INPUT

RESEARCH REPORT

European Utilities Sector IT Software & Services Market 1997 - 2002

European Utilities Sector IT Software & Services Market: 1997 - 2002

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Abstract

The Utilities sector, once a highly regulated and largely government owned industry, is now experiencing a period of rapid change.

A combination of new technology driving forces, smaller scale gas powered generating plant and information technology (IT), and liberalization, have had a dramatic impact on the sector, particularly the electricity supply sector.

As a result the Utilities sector is having to focus on competitive customer retention and profitability, a challenge for organizations shifting from monopolistic practices.

IT investment is particularly critical to the achievement of these new objectives. Utilities firms are having to use IT to support the reengineering of their processes to deliver flexible pricing, improved customer care and bottom line oriented efficiency.

This report assesses the impact of these changes on the IT market within the European Utilities sector, particularly on the current and future use of IT Software & Services.

The report provides an analysis of total IT budgets. It provides forecasts for IT Software & Services expenditure through to the year 2002 and provides comparisons with other industry sectors.

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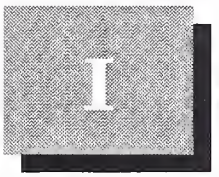

Introduction

This report is produced as part of INPUT's *European Market Forecast Program* for the IT Software & Services industry.

This report is one of a series produced by INPUT to examine the relative importance and position of key industry sectors for the European IT Software & Services business.

Companion reports in other INPUT Programs cover these industry sectors for the United States and from a world-wide perspective.

This chapter identifies the purpose and scope of this report, describes how the document is organized, and explains INPUT's research methodology.

A
Purpose of the Report

The purpose of this report is to provide an industry perspective on the Utilities sector in Europe for IT Software & Services vendors.

The report provides a quantitative analysis of the significance of the sector in relationship to the whole market and to other industry sectors for overall IT related expenditure especially expenditure on IT Software & Services.

The Utilities Sector addressed in this report is defined by INPUT as follows:

- Electric utilities, which can be investor-owned, cooperatives, municipally owned or government owned.
- Gas utilities, which consist of pipelines (transmission) and distribution (local) companies.

- Water/sewage/waste disposal utilities, which can be publicly or municipally owned, or privately owned.

Within the Utilities sector the combination of new technology application and liberalization is wreaking profound change, most especially on the electric utilities.

As a result the electric, gas and fuel markets are tending to converge into a single unified energy market.

This report covers the entire Utilities sector from the standpoint of the quantitative analysis of IT Software & Services expenditure.

Discussion of the industry trends, however, is focused mainly on the particular challenges being faced by the electricity supply industry.

B
Scope of the Report

This report specifically focuses on the Utilities sector, as defined above, in Europe, from the perspective of the IT Software & Services industry.

The analysis of this sector provided in this report, covers total IT expenditure in general and IT Software & Services user expenditure in particular.

These areas are described in the sub-sections below.

1. Total IT Expenditure

Respective sections in the report analyze and forecast the total IT budget, including both internal and external IT-related spending. This comprises:

- Equipment sales — expenditure on computer and data communications hardware products.

- Software products — all expenditure on systems software products and applications software product licenses including support services where these are included within the basic license fee.

- Information services — all expenditure on professional services, systems integration, outsourcing, processing services, network services, turnkey systems, systems software product support services and applications software product support services, and equipment services which comprises equipment maintenance and environmental services.

- Communications — all expenditure on IT-related data communications services.

- Facilities — IT budget expenditure on overheads such as space, heating, lighting, furniture, vehicles etc.

- Staff — direct in-house staff costs including any temporary contract labor.

2. IT Software & Services Categories

The complete list of categories included within INPUT's definitions is as follows:

- Professional services.

- Systems integration.

- Outsourcing.

- Processing services.

- Network services.

- Systems software products.

- Applications software products.

- Turnkey systems.

- Equipment services.

3. Industry Sectors

INPUT defines the following industry sectors according to the most recent revision of the Standard Industrial Classification (SIC) code system:

- Discrete manufacturing.

- Process manufacturing.
- Transportation services.
- Telecommunications.
- Utilities.
- Retail trade.
- Wholesale trade.
- Banking and finance.
- Insurance.
- Health services.
- Education.
- Business services.
- Federal Government.
- State and Local Government.
- Miscellaneous industries.

The definition of these sectors by SIC code can be found in Appendix C, Terms and Definitions.

Additionally INPUT recognizes a separate set of Process or Cross-Industry sectors since they have general applicability across all industries.

These sectors involve multi-industry applications such as human resource systems and accounting systems.

These process-oriented sectors comprise:

- Accounting/Finance.
- Human resources.
- Education and training.

- Office systems.
- Engineering and scientific.
- Planning and analysis.
- Sales and marketing.

Further descriptions of these sectors are provided in the Terms and Definitions section included in this report as Appendix C.

C
Methodology

The data upon which this report is based was gathered as part of INPUT's ongoing market analysis program for the IT Software & Services business.

Trends, market sizes, and growth rates are based upon INPUT research, interview programs with users and buyers within the industry and the vendors serving these industries.

In addition extensive use was made of INPUT's corporate library. The resources in this library include on-line periodicals databases, subscriptions to a broad range of computer and general business periodicals, continually updated files on over 3000 IT Software & Services vendors, and European Community industry statistics.

It must be noted that in the case of *financial data* some vendors are unwilling to provide detailed revenue data by product/services group or industry.

Also, vendors often use different categories of industries and industry segments, or view their services as falling into different product/service groups than those used by INPUT.

In these cases INPUT estimates revenues for these categories on a best-effort basis.

The values used in many of the exhibits contained in this report have been rounded for ease of reference.

D
Report Structure

The remainder of this report is structured in the following way:

Chapter II, *Executive Summary*, provides an overview of the principal analyses and conclusions developed in the main body of the report.

Chapter III, *Utilities Sector IT Environment*, discusses changes, market issues and activities in the European Utilities sector that can affect the current and future use of IT Software & Services.

Chapter IV, *Utilities Sector IT Market*, contains an analysis of total IT budgets and IT Software & Services expenditures in particular, within the European Utilities sector. It provides forecasts for expenditure in these segments through to the year 2002 and provides comparisons to other industry sectors.

Chapter V, *Electronic Business Directions* is a discussion of the major driving forces causing organizations to redefine processes and reengineer their structures.

Appendix A provides a set of summary tables that form a supporting database for the market forecasts contained in this report.

Appendix B provides a reconciliation between the market assessments and forecasts shown in this report in comparison with those previously published by INPUT in 1996.

Appendix C provides a definition of the terms used in the analysis of the IT Software & Services market.

E
Related INPUT Research Programs and Reports

The following reports contain detailed analysis of each market sector, offering commentary and recommendations for vendors.

1.US Reports

Desktop Services Opportunities for the U.S. - 1997

Evaluation of Business Continuity Services in the U.S.

IT Customer Services Market Analysis, U.S. 1997-2002

Evaluation of Digital Money Products in U.S. Banking

Impact of Digital Money on Banking, 1997

Evaluation of Federal Program Budgets, 1998

Federal Financial Management Systems Market 1996

Federal Imaging Market 1996-2001

Federal Information Systems and Services Market 1996-2001

Federal Information Systems and Services Market 1997-2002

Federal Telecommunications Market 1996-2001

Impact of Procurement Reform on Federal Government

Outlook for the Federal Professional Services Market 1996-2001

Evaluation of SAP Service Providers in the U.S., 1997

Evaluation of Firewall Solutions, U.S., 1997

Evaluation of Intranet Development Opportunities - U.S.

Outsourcing Vendor Performance Analysis - U.S.

Year 2000 Services Opportunities

2. European Reports

a. Europe Wide Reports

Desktop Services Opportunities - Europe

Evaluation of Business Continuity Services in Europe

Professional Services Market Forecast, Europe, 1997-2002

SAP Services - European User Perspectives

Evaluation of Internet Firewall Solutions, Europe

Evaluation of Intranet Development Opportunities - Europe

Customer Care and Billing Solutions within Telecommunications Providers in Europe, 1996-2000

Operational Services Market Forecast, Europe 1997-2002

Outsourcing Vendor Performance Analysis - Europe

b. French Reports

Evaluation des Opportunites de Services Micros et LANs France, 1997

Evaluation of Business Continuity Services in France

Evaluation of SAP Services Providers in France

Evaluation of Internet Firewall Solutions, France

Opportunites de Services autour d'Intranet, 1996-2001

Les Services D'Exploitation de Centres D'Appels, France

Outsourcing Vendor Performance Analysis - France

c. German Reports

Evaluation of Business Continuity Services in Germany

Outsourcing Vendor Performance Analysis - Germany

d. United Kingdom Reports

Desktop Services Opportunities - UK

Evaluation of Business Continuity Services in the UK

Future of Network Management Support in the U.K.

