selection, modification, integration and customization
- Custom software design and development
- Custom hardware design and development
- Systems implementation, including testing, conversion and post-implementation evaluation and tuning
- Life cycle support, including
  - System documentation and user training
  - Systems operations during development
  - Systems maintenance

6. Professional Services

This category includes three submodes: consulting, education and training, and software development.

- *Consulting:* Services include management consulting (related to information systems), information systems consulting, feasibility analysis and cost-effectiveness studies, and project management assistance. Services may be related to any aspect of the information system, including equipment, software, networks and systems operations.

- *Education and Training:* Products and services related to information systems and services for the professional and end user, including computer-aided instruction, computer-based education, and vendor instruction of user personnel in operations, design, programming, and documentation.

- *Software Development:* Services include user requirements definition, systems design, contract programming, documentation, and implementation of software performed on a custom basis. Conversion and maintenance services are also included.

7. Network Services

Network services typically include a wide variety of network-based functions and operations. Their common thread is that most of these functions could not be performed without network involvement. Network services is divided into two submodes: *Electronic Information Services,* which involve selling information to the user, and *Network Applications,* which involve providing some form of enhanced transport service in support of a user's information processing needs.

a. Electronic Information Services

Electronic information services are data bases that provide specific information via terminal- or computer-based inquiry, including items such as stock prices, legal precedents, economic indicators, periodical literature, medical diagnosis, airline schedules, automobile valuations, etc. The terminals used may be computers themselves, such as communications servers or personal computers. Users typically inquire into and extract information from the data bases. Although users may load extracted data into their own computer systems, the electronic information vendor provides no data processing or manipulation capability and the users cannot update the vendor's data bases.

The two kinds of electronic information services are:

- *On-line Data Bases* - Structured, primarily numerical data on economic and demographic trends, financial instruments, companies, products, materials, etc.

- *News Services* - Unstructured, primarily textual information on people, companies, events, etc.

While electronic information services have traditionally been delivered via networks, there is a growing trend toward the use of CD ROM optical disks to support or supplant on-line services, and these optical disk-based systems are included in the definition of this delivery mode.

b. Network Applications

Value-Added Network Services (VAN Services) - VAN services are enhanced transport services which involve adding such functions as automatic error detection and correction, protocol conversion, and store-and-forward message switching to the provision of basic network circuits.

While VAN services were originally provided only by specialized VAN carriers (Tymnet, Telenet, etc.), today these services are also offered by traditional common carriers (AT&T, Sprint, etc.). Meanwhile, the VAN carriers have also branched into the traditional common carriers' markets and are offering unenhanced basic network circuits as well.

INPUT's market definition covers VAN services only, but includes the VAN revenues of all types of carriers. The following are examples of VAN services.

- *Electronic Data Interchange (EDI)* - Application-to-application exchange of standardized business documents between trade partners or facilitators. This exchange is commonly performed using VAN services. Specialized translation software is typically employed to convert data from organizations' internal file formats to EDI interchange standards. This software may be provided as part of the VAN service or may be resident on the organization's own computers.

- *Electronic Information Exchange (EIE)* - Also known as electronic mail (E-mail), EIE involves the transmission of messages across an electronic network managed by a services vendor, including facsimile transmission (FAX), voice mail, voice messaging, and access to Telex, TWX, and other messaging services. This also includes bulletin board services.

- *Other Network Services* - This segment contains videotex and pure network management services. Videotex is actually more a delivery mode than an application. Its prime focus is on the individual as a consumer or in business. These services provide interactive access to data bases and offer the inquirer the ability to send as well as receive information for such purposes as home shopping, home banking, travel reservations, and more.

  Network management services included here must involve the vendor's network and network management systems as well as people. People-only services are included in professional services that involve the management of networks as part of the broader task of managing a user's information processing functions are included in systems operations.

D

Vendor Revenue and User Expenditure Conversion

The size of the information services market may be viewed from two perspectives: vendor (producer) revenues and user expenditures. While the primary data for INPUT's research is vendor interviews, INPUT defines and forecasts the information services market in terms of end-user expenditures. End-user expenditures reflect the markup in producer sales when a product such as software is delivered through indirect distribution channels (such as original equipment manufacturers (OEMs), retailers and distributors). The focus on end-user expenditure also eliminates the double counting of revenues that would occur if sales were tabulated for both producer (e.g., Lotus) and distributor (e.g., BusinessLand).