Evaluation of SAP Service Providers - UK

Evaluation of Intranet Development Opportunities - UK

- Operational Services

Outsourcing Vendor Performance Analysis for the UK

3. Worldwide Profiles

Worldwide Market Profile, 1997-2002

Regional Market Profiles, 1997 - 2002

North America
Latin America
Asia Pacific
Western Europe
Central & Eastern Europe
Middle East / Africa

Country Market Profiles, 1997 - 2002

United States
Canada
Mexico

Australia
China
India
Japan
South Korea
Taiwan
Hong Kong
New Zealand
Singapore

Israel
South Africa

Argentina
Brazil
Venezuela

France
Germany
Italy
United Kingdom

Russia

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II

Executive Summary

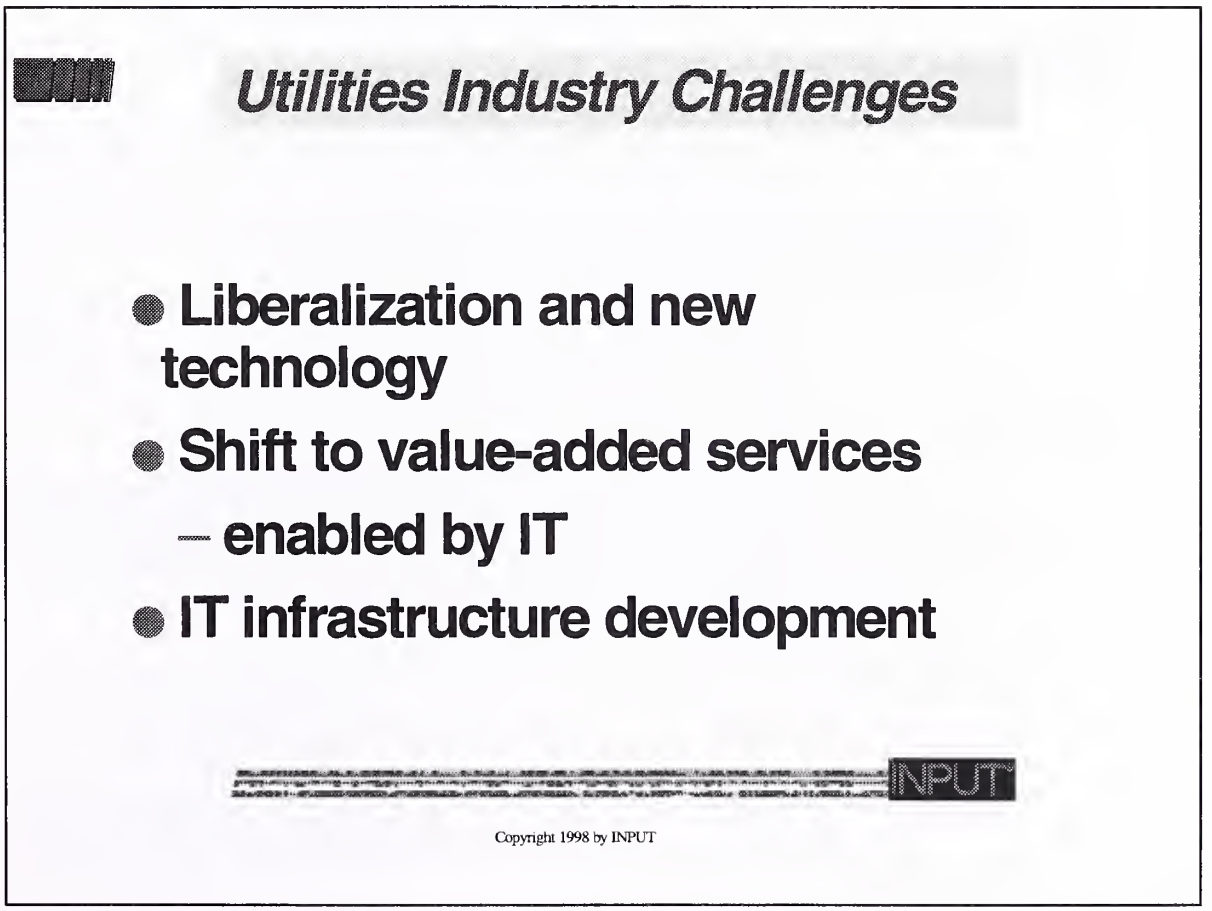
A

Utilities Industry Shifts to IT Based Value-Added Services

The Utilities sector, once a highly regulated and largely government owned industry, is now a sector undergoing rapid change, reference Exhibit II-1.

Exhibit II-1

Utilities Industry Challenges



Source: *INPUT*

A combination of the application of new technology and liberalization has had a dramatic impact on the sector, particularly the electricity supply industry.

The Utilities sector now has to shift to a prioritization of IT-based value-added services as customer loyalty and customer satisfaction become of paramount concern in newly competitive environments.

To fully implement these changes, the Utilities sector is:

- Exploiting the liberalizing and technology driving forces shaping this dramatic shift in industry focus for commercial advantage.
- Applying IT investment to support the shift to value-added services for utility customers.

This Executive Summary also reviews the impact of these developments on IT expenditure, in particular expenditure on IT Software & Services, within the Utilities sector.

B
Utilities Industry Shifts Focus

Two separate but inter-dependent forces, liberalization and new technology, have challenged the historic Utilities sector industry model, characterized by government owned-vertically integrated monopolies.

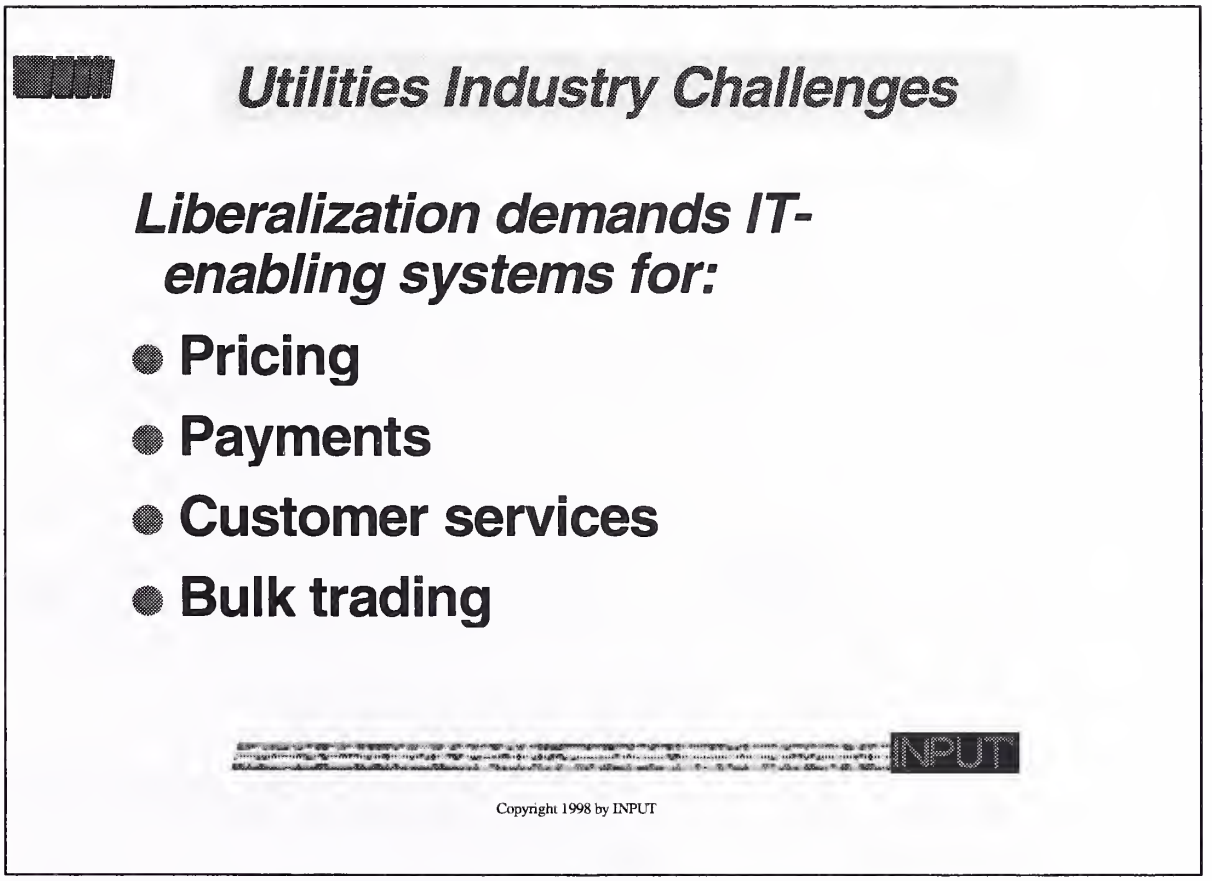
Liberalizing forces represent a change within the political environment that favor the introduction of competition and customer choice in parallel with privatization of government owned assets.

The introduction of competition, customer choice and the privatization of government owned assets have manifested the liberalization trend in the European Utilities sector.

As a result of these changes the Utilities sector has witnessed a significant increase in the amount of data processing required to support a more complex and more open value chain, see Exhibit II-2.

Exhibit II-2

Utilities Industry Changes Focus



Source: *INPUT*

A liberalized, more competitive and privatized industry has to be supported by complex commercial functions that can only be effectively and efficiently operated when built on an IT infrastructure.

Competitive, privatized Utilities need to introduce flexible and market responsive pricing triffs.

Likewise payments systems need to be re-built and integrated with advances like automated meter reading.

The new competitive environment requires a new emphasis on customer service typically now being addressed through call center development linked in with the billing system for common access to the customer database.

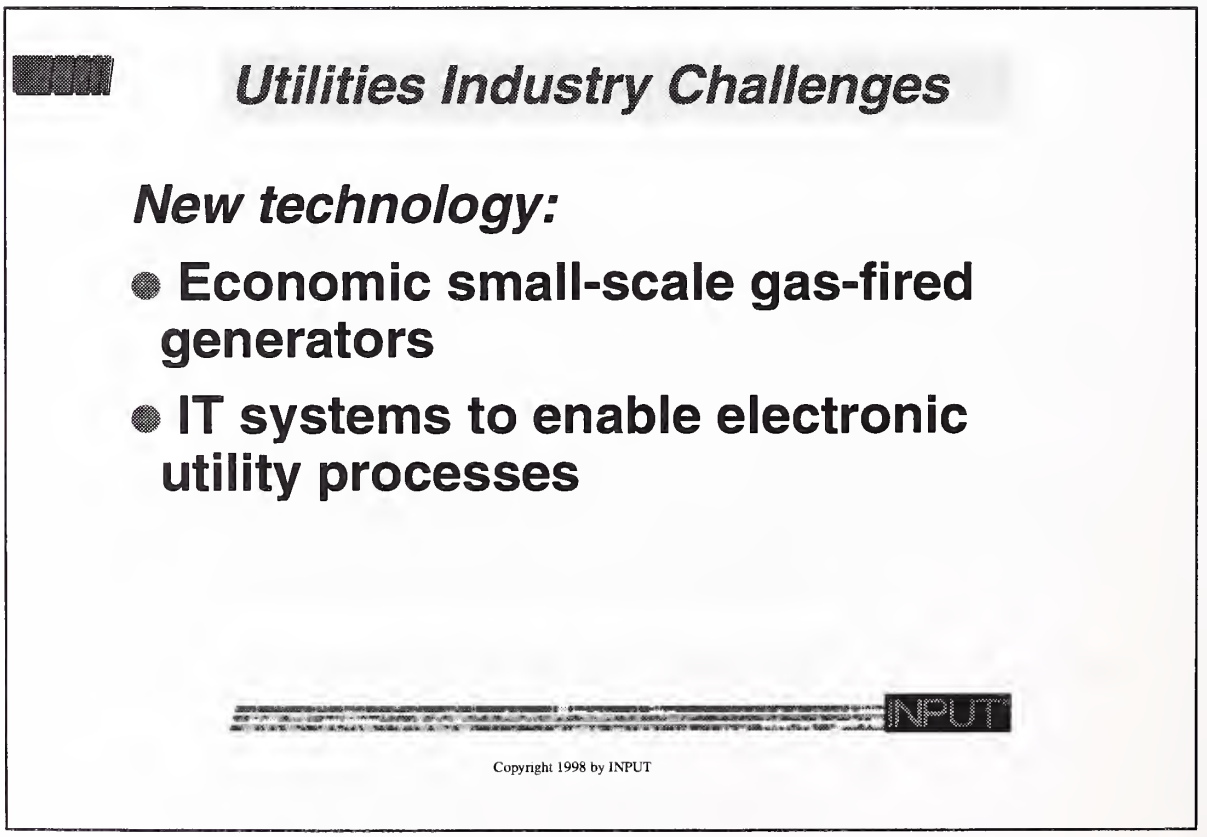
The disaggregation of the old vertically integrated industry model has introduced the need for bulk trading schemes.

Complex real-time trading of energy supplies can only be operated effectively using advanced computer systems to support and track the transactions being effected.

However, Information Technology is not the only technological development force to have made an impact on the Utilities sector, see Exhibit II-3.

Exhibit II-3

New Technology and the Utilities Industry



Source: *INPUT*

The other signific cant technological development to affect the Utilities sector has been driven by the emergence of plentiful supplies of cheap gas for fuel.

Cheap gas was assessed by the industry as a long term condition, experts have estimated at least 200 years supply with currently known reserves.

The availability of plentiful supplies of cheap gas led in turn to significant investment in gas-fired generators, which led in turn to the development of small-scale gas–fired generators.

Environmental issues also spurred these developments as gas-fired power plants are claimed to emit 40% less carbon dioxide than coal-fired plants.

Allied Signal and Ballard Power Systems are two firms actively engaged in the development of small-scale gas-fired generators.

These developments have naturally led to the possibility of localized power generation that is economically competitive with supplies from the national grid.

This opportunity could represent an historic reversal for the development of the electricity generating industry.

Were this development to gain a significant foothold in the market it would represent a return to the situation that prevailed in the early decades of the 20th century when most factories generated their own electric supplies.

The developing liberalized, competitive and privatized model of the Utilities sector is placing great emphasis on cost reduction and process efficiency.

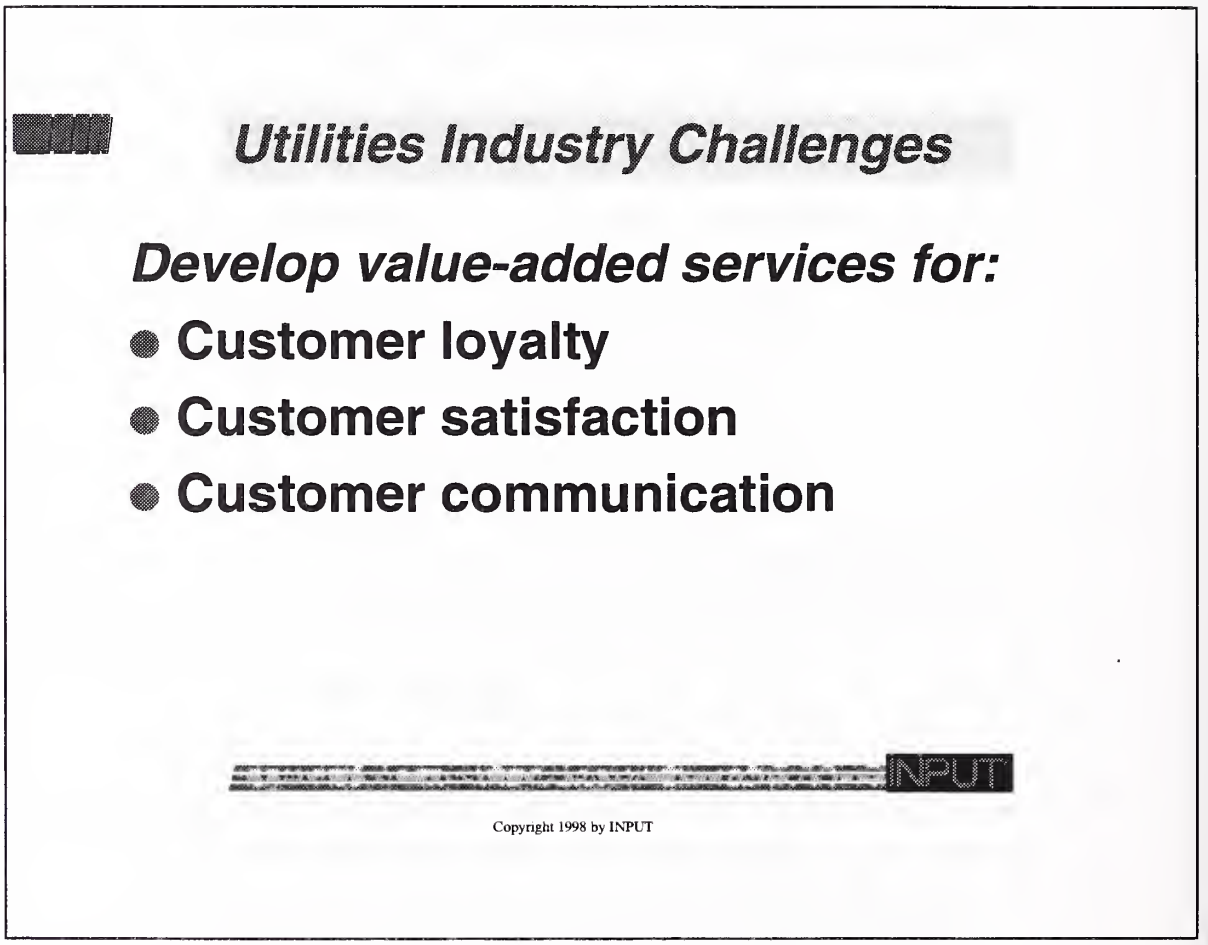
These imperatives are only being met through a significant reengineering of business processes uniquely enabled by IT systems.

C
Business Development Focus for the Utilities Industry

The developing competitive environment in the Utilities sector is placing a new emphasis on customer relations, see Exhibit II-4.

Exhibit II-4

Utilities Industry - Value Added Services



Source: *INPUT*

The new emphasis on customer relations is placing increasing emphasis on the extension and development of existing customer relations processes.