For most delivery modes, vendor revenues and user expenditures are fairly close. However, there are some areas of significant difference. Many microcomputer software products, for example, are marketed through indirect distribution channels. To capture the valued added through these indirect distribution channels, adjustment factors that incorporate industry discount ratios are used to convert estimated information services vendor revenues to end-user expenditures.

EXHIBIT A-2

Vendor Revenue to User Expenditure Conversion

Delivery Mode	Vendor Revenue Multiplier
Applications Software Products	1.18
Systems Software Products	1.10
Systems Operations	1.00
Systems Integration	0.99
Professional Services	0.99
Network Services	0.99
Processing Services	0.99
Turnkey Systems	0.95

For some delivery modes, including software products, systems integration and turnkey systems, there is a significant volume of intra-industry sales. For example, systems integrators purchase software and subcontract the services of other professional services vendors. And turnkey vendors incorporate purchased software into the systems they sell to end users.

To account for such intra-industry transactions, INPUT uses other conversion ratios to derive the estimate of end-user expenditures.

Exhibit A-2, above, summarizes the net effect of the various ratios used by INPUT to convert vendor revenues to end-user expenditure (market size) figures for each delivery mode.

B

Market Forecast Data Base

Appendix B of the *Worldwide Information Services Forecast* provides the detailed market forecast data for the worldwide total and each of the regional summaries. For ease of use, the detailed market forecast data for each country or subregion has been included with the national profile in Chapter VIII.

EXHIBIT B-1

Information Services Industry User Expenditure Forecast by Delivery Mode, 1991-1996 Worldwide

Delivery Mode	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Worldwide Information Services Market	207,929	13	234,073	266,225	302,937	346,138	395,870	454,422	14
Processing Services	32,682	8	35,188	38,013	41,095	44,492	48,111	52,065	8
Turnkey Systems	25,919	12	29,021	32,557	36,566	40,943	45,887	51,354	12
Applications Software Products	29,340	15	33,737	38,955	45,013	52,236	60,807	71,035	16
Systems Operations	11,572	16	13,409	15,777	18,633	21,931	25,779	30,346	18
Systems Integration	13,015	15	15,030	17,798	21,131	25,207	29,801	35,535	19
Professional Svcs.	50,442	13	56,957	65,734	75,181	86,700	99,780	115,186	15
Network/Electronic Information Services	13,763	17	16,049	18,739	22,063	26,088	30,964	36,726	18
Systems Software Products	31,198	11	34,683	38,653	43,255	48,539	54,740	62,175	12

EXHIBIT B-2

Information Services Industry
User Expenditure Forecast by Region, 1991-1996
Worldwide

Region	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Worldwide Information Services Market	207,929	13	234,073	266,225	302,937	346,138	395,870	454,422	14
Asia/Pacific	31,652	17	37,125	43,512	51,146	60,056	70,670	83,337	18
Europe	68,440	13	77,675	89,447	102,282	117,796	135,505	155,735	15
Latin America	2,999	19	3,564	4,234	5,009	5,964	7,039	8,294	18
Middle East/Africa	920	21	1,114	1,352	1,658	2,034	2,515	3,118	23
North America	103,918	10	114,595	127,680	142,842	160,288	180,141	203,938	12

EXHIBIT B-3

Information Services Industry
User Expenditure Forecast—Processing Services, 1991-1996

Region	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Worldwide Processing Services Market	32,682	8	35,188	38,013	41,095	44,492	48,111	52,065	8
Asia/Pacific	5,779	10	6,336	6,966	7,651	8,411	9,268	10,213	10
Europe	8,781	7	9,382	10,083	10,805	11,667	12,490	13,343	7
Latin America	280	10	308	339	376	414	458	506	10
Middle East/Africa	270	15	310	355	410	465	530	610	14
North America	17,572	7	18,852	20,270	21,853	23,535	25,365	27,393	8

EXHIBIT B-4

Information Services Industry
User Expenditure Forecast—Turnkey Systems, 1991-1996