These initiatives being designed to improve the overall relationship with the customer base.

One example of the need for this, beyond simply customer retention in a competitive environment, is the general public's concern over

environmental issues and the need to communicate with customers on these issues.

A number of other important business challenges are facing Utilities industry executives as a result of the new competitive and technological environment, see Exhibit II-5.

Exhibit II-5

New Market Model Challenges

Source: *INPUT*

One of the most profound changes is the tendency for convergence of electricity, gas and fuel markets into a single unified energy market.

There exists also a tendency towards convergence of classical utility supply at the customer interface, thus implying the possibility for water/sewage services to also join together to create unified energy/utility suppliers.

In this environment, privatized organizations have the opportunity to seek new ways to maintain or increase their earnings growth, a

preoccupation of senior executives once the stock of the company is openly traded.

Newly liberalized Utility firms will seek to leverage their capital resources, technology and services know-how, particularly where this relates to efficiency and productivity.

At the same time a belief in the supposed benefits of globalization will also be a driver for privatized firms that believe they can create viable multi-national energy/utility businesses.

These tendencies create the conditions for Merger & Acquisition (M & A) activity to become prevalent and this has already manifested itself on an international basis.

A complementary trend is that of disaggregation and restructuring.

Disaggregation and restructuring are natural developments of the breaking apart of previously vertically integrated Utility organizations.

D
Utilities Industry IT Development

Total IT related expenditure in the Utilities sector in 1997 only accounted for between 2-3% of the all industry European total.

However, as an industry it ranked above average for the proportion of total revenues spent on IT (2.1% against a European all industry average of 1.9%.).

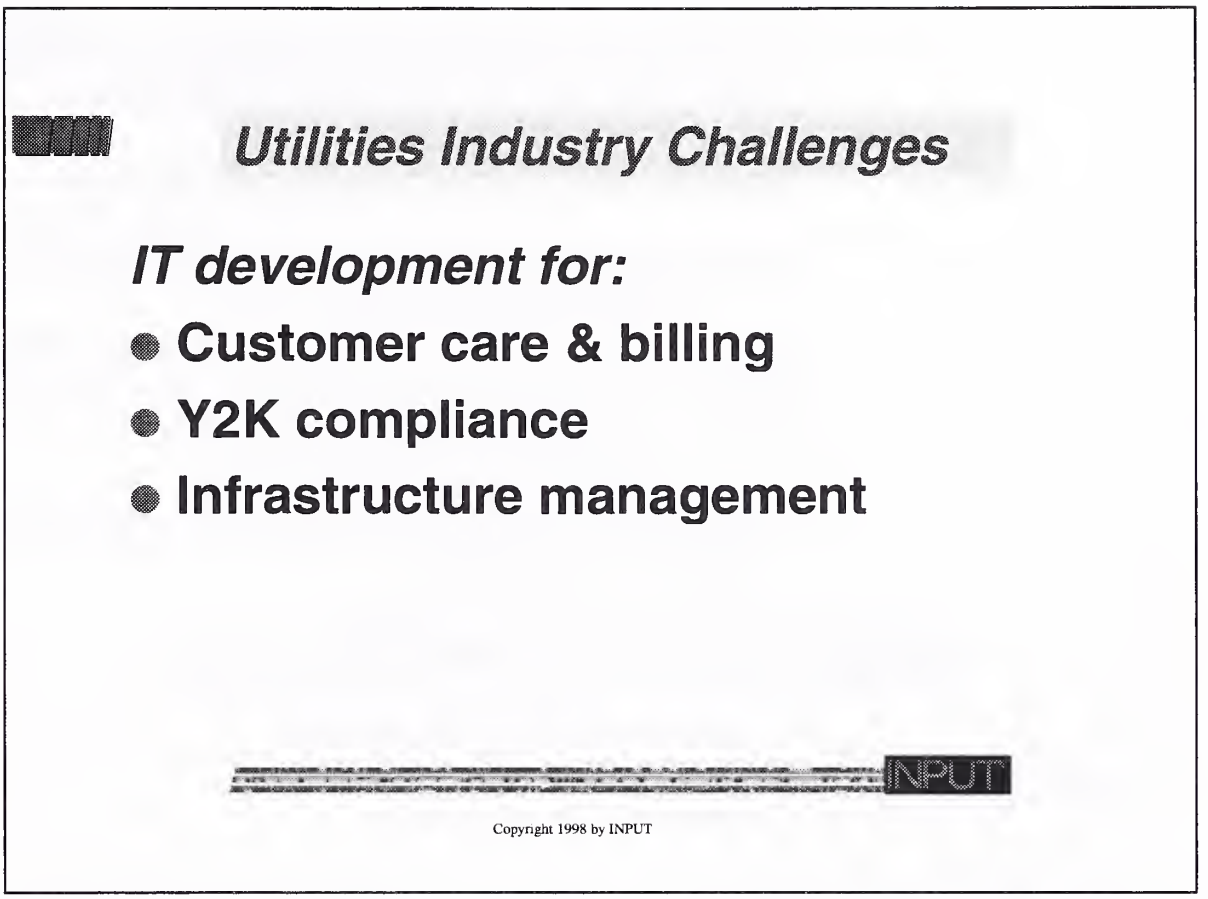
The Utilities industry ranked as the fourth highest growing industry sector in terms of expected growth of spending on IT Software & Services (a 11.3% CAGR for the period 1997 to 2002).

The CAGR for the total of all European industry sectors is forecast at 10.4%.

Exhibit II-6 shows three important areas of focus for IT in the Utilities sector.

Exhibit II-6

IT Development in the Utilities Industry



Source: INPUT

Historically, Utilities sector organizations had focussed their customer systems on billing. Now the customer service dimension is being added

Significant investment must now be devoted to the extension and development, or the complete replacement, of existing customer information systems in order to support these new competitive market requirements.

The Y2K millennium issue is critical for the Utilities industry since it is the provider of the vital ubiquitous energy source (electricity) for society as a whole.

In addition the Utilities industry has specific regulatory requirements to meet in respect of safety and the continuity of supplies.

The fact that the industry operates a significant number of nuclear facilities has also made the Y2K issue key.

It is claimed that more than 90% of safety related systems in nuclear plants are analog, nevertheless many systems are digital and require Y2K compliance.

A nuclear plant may have between 1,000 and 2,000 applications and between 200 and 600 hardware devices containing embedded systems.

Fossil fuel based generating plants may be perceived to be less risky but do face some unique issues. These include environmental emissions compliance, plant room control and time-dependent fuel delivery systems.

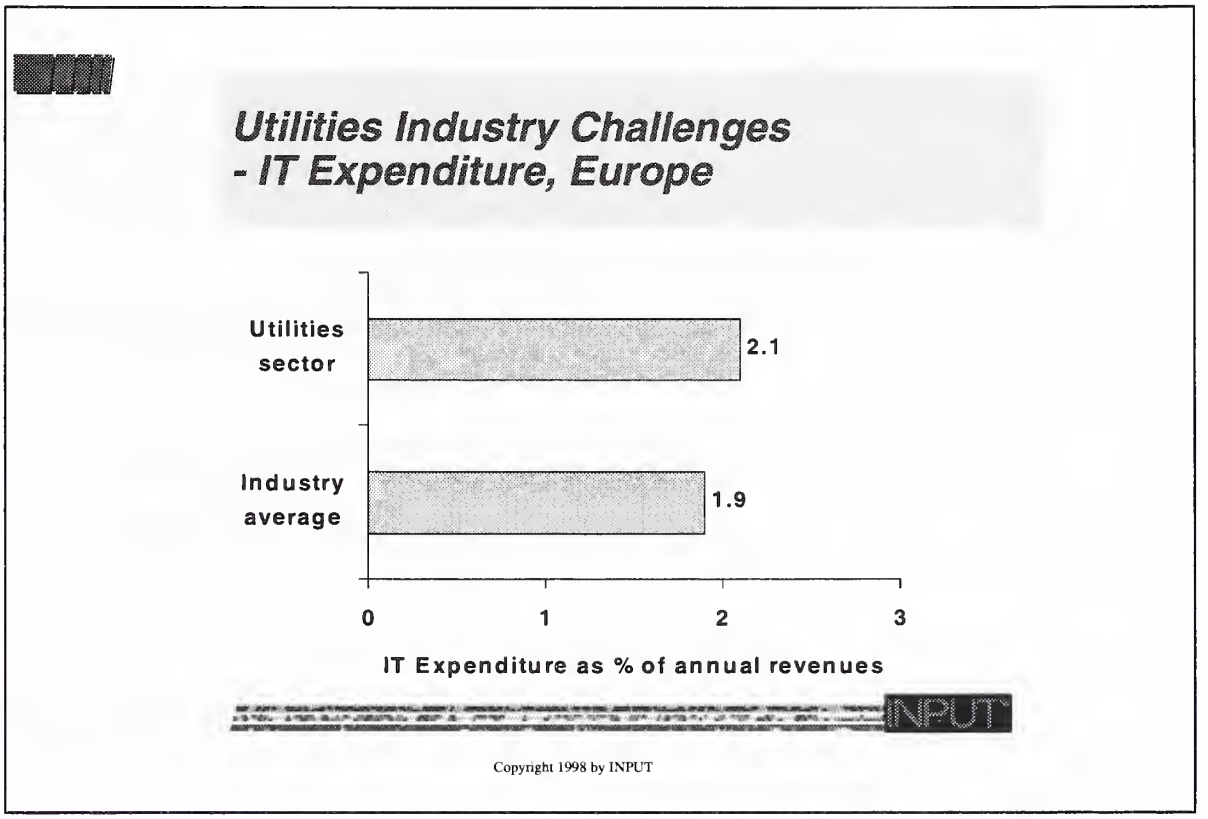
There are many other areas of new technology development for the Utilities sector that support and develop its overall infrastructure. These include:

- Automated Mapping/Facilities Management/Geographic Information Systems (AM/FM/GIS).
- Supply Chain Management.
- Data Mining/Data Warehousing.
- Document Management.