Region	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Worldwide Turnkey Systems Market	25,919	12	29,021	32,557	36,566	40,943	45,887	51,354	12
Asia/Pacific	3,916	12	4,385	4,953	5,608	6,323	7,206	8,065	13
Europe	10,812	14	12,314	14,117	16,320	18,725	21,432	24,345	15
Latin America	409	16	474	556	632	735	845	977	16
Middle East/Africa	100	10	110	120	135	155	175	195	12
North America	10,682	10	11,738	12,811	13,871	15,006	16,229	17,772	9

EXHIBIT B-5

Information Services Industry
User Expenditure Forecast—Applications Software Products 1991-1996

Region	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Worldwide Applications Software Products Market	29,340	15	33,737	38,955	45,013	52,236	60,807	71,035	16
Asia/Pacific	2,440	20	2,923	3,507	4,193	4,948	5,910	6,995	19
Europe	7,650	18	9,060	10,770	12,682	14,994	17,708	20,925	18
Latin America	812	24	1,005	1,240	1,520	1,880	2,285	2,760	22
Middle East/Africa	220	30	285	370	480	625	815	1,060	30
North America	18,218	12	20,464	23,068	26,138	29,789	34,089	39,295	14

EXHIBIT B-6

Information Services Industry
User Expenditure Forecast—Systems Operations, 1991-1996

Region	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Worldwide Systems Operations Market	11,572	16	13,409	15,777	18,633	21,931	25,779	30,346	18
Asia/Pacific	2,741	16	3,192	3,826	4,588	5,482	6,569	7,898	20
Europe	1,220	22	1,490	1,805	2,180	2,646	3,175	3,800	21
Latin America	185	12	208	234	260	293	330	372	12
Middle East/Africa	0	30	0	0	0	0	0	0	30
North America	7,426	15	8,519	9,912	11,605	13,510	15,705	18,276	16

EXHIBIT B-7

Information Services Industry
User Expenditure Forecast—Systems Integration, 1991-1996

Region	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Worldwide Systems Integration Market	13,015	15	15,030	17,798	21,131	25,207	29,801	35,535	19
Asia/Pacific	2,668	22	3,244	3,932	4,760	5,778	7,000	6,525	21
Europe	2,800	20	3,355	3,960	4,720	5,640	6,780	8,150	19
Latin America	114	13	129	145	165	189	214	242	13
Middle East/Africa	25	12	28	31	35	39	43	48	11
North America	7,408	12	8,274	9,730	11,451	13,561	15,765	18,570	18

EXHIBIT B-8

Information Services Industry
User Expenditure Forecast—Professional Services, 1991-1996

Region	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Worldwide Professional Services Market	50,442	13	56,957	65,734	75,181	86,700	99,780	115,186	15
Asia/Pacific	10,406	22	12,655	15,045	18,061	21,563	25,707	30,965	20
Europe	21,722	14	24,724	29,127	33,331	38,836	44,947	51,957	16
Latin America	514	20	618	746	887	1,053	1,246	1,475	19
Middle East/Africa	220	30	285	370	480	620	810	1,050	30
North America	17,580	6	18,675	20,446	22,422	24,628	27,070	29,739	10

EXHIBIT B-9

Information Services Industry
User Expenditure Forecast—Network Services, 1991-1996

Region	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Worldwide Network Services Market	13,763	17	16,049	18,739	22,063	26,088	30,964	36,726	18
Asia/Pacific	1,355	21	1,641	2,014	2,449	2,972	3,606	4,353	22
Europe	4,030	17	4,722	5,553	6,605	7,938	9,603	11,610	20
Latin America	114	14	130	148	174	198	225	253	14
Middle East/Africa	20	15	23	27	30	33	36	40	12
North America	8,244	16	9,533	10,997	12,806	14,947	17,494	20,470	17

EXHIBIT B-10

Information Services Industry
User Expenditure Forecast—Systems Software Products, 1991-1996

Region	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Worldwide Systems Software Products Market	31,198	11	34,683	38,653	43,255	48,539	54,740	62,175	12
Asia/Pacific	2,347	17	2,749	3,269	3,837	4,579	5,404	6,323	18
Europe	11,425	11	12,628	14,032	15,639	17,350	19,370	21,605	11
Latin America	571	21	692	826	995	1,202	1,436	1,709	20
Middle East/Africa	65	12	73	80	88	97	106	115	10
North America	16,790	10	18,541	20,446	22,696	25,312	28,424	32,423	12