Exhibit II-7 shows the average percentage of annual revenues spent on IT by the Utilities industry.

Exhibit II-7

IT Expenditure in the Utilities Industry



Source: INPUT

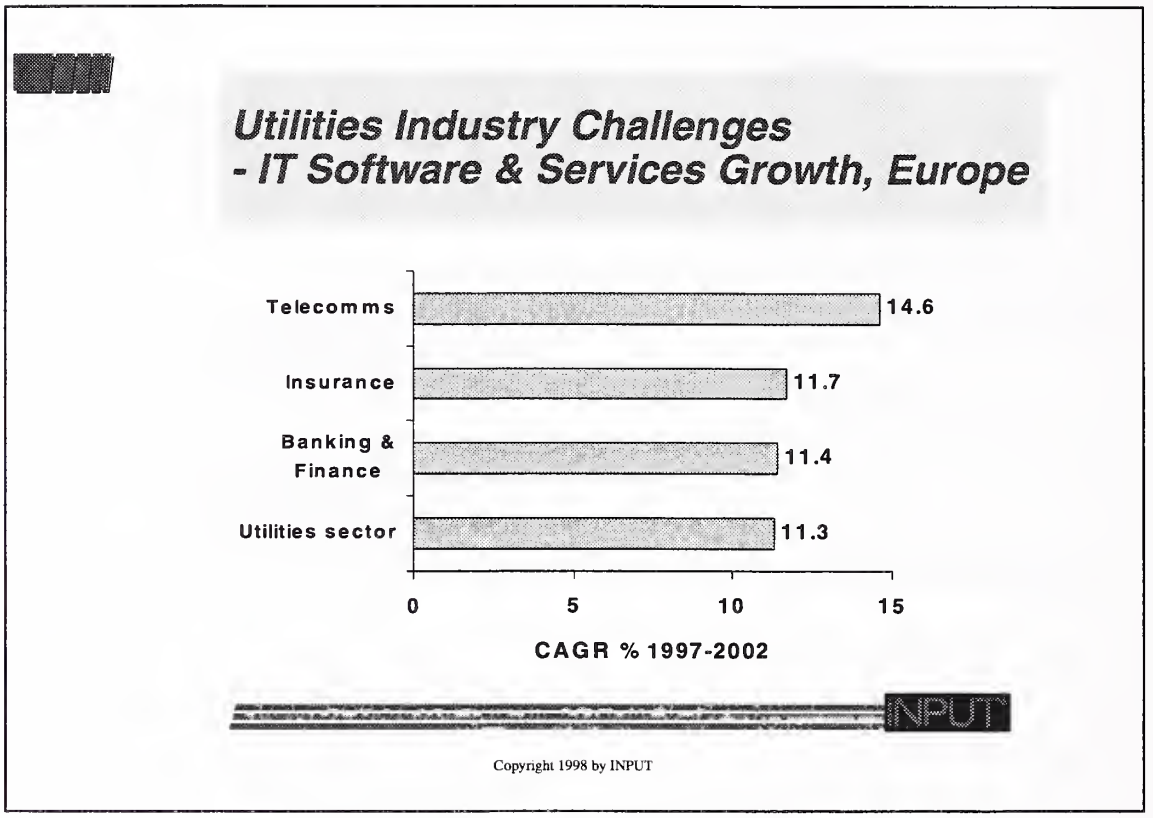
Although this is an above average figure it is well behind key IT spending sectors like Banking & Finance (8%), Insurance (5%) and Telecommunications (4.4%).

The Utilities sector has a relatively strong expenditure on services related to IT and a lower than average expenditure on software products.

Exhibit II-8 shows the leading industry sectors in terms of expected growth for IT Software & Services.

Exhibit II-8

Comparative Industry Sector Growth



Source: *INPUT*

Above average IT Software & Services growth is being fueled by the particular circumstances of the Utilities sector overall. The liberalization of energy markets and the introduction of competition is spurring the roll-out of new IT systems to provide operational support.

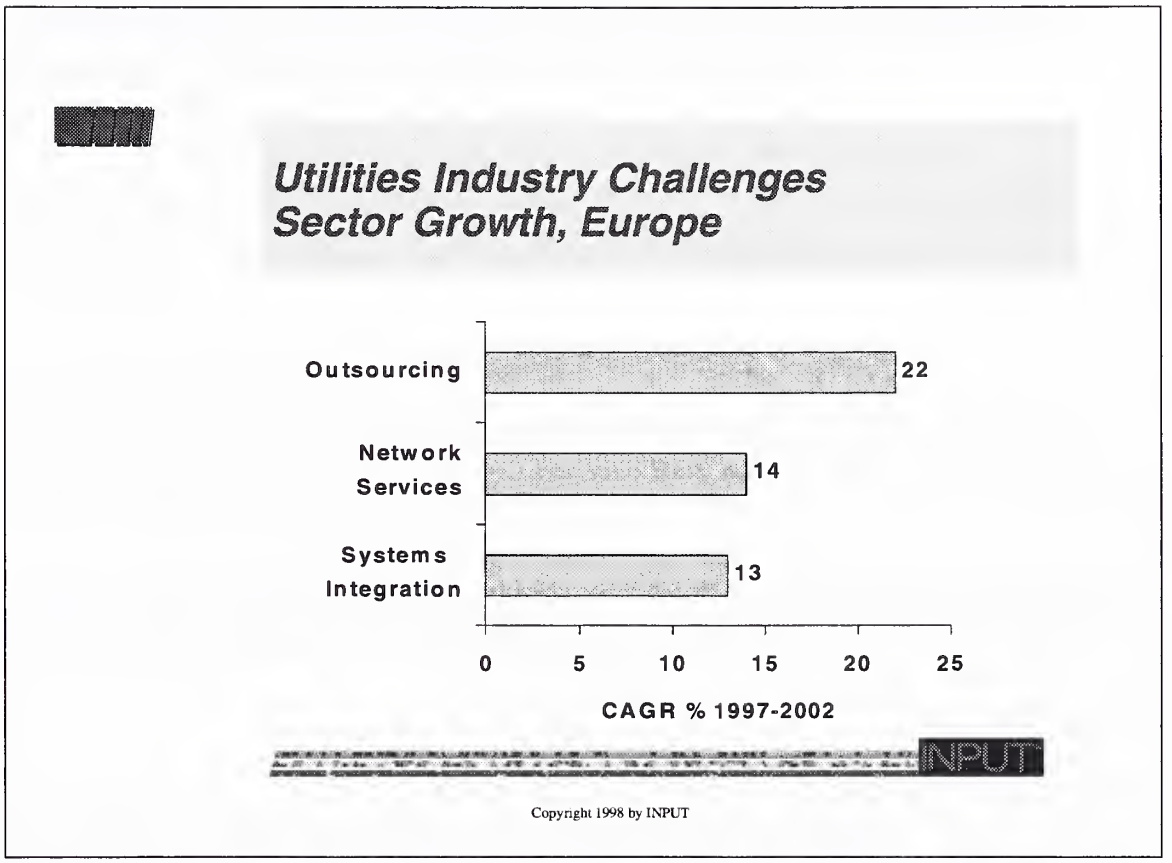
These new commercial pressures are, as already referenced, driving specific application needs, notably Customer Care & Billing, AM/FM/GIS systems and supply chain management systems.

At the same time the Y2K issue is particularly critical for the Utilities industry because of the industries' power generation role.

Exhibit II-9 indicates the key IT Software & Services sectors that are generating this high growth.

Exhibit II-9

Key Utilities Industry IT Sectors



Source: *INPUT*

Outsourcing growth in the Utilities sector is being driven by the challenge of balancing new IT investments with the need to maintain legacy systems in an environment of severe skill shortages.

Additionally the demands for new capital investment in all areas, not just IT, make outsourcing attractive financially.

Outsourcing growth in the Utilities sector will be just a little under the industry average figure of 23% per annum.

The Network Services sector within the Utilities industry will be driven by increased use of EDI and supply chain management systems to create electronic links with extensive networks of suppliers.

Network Services growth in the Utilities sector will be above the industry average figure of 18% per annum.

Although the Systems Integration sector within the Utilities industry is the third highest IT Software & Services growth rate, it is significantly below the industry average rate of 17% per annum.

Similarly the Professional Services sector within the Utilities industry also shows weaker growth in comparison to the industry average, 4% per annum for the Utilities sector in comparison to 65% for the industry.

These forecasts acknowledge the importance of in-house resources for Utilities organizations.

III

Utilities Sector IT Environment

A
Utilities Sector Overview

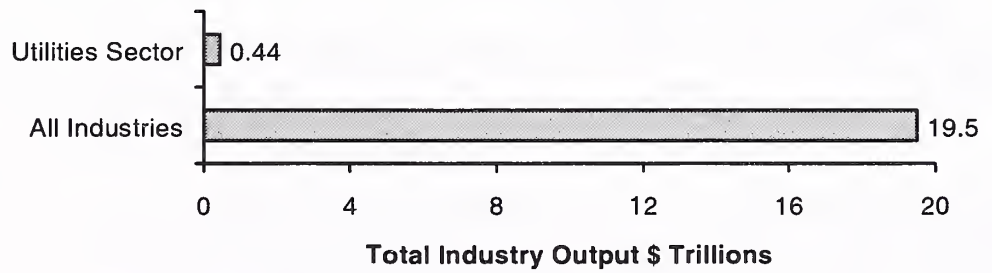
1. Macroeconomic Context

Globally the Utilities sector generates output estimated to total about $1.2 trillion annually. The European Utilities sector accounts for around 36% of this world total.

The Utilities sector accounts for just 2.2% of the total economic output of the European economy as indicated in Exhibit III-1.

Exhibit III-1

The Utilities Sector and Total European Output - 1997



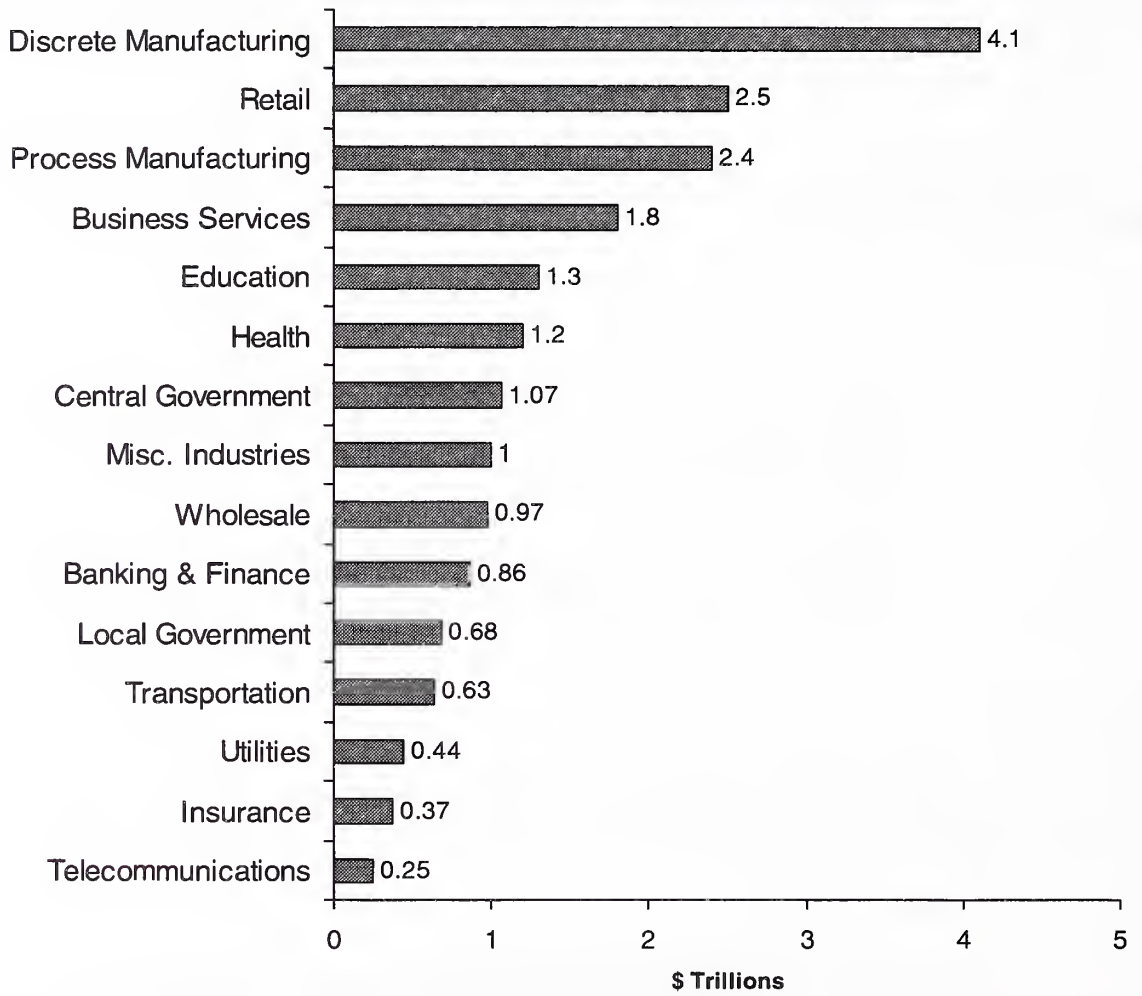
Source: INPUT

The European Utilities sector is the third smallest industry sector measured by output, although it is of course a very critical one. The industry is defined using the industry classification set out by INPUT in detail in Appendix C for the purposes of this analysis.

A comparison of the relative size of the total output for each industry sector is shown in Exhibit III-2.

Exhibit III-2

Total Estimated Output by Industry Sector – Europe, 1997



Source: INPUT

The analysis above measures the total output of each industry sector without regard for the inputs and outputs between sectors. Consequently this analysis is done on a completely different basis from that used to calculate GDP.

Total industry output measures the total value of goods and services produced by each industry without eliminating intra-industry and inter-industry trading.

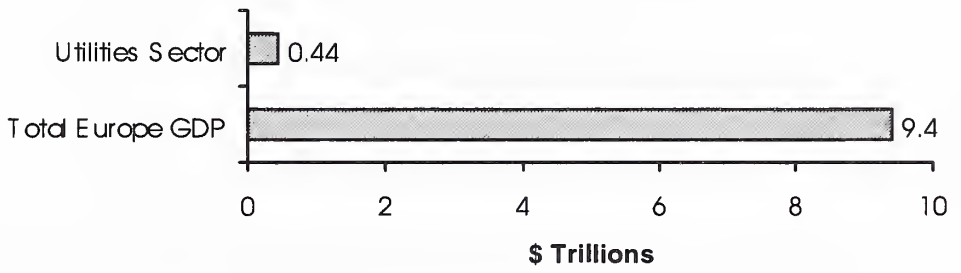
GDP estimates are specifically designed to remove these elements from the calculation.

The Utilities industry sector measured as a proportion of total European GDP amounts to about 4.6%.

A comparison between the relative size of GDP and the measurement of total economic output used here is shown in Exhibit III-3.

Exhibit III-3

GDP and Total Utilities Sector Output – Europe, 1997



Source: INPUT

INPUT uses the total economic output approach in this report, as it is a more meaningful way to conduct a subsequent analysis of the total significance of IT expenditure to the sector.

The metric that is important to industry executives and managers in respect of total industry output is the proportion of IT expenditure to the organizations total revenues or expenses.

The overall proportion of IT expenditure for a sector related to its total output is the benchmark for IT expenditure at the individual firm level. This is discussed in the next chapter.

The electricity supply industry is the most important part of the Utilities sector globally and is the sub-sector of the industry that has undergone the most radical change in recent years as a result of the combination of new technology application and liberalization.

One of the major results of these forces is that the electric, gas and fuel markets are tending to converge into a single unified energy market.

Consequently the electricity generation and supply part of the Utilities industry sector has become an important focus for IT vendors.

The nature of the electricity generation and supply industry is a value chain comprising a variety of specific activities:

- Power plant construction.
- Fuel purchasing.
- Power plant operation.
- Developing and maintaining transmission network infrastructure.
- Operating transmission and distribution networks.
- Bulk electricity trading.
- Customer supply and metering operations.
- Customer care, billing and accounting systems operations.

Historically the model for the electricity supply industry has been that of a vertically integrated state owned organization. The exceptions were the United States and Japan.

The industry structure resulted from the viewpoint of early industry leaders like Edison who forecast that electricity could be made more and more cheaply and that this benefit could be most effectively produced by a vertically integrated monopoly.

For most of the 20th century this forecast was fulfilled in Europe, and in the rest of the world, by engaging economies of scale.

Bigger power generation plants were built whether utilizing fossil fuels, nuclear power or hydro-generation techniques.

Transmission and distribution networks were also established to provide load-sharing capabilities that enabled power plants to operate continuously and therefore more cost effectively.

Since monopoly power can be abused it was a natural development that government regulation should become established.

In most countries today, regulatory authorities exist under government control to set price limits and service levels, monitor financial performance of the utility and determine which fuels are to be used and the environmental standards that are to be achieved.

This 'industry control' by government was in many cases established by full government ownership of the utility.