EXHIBIT B-11

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Asia/Pacific

Delivery Mode	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Asia/Pacific Information Services Market	31,652	17	37,125	43,512	51,146	60,056	70,670	83,337	18
Processing Services	5,779	10	6,336	6,966	7,651	8,411	9,268	10,213	10
Turnkey Systems	3,916	12	4,385	4,953	5,608	6,323	7,206	8,065	13
Applications Software Products	2,440	20	2,923	3,507	4,193	4,948	5,910	6,995	19
Systems Operations	2,741	16	3,192	3,826	4,588	5,482	6,569	7,898	20
Systems Integration	2,668	22	3,244	3,932	4,760	5,778	7,000	8,525	21
Professional Svcs.	10,406	22	12,655	15,045	18,061	21,563	25,707	30,965	20
Network/Electronic Information Services	1,355	21	1,641	2,014	2,449	2,972	3,606	4,353	22
Systems Software Products	2,347	17	2,749	3,269	3,837	4,579	5,404	6,323	18

EXHIBIT B-12

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Europe

Delivery Mode	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Europe Information Services Market	68,440	13	77,675	89,447	102,282	117,796	135,505	155,735	15
Processing Services	8,781	7	9,382	10,083	10,805	11,667	12,490	13,345	7
Turnkey Systems	10,812	14	12,314	14,117	16,320	18,725	21,432	24,345	15
Applications Software Products	7,650	18	9,060	10,770	12,682	14,994	17,708	20,925	18
Systems Operations	1,220	22	1,490	1,805	2,180	2,646	3,175	3,800	21
Systems Integration	2,800	20	3,355	3,960	4,720	5,640	6,780	8,150	19
Professional Svcs.	21,722	14	24,724	29,127	33,331	38,836	44,947	51,957	16
Network Services	4,030	17	4,722	5,553	6,605	7,938	9,603	11,610	20
Systems Software Products	11,425	11	12,628	14,032	15,639	17,350	19,370	21,605	11

EXHIBIT B-13

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Latin America

Delivery Mode	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Latin America Information Services Market	2,999	19	3,564	4,234	5,009	5,964	7,039	8,294	18
Processing Services	280	10	308	339	376	414	458	506	10
Turnkey Systems	409	16	474	556	632	735	845	977	16
Applications Software Products	812	24	1,005	1,240	1,520	1,880	2,285	2,760	22
Systems Operations	185	12	208	234	260	293	330	372	12
Systems Integration	114	13	129	145	165	189	214	242	13
Professional Svcs.	514	20	618	746	887	1,053	1,246	1,475	19
Network Services	114	14	130	148	174	198	225	253	14
Systems Software Products	571	21	692	826	995	1,202	1,436	1,709	20

EXHIBIT B-14

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
Middle East/Africa

Delivery Mode	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total Middle East/ Africa Information Services Market	920	21	1,114	1,352	1,658	2,034	2,515	3,118	23
Processing Services	270	15	310	355	410	465	530	610	15
Turnkey Systems	100	10	110	120	135	155	175	195	12
Applications Software Products	220	30	285	370	480	625	815	1,060	30
Systems Operations	0	0	0	0	0	0	0	0	0
Systems Integration	25	10	28	31	35	39	43	48	10
Professional Svcs.	220	30	285	370	480	620	810	1,050	30
Network/Electronic Information Services	20	20	23	27	30	33	36	40	10
Systems Software Products	65	10	73	80	88	97	106	115	10

EXHIBIT B-15

Information Services Industry
User Expenditure Forecast by Delivery Mode, 1991-1996
North America

Delivery Modes	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Total North America Information Services Market	103,918	10	114,595	127,680	142,842	160,468	180,141	203,938	12
Processing Services	17,572	7	18,852	20,270	21,853	23,535	25,365	27,393	8
-Transaction Proc. Services	14,427	7	15,371	16,386	17,509	18,674	19,912	21,264	7
-Utility Processing	1,088	5	1,143	1,200	1,260	1,322	1,389	1,459	5
-Other Processing	2,057	14	2,339	2,685	3,084	3,539	4,065	4,670	15
Turnkey Systems	10,682	10	11,738	12,811	13,871	15,006	16,229	17,772	9
-Equipment	5,094	10	5,595	6,105	6,607	7,145	7,725	8,458	9
-Packaged Software Products	3,893	10	4,278	4,670	5,058	5,473	5,921	6,483	9
-Professional Svcs.	1,695	10	1,864	2,036	2,205	2,387	2,583	2,831	9
Applications Software Products	18,218	12	20,464	23,068	26,138	29,789	34,089	39,295	14
-Mainframe	5,320	6	5,654	6,010	6,415	6,859	7,334	7,858	7
-Minicomputer	5,408	10	5,969	6,548	7,196	7,938	8,767	9,658	10
-Workstation/PC	7,490	18	8,841	10,510	12,528	14,992	17,988	21,779	20
Systems Operations	7,426	15	8,519	9,912	11,605	13,510	15,705	18,276	16
-Platform Systems Operations	3,255	14	3,713	4,287	4,899	5,515	6,142	6,838	13
-Applications Sys. Operations	4,171	15	4,806	5,625	6,706	7,995	9,563	11,438	19
Systems Integration	7,408	12	8,274	9,730	11,451	13,561	15,765	18,570	18
-Equipment	3,042	12	3,397	3,990	4,691	5,545	6,439	7,578	17
-Packaged Software Products	581	12	650	762	893	1,053	1,221	1,433	17
-Professional Svcs.	3,482	12	3,891	4,582	5,402	6,415	7,469	8,813	18
-Other Services	301	12	337	395	464	548	635	747	17
Professional Services	17,580	6	18,675	20,446	22,422	24,808	27,070	29,739	10
-Consulting	4,187	9	4,558	5,159	5,847	6,637	7,531	8,535	13
-Software Development	10,794	5	11,312	12,167	13,097	14,293	15,212	16,384	8
-Education and Training	2,600	8	2,805	3,119	3,478	3,878	4,328	4,820	11
Network Services	8,244	16	9,533	10,997	12,806	14,947	17,494	20,470	17
-Electronic Information Svcs.	6,477	16	7,485	8,604	9,997	11,622	13,528	15,754	16
-Network Applications	1,767	16	2,047	2,394	2,809	3,325	3,966	4,716	18
Systems Software Products	16,790	10	18,541	20,446	22,696	25,312	28,424	32,423	12
-Mainframe	8,081	8	8,706	9,474	10,364	11,367	12,483	13,821	10
-Minicomputer	5,553	10	6,103	6,635	7,237	7,921	8,697	9,674	10
-Workstation/PC	3,156	18	3,731	4,338	5,095	6,024	7,245	8,928	19

C

Currency Conversion Factors

Appendix C lists the currency conversion factors used to convert from local currencies to U.S. dollars. For Europe, the factors are those used by INPUT, Ltd. in its 1991 research. The factors for other countries were derived from the Wall Street Journal, December 30, 1991.

Country	Currency	Value
Argentina	Austral	9,905.00
Australia	Dollar	1.29
Austria	Schilling	11.80
Belgium	Franc	34.60
Brazil	Cruzado	989.00
Canada	Dollar	1.15
Denmark	Krone	6.39
Finland	Markka	3.96
France	Franc	5.65
Germany	Mark	1.68
Greece	Drachma	153.30
Hong Kong	Dollar	7.77
India	Rupee	25.80
Ireland	IR Punt	1.92
Italy	Lira	1,233.00
Japan	Yen	128.00
Korea, South	Won	758.00
Mexico	Peso	3,072.00
Netherlands	Guilder	2.05
New Zealand	Dollar	1.69
Norway	Krone	6.49
Portugal	Escuedo	132.50
Singapore	Dollar	1.74

Country	Currency	Value
South Africa	Rand	2.77
Spain	Peseta	95.00
Sweden	Krona	5.61
Switzerland	Franc	1.27
Taiwan	Dollar	25.74
United Kingdom	Pound Sterling	1.92
Venezuela	Bolivar	61.50

D

Economic Assumptions

EXHIBIT D-1

U.S. GNP Inflation Growth Assumptions 1991-1996 (Percent)