This was particularly the case in countries with a tradition of public ownership of vital services, notably France.

These conditions and characteristics have come under severe challenge in the last 15 years. The next sub-section discusses these changes and their overall impact on the sector.

2. Key Challenges for the Utilities Sector

The traditional government owned or government regulated monopoly model in the Utilities sector has come under challenge from two principal directions:

- Liberalization.
- New technology.

a. Liberalization

As early as twenty years ago a few governments began to question the monopoly industry model already described above.

Peter Drucker, the management guru, was a strong influence behind the UK's drive for privatization and liberalization of public utilities, for example. This activity started in the early 1980s.

The economic stimulation of this trend was supplied by the emergence of lower cost gas for fueling electricity generation powerplants.

The availability of lower cost gas in turn created the conditions under which investments were made in small-scale gas-fired power generation equipment and this point is elaborated upon below in the next sub-section.

The two trends, liberalization and the impact of new technology have, however, complemented each other.

The trend towards liberalization has manifested itself into three inter-related changes that are having a profound impact on the European Utilities sector. These are:

- Competition.
- Customer choice.
- Privatization.

The liberalization trend caused competition in the supply of electric power to be considered as a viable alternative to government regulation as way of setting prices and controlling the financial performance of the generators.

The introduction of competition means that competitive market forces can be used to set the price of electricity, principally the price of power being transmitted from the power plant.

Customer choice means that users should be able to select their supplier and the terms under which they receive that supply rather than these factors being determined by the monopoly utility alone.

The trend towards introducing customer choice is fueled by a change in the attitudes of governments and the European Commission, the possibility of achieving lower prices for consumers, particularly industrial users, and business demand for new products and services.

The third of these major changes has been the trend towards private ownership of public assets, a trend pioneered in Europe in the UK under the leadership of Margaret Thatcher.

A key driving force for privatization in Europe has been the imperative of the reduction of government deficits, notably for meeting the Maastricht criteria for European monetary integration.

For the Utilities industry in particular a very important factor has also been the requirement for new capital to invest in state-of–the-art new generating capacity.

A further demand on capital has been the need for refurbishment of existing power generation capacity to meet increasing demands for higher level environmental standards.

The need for capital in the Utilities industry has been estimated by McKinsey, the management consultants, at in excess of $1 trillion globally over a period of about ten years.

This amount should be seen in the context of the INPUT estimate that the annual output of the entire global Utilities industry was $1.2 trillion in 1997.

As a result of these changes in the Utilities sector environment the industry finds itself going through a period of profound change.

Electricity generating and supply organizations in Europe are, and will need to go through radical changes that will affect not only their structure but also their economic business model.

Naturally some countries and some utilities are moving faster than others. The full transition is likely to take place gradually in order to ensure continuity of services and to minimize the stress on changing infrastructures, notably for computer systems.

The most significant implementations of de-regulation and privatization to date have taken place in the United Kingdom, already referenced above, and the Scandinavian countries.

Already initiatives are underway within the European Community to introduce competitive markets for electricity.

The European Community has the objective that 33% of the European market should be open by 2003.

This objective looks likely to be overtaken as the UK, the Nordic countries, the Netherlands and Spain area already well on the way to full liberalization.

Even in Central & Eastern Europe there exist initiatives to decentralize and unbundle the electricity generating business. However, these moves are likely to take place at a much slower pace that in the rest of Europe.

Russia does, however, have a plan to sell off half of the equity in its electricity generating and supply monopoly. It also has an initiative to integrate its grid with that of the European Community.

Poland has also taken some important steps in this area, passing laws that call for the privatization of all power plants, local distributors and ultimately the national grid.

b. New Technology

Two broad areas of technological development have been critical for the Utilities industry:

- Small-scale gas-fired generation equipment.
- Information technology.

As already referenced above the emergence of liberalizing thinking in governments related to public utilities coincided with the emergence of plentiful supplies of cheap gas for fuel.

Cheap gas is not perceived in the industry as a short-term phenomenon. Little medium term change is expected by industry experts in respect of this fuel source as it is estimated that with known reserves and current rates of consumption that the world has about 200 years supply available.

Cheap gas instigated investment in research on small-scale gas-fired generators.

An additional factor driving research in this direction is the environmental issue. Gas-fired powerplants are claimed to emit 40% less carbon dioxide than coal-fired plants.

Commitments were made at the environmental conference in Kyoto, Japan in December 1997 to reduce greenhouse-gas emissions. This implies the substitution of coal-fired electric generating capacity with gas-fired capacity.

Allied Signal is one firm that is making significant investments in the development of small gas-fired turbines for the generation of electricity.

Another firm, Ballard Power Systems of Canada, has predicted that it will be able to sell a 250KW generator to small industrial enterprises or similar establishments, e.g. a shopping mall, at prices that will be competitive with the available national grids.

One of the interesting developments that is likely to emerge from this technology is more and more on-site power generation.

This would be a major reversal of the historic centralized generation paradigm of the electricity generation industry based on the force of economies of scale.

Interestingly this would signal a return to the situation that prevailed in the early years of the electricity industry this century when most factories generated their own electric power. (Slough Estates, a privately owned industrial estate, claimed to be the world's first, and situated close to INPUT's UK office, has always generated its own electric power for the use of the firms that rent its facilities.)

The second major technology factor for the Utilities sector has been Information Technology.

The principal impact of Information Technology systems on the Utilities sector has been to make possible the vast amounts of data processing that are needed to support the more complex, open value chain, business model that a liberalized industry demands.

A deregulated, competitive and privatized industry has to be supported by complex commercial functions for:

- Pricing.
- Payment systems.
- Customer service systems.

It is only through the introduction of IT based process management systems that these challenges can be addressed.

The new competitive environment being introduced into the Utilities industry will force a focus on cost reduction and process efficiency.

These will in turn lead to significant reengineering of internal processes, purchasing systems and the delivery of improved customer service in an economic way.

It will further force a re-examination of the specific businesses that the organization addresses as the vertically integrated industry model fragments.

The competitive environment and the ensuing price competition also point towards the need to develop and introduce higher value-added services to maintain and enhance customer loyalty and satisfaction.

These higher value-added services are a key feature of the Electronic Business environment. They are derived and built from business systems that can only be built and delivered with the support of sophisticated IT systems. They confer significant competitive advantages to their suppliers.

Many other industry sectors are exhibiting this trend towards higher value-added service provision, for example the logistics industry, travel services and of course IT services.

The principal IT issues and trends affecting the Utilities sector are explored further in the section C. below.

In addition to computer processing the developments in the telecommunications technology sector are also of considerable significance to the Utilities sector.

For example telecommunications technology is being developed for automated meter reading via cable or wireless networks.

Wireless technologies are likely to be increasingly adopted in order to improve customer services and thus brand loyalty in an ever more competitive environment.

In a parallel but different sphere of activities a number of Utility organizations, Energis in the United Kingdom is a notable example, are developing or exploring the leveraging of their existing transmission infrastructure and support functions to enter the data and voice communications business. This external convergence is touched on again below.

B
Background Trends and Economic Assumptions

1. Utilities Sector Trends

Other important trends that are likely to be of importance to the Utilities sector in Europe include the following:

- Convergence.
- Mergers and acquisitions.
- Disaggregation and restructuring.

The topic of convergence was alluded to in the previous section. Convergence concerns external as well as internal activities.

External convergence could include activities involving the information technology industry and the telecommunications industry.

Internal industry sector convergence would imply adoption of the integrated energy/utility supplier concept that would encompass gas and water/sewage services as well as electricity.

The incidence of merger and acquisition activity in the Utilities sector is notably on the increase.

Privatized organizations will seek new ways to maintain or increase their earnings growth.

Utilities firms will seek to leverage their capital resources and technology and service know-how, particularly where this relates to efficiency and productivity.

A belief in the supposed benefits of globalization will also be a driver if privatized firms believe that they can create viable multi-national energy businesses.

Complementary to these initiatives will be the trend towards disaggregation and restructuring.

This trend will be a natural development of the breaking apart of previously vertically integrated utilities as managers examine their cost models within the new realities of a competitive and privatized business environment.

2. Overall Economic Assumptions

The forecast for the European Utilities sector IT Software & Services market contained in this report are based on a fundamentally positive economic scenario.

However concerns exist about the Far Eastern economic crisis and its possible knock-on effects for the European economy as a whole.

GDP growth is now forecast at about 2.7% per annum for Western Europe as a whole with inflation forecast to continue at around its current level.

In this economic scenario unemployment is not expected to rise higher than current levels.

This forecast is, however, contingent upon continued economic recovery in Germany where growth is forecast to reach 3% over the next year.

The positive economic scenario put forward here views the Far Eastern crisis as a timely intervention that brakes 'out of control' economic growth that would have otherwise been addressed by central bank interest rate hikes.

I should, however, be recognized that a far worse financial impact, than that assumed here, could yet impact the European economy. This is a continuing risk until the Japanese authorities have demonstrated that they have taken sufficient action to stabilize their economy.