1990 Report Assumptions*	1990E	1991E	1992E	1993E	1994E	1995E	1996E
Nominal GNP	5.4	5.4	6.7	6.7	6.7	6.5	6.4
GNP Deflator	4.4	4.6	4.1	4.0	4.0	3.9	3.8
Real GNP	1.0	0.8	2.6	2.7	2.7	2.5	2.6
1991 Report Assumptions**	**1990A**	**1991E**	**1992E**	**1993E**	**1994E**	**1995E**	**1996E**
Nominal GNP	5.0	3.8	6.3	6.7	6.5	6.0	6.2
GNP Deflator	4.1	3.9	3.6	3.9	3.9	3.8	3.7
Real GNP	0.9	(0.1)	2.7	2.8	2.6	2.2	2.5

Source: CONSENSUS™ forecast, Blue Chip Economic Indicators
* Blue Chip Economic Indicators—Vol. 15, No. 10, October 10, 1990
**Blue Chip Economic Indicators—1991 and 1992 from Vol. 16, No. 7, July 10, 1991
—1993-1996 from Vol. 16, No. 3, March 10, 1991

EXHIBIT D-2

Inflation Assumptions 1990 and 1991

Country	Assumption 1990-1995	Assumption 1991-1996	Change
France	4.5	3.0	-1.5
Germany	4.0	2.7	-1.3
United Kingdom	7.0	4.8	-2.2
Italy	7.0	4.4	-2.6
Sweden	7.0	6.3	-0.7
Denmark	5.0	2.7	-2.3
Norway	5.0	4.9	-0.1
Finland	6.0	5.0	-1.0
Netherlands	3.0	2.4	-0.6
Belgium	4.0	3.3	-0.7
Switzerland	5.0	3.3	-1.7
Austria	4.0	2.6	-1.4
Spain	6.5	4.7	-1.8
Portugal	-	8.0	N/A
Greece	-	12.0	N/A
Ireland	-	3.0	N/A
European Average	5.5	4.0	-1.5

Sources: OECD 1991 Forecast
IMF 1989

April 1992

Country:_____

Vendor: _____

INPUT

Hello, I'm calling from INPUT, a market research and consulting firm from San Francisco. We are preparing an annual report on the worldwide information services market, and are interviewing leading vendors in over 30 countries.

I would like to ask you a few questions about the information systems products and services in your country and your organization.

In return for you assistance, we would be pleased provide you with a copy of the executive overview of INPUT's annual forecast of the U.S. information services industry *and* a copy of the executive overview of the Worldwide Market Forecast when it is completed later this year.

Is now a good time, or would you prefer to schedule a time?

_____If now, continue
_____Schedule time

Worldwide Market Forecast
1991 Questionnaire

General Questions

1. For each of the following types of services, please provide your estimates of the following in _____ (country)?

Processing Services
(Processing of computer-based applications using vendor computers for transaction processing, utility and other processing.) **(Interviewer note:** Companies that provide Processing Services are frequently referred to as Service Bureaus.)

_____Total size of Processing Services market in 1991

_____Compound Annual Growth Rate for 1991-1996

The three leading vendors in Processing Services:

_____

_____

_____

Applications Software Products
(Software that performs functions that are directly related to solving users' business or organization needs. Examples are payroll, inventory control, and financial planning.)

_____Total size of Applications Software market in 1991

_____Compound Annual Growth Rate for 1991-1996

The three leading vendors in Applications Software Products:

_____

_____

_____

Systems Software Products
(Software that enables the computer or communications system to perform basic machine functions such as systems control, data center management, and applications development.)

_____Total size of Systems Software market in 1991

_____Compound Annual Growth Rate for 1991-1996

The three leading vendors in System Software Products:

_____

_____

_____

Professional Services (Excluding Systems Integration)
(Management consulting activity related to electronic data processing, consulting, production of custom software, education and training, and systems operations of client-owned software.)

_____Total size of Professional Services market in 1991

_____Compound Annual Growth Rate tor 1991-1996

The three leading vendors in Professional Services:

_____

_____

_____

Turnkey Systems
(Integration of systems software, packaged and customized applications software with CPU, equipment, and peripherals. System is packaged and delivered as a single application solution.)