Economic assumptions for the four major European economies and the Central & Eastern European Region are summarized below.

a. Germany

Economic growth:
– Official growth target for 1997, 2.2% and 2.8% targeted for 1998
– Rate of growth inhibited by the controls for entry into Maastricht and large transfer payments to Eastern Germany.
– Growth will be stimulated by improving export prospects as currency appreciation is reversed.
– Overall growth rate in 1996 of 1% is largely accounted for by Eastern Germany's subsidized 3% growth rate.

Employment:
– 49.1% of the German population is represented within the working population, against a European average of 55%.

Unemployment:
– 10% level is expected to continue throughout 1997 and 1998
– Eastern Germany now has an unemployment rate of 20%
– Tax reforms are expected to stimulate employment prospects into 1998 through improved export conditions and increased internal consumption.

– GDP deflators are estimated at:
1996 1%
1997 1.2%
1998 1.1%

b. France

Economic growth:
– Official growth target for 1997, 2.5% and 2.8% targeted for 1998

Employment:
– 45% of the French population is represented within the working population, against a European average of 55%.

Unemployment:
– 11.9% level for 1996 is expected to decline to a slightly improved 11.6% in 1997

GDP deflators are estimated at:
1996 1.2%
1997 1%
1998 1.4%

c. United Kingdom

Economic growth:
– Official growth targets
1996 2.1%
1997 3.0%
1998 2.7%.
– The U.K. assimilates 40% of direct investment from outside the European Union.
– The United Kingdom has decided not to enter the European Monetary Union in 1999, which may act to inhibit growth initially

Employment:
– 49.4% of the UK population is represented within the working population, against a European average of 55%.

Unemployment:
–6.1% level for 1997 is expected to decline slightly into 1998
– The decrease in the rate of unemployment has not had a significant effect on the long term unemployed (over 1 year), which remains at a 3% level.

GDP deflators are estimated at:
1996 3.1%
1997 2.3%
1998 2.2%

d. Italy

Economic growth:
– Official growth target for 1997, 1% and 1.8% targeted for 1998
– Rate of growth limited by firm macroeconomic controls designed to meet Maastricht criteria (e.g. inter-alia to address Italy's mountain of debt estimated at about 120% of GDP, double the required criteria level)
– Italy well behind the recovery cycle of the French and German economies.

Employment:
– Only 42% of the Italian population is counted within the working population, against a European average of 55% -however note the presence of a very significant underground economy

Unemployment:
-12.2% level not expected to change markedly in near term
Significant difference between the export-oriented North and the public sector dependent South
– Labor market situation heavily influenced by the underground economy.

Inflation:
– Consumer price index changes estimated at:
1997 3.0%
1998 2.9%
– Unit labor cost increases are estimated at:
1996 4.7%
1997 3.4%.
– GDP deflators are estimated at:
1996 4.5%
1997 2.4%.

e. Central & Eastern European Region

Russia's economy, the largest in the Region, is predicted to be about to complete its first full year of economic growth since the end of the Soviet Union.

Growth is expected to go from the 1% achieved in 1997 to 3% in 1998 based on an expanding export trade.

The OECD and other economic forecasters are also predicting improved growth for Hungary, 3.5% in 1998 compared to 2.5% in 1997.

Similarly economic commentators see the strong possibility of an economic revival in the Czech Republic which has only registered GDP growth at about the 1% level in 1997.

C
Information Systems Environment

The Utilities sector in total only accounted for 2.3% of all IT related expenditures in Europe in 1997. However, as an industry it ranked above the European average for the proportion of total industry revenues (industry output) spent on IT related activities.

The Utilities industry averaged 2.05% of annual revenues spent on IT in 1997 in Europe compared to the average across all industry sectors of 1.94%.

Chapter IV below provides a detailed analysis of IT related expenditure, and specifically of IT Software & Services expenditure within the sector. Chapter IV also provides comparisons with other industry sectors.

The significance of IT to the Utilities sector has already been referenced in the previous sub-section.

The IT challenge for Utility organizations is the allocation of appropriate investment funds in competition with all of the other demands on capital as the industry progresses through a period of significant restructuring.

Three IT related areas are discussed below:

- The Y2K Millennium issue.
- Customer Care & Billing Systems.
- Other IT areas e.g. AM/FM/GIS.

1. The Y2K Millennium Issue

The Y2K Millennium bug issue is rapidly becoming a major issue for the Utilities industry.

Like other industry sectors preparedness for it seems weak with every indication that only now are Utility sector managers and executives really waking up to the full implications for their sector.

However, unlike a number of other industry sectors, the Utilities industry not only provides the critical energy for modern society and commerce to function but also has particular regulatory requirements to meet in respect of safety and the continuity of supplies.

These requirements are shown in particular relief in respect of the nuclear power generation part of the industry.

Some regulatory authorities may demand that each nuclear facility, for example, prove conclusively that it is Y2K compliant or be shut down prior to the Millennium. Some experts believe that it will not be possible to prove that any plant or organization is fully Y2K compliant.

Y2K compliance at a nuclear facility is likely to include at least a detailed review of all systems linked to safety measures, the following is representative:

- Electro-mechanical systems such as reactor control, turbine control, event logging, safety related embedded control systems, emergency core cooling systems etc.

- Nuclear safety-significant administrative systems such as plant maintenance scheduling and commitment tracking.

Some industry observers have tried to play down the Y2K threat for nuclear facilities. The claim is that it may not be that significant an issue due to the fact that analog technology predominates.

It has been estimated that in a typical nuclear power plant more than 90% of the safety-related systems are analog, that they are not driven by digital computers, so not use data-bases to support them and so not have date driven functions.

This may be reassuring but the fact remains that there still exist plenty of systems that are digitally based, for example surveillance, testing, emergency management, event reporting and other safety-related systems.

All of these systems are required to be operational if the plant is to continue running.

The distinguishing characteristic of nuclear power generation plant in comparison to those using fosse fuels is the greater range of automatic safety and support systems. Consequently the Y2K issue is as much an issue of scale as it is of complexity.

For example a nuclear plant may have between 1000 and 2000 applications in total and between 200 and 600 hardware devices containing embedded systems.

Fossil fuel based generating plants may be less at risk than nuclear plants but face some unique issues of their own. These will include environmental emissions compliance, plant room control and time-dependent fuel delivery systems.

Time dependent fuel delivery systems may cause particular concern since the fuel is delivered by third parties, e.g. a railway freight operator, that may not be Y2K compliant in all of their systems.

It is also important to note that skepticism should be maintained with regards to Y2K compliance statements made by other organizations, whether trading partners or vendors of IT products.

As for many other sectors of industry and commerce a major problem for the Utilities sector is that not enough time and attention or money has as yet been applied to the Y2K issue.

2. Customer Care & Billing Systems

The new competitive environment being ushered in to the Utilities sector is placing a new emphasis on customer relations.

This is in turn placing increasing emphasis on the extension and development of existing customer information systems in order to adapt them to new business requirements.

A further driving force for customer information systems is environmental concerns.

These are causing Utilities to see as crucial the need to communicate with their customers to address and allay fears concerning the installation of new power generation plants.

They are also of value in keeping the public informed when a major power outage occurs or when some other customer facing issue arises.

Historically, Utilities sector organizations had focused their customer systems just on billing. Now new dimensions are being added as the focus on customer retention and marketing become important competitive factors.

For example a focus on customer care capabilities.

For some Utilities customer care and billing systems will need to accommodate the requirements of maintaining independent marketer relationships.

3. Other IT Investment Areas

An enormous variety of applications areas exist within the Utilities sector.

One of the significant characteristics of Utility sector data processing needs is the huge amount of data that needs processing.

In addition to huge customer databases Utilities need to store and access a vast amount of data associated with the location of their facilities in the geographic area they cover. It is in this latter area where Utilities have significant needs for handling 3D/4D, seismic and other real-time feeds.

Consequently the Utilities sector is an attractive market for powerful databases and supporting information management tools.

In addition to the increased use of IT solutions to help address the cost saving and competitive needs of management, the industry must also maintain systems that document regulatory compliance and that are available at all ties to the regulatory authorities.

Nuclear systems, in particular, need to retain lifetime records. For example, plant description documents and operations records must generally be on-file and available for 10 years after a plant de-commissioning.

This implies a 40-year span in total for record keeping. Personnel records usually need to be maintained for a similar period.

Some of the most important applications of IT in the Utilities sector today are:

- Automated Mapping/Facilities Management/Geographic Information Systems (AM/FM/GIS).
- Supply Chain Management.
- Data Mining/Data Warehousing.

- Document Management.

AM/FM/GIS systems are of wide applicability to the Utilities sector. Suppliers of such systems include firms like Intergraph Corporation and CADTEL Systems, Inc.

These systems offer enormous potential benefits to Utilities organizations, principally in enabling them to automate control of their complex distribution and transmission systems.

These systems usually require that all facilities data is converted into a database at the outset of the project. Subsequently the applications are developed to utilize the data.

Unfortunately many potential AM/FM/GIS type projects are held back or cancelled because of the extremely high cost of carrying out the data conversion at the outset of the project.

For example, a Utility serving some 1.7 million electricity customers estimated data conversion costs at anything between $20 million and $40 million.

Utilities are advised to evolve