_____Total size of Turnkey Systems market in 1991

_____Compound Annual Growth Rate for 1991-1996

The three leading vendors in Turnkey Systems:

_____

_____

_____

Systems Integration
(Integration of systems software, packaged and customized applications software with CPU, equipment, and peripherals. System is packaged and delivered as a single application solution.)

_____Total size of Systems Integration market in 1991

_____Compound Annual Growth Rate for 1991-1996

The three leading vendors in Systems Integration:

_____

_____

_____

Systems Operations (Facilities Management)
(Contracting for the management of all or a major portion of a company's computer operations on a long-term basis. Long term is more than one year.)

_____Total size of Systems Operations market in 1991

_____Compound Annual Growth Rate tor 1991-1996

The three leading vendors in Systems Operations:

_____

_____

_____

Network Services
(Network-oriented services or functions such as value-added networks, electronic mail, electronic data interchange, on-line data bases, and news data bases.)

_____Total size of Network Services market in 1991

_____Compound Annual Growth Rate tor 1991-1996

The three leading vendors in Network Services:

_____

_____

_____

2. Please identify the three leading technological or business factors that will cause the information services industry to grow in _____ (country) over the next five years and why they will do so.

_____

_____

_____

3. Please identify the three leading technological or business factors that will keep the information services industry from growing in _____ (country) over the next five years and why they will do so.

_____

_____

_____

4. Please describe other primary economic, legal, and political factors influencing information services growth in _____ (country).

_____

_____

_____

5. Please rate the importance of information services to business development in _____ (country) today.

_____Much Below Average Importance
_____Below Average Importance
_____Average Importance
_____Above Average Importance
_____Much Above Average Importance

6. Please rate how important information services will be to business development in _____ (country) five years from now.

_____Much Below Average Importance
_____Below Average Importance
_____Average Importance
_____Above Average Importance
_____Much Above Average Importance

7. If given a choice, do companies in _____ (country) prefer to buy local products and services or products and services developed by foreign vendors?

_____Local
_____Foreign
_____Other (Specify) _____

8. When buying products and services developed by foreign vendors, which of the following countries would companies in_____ (country) prefer to work with?

_____European Companies
_____American Companies
_____Japanese Companies
_____Other (Specify) _____

9. Please indicate why companies in _____ (country) prefer to work with companies from _____ (Question 8).

10. Please rate how important products and services of American vendors are to the growth of the information services industry in _____ (country).

_____Much Below Average Importance

_____Below Average Importance

_____Average Importance

_____Above Average Importance

_____Much Above Average Importance

11. How well do American vendors adapt products and services for use in _____ (country)?

_____Products and services are very well adapted

_____Products and services are not well adapted

_____Other (Specify) _____

12. What should American vendors do to provide better products and services in _____ (country)?

_____

_____

_____

Employee Information

Now we would like to ask several questions for classification purposes. Please note that all responses are kept strictly confidential.

13. How many persons were employed by your company as of 12/31/90?

_____Number of employees

14. What percent of your company's total employees were involved in information services activities as of 12/31/90?

_____ %

Revenue Information

15. Please provide your company's Information Services revenue for 1990. Please note, once again, that all replies are kept strictly confidential. **(Interviewer Note:** If company will not provide this information, try to get answer to question 18.)

_____Revenue (Local Currency - Millions)

16. What was the percentage growth of your 1990 information services revenues over your 1989 revenues?

_____%

17. What average percentage growth, per year, do you expect for your information services revenues over the next five years?

_____%

Revenue Sources

18. Please indicate the percent of your company's 1990 information services revenue derived from the following services and products.

_____% Processing Services
_____% Applications Software
_____% Systems Software
_____% Professional Services
_____% Turkey Systyems
_____% Systems Integration
_____% Systems Operations
_____% Network Services

19. Please indicate the percent by which your company's 1990 revenues grew over 1989 for each category: (**Interviewer Note**: Ask only for categories responded to in Question 18.)

_____% Processing Services
_____% Applications Software
_____% Systems Software
_____% Professional Services
_____% Turnkey Systems
_____% Systems Integration
_____% Systems Operations
_____% Network Services

Thank you for your assistance. If you would like to receive the executive overview of the report, please provide the following information for mailing. (**Interviewer Note:** Print name and address information.)

Name: _____

Title: _____

Company: _____

Address: _____

_____

_____

_____

Thank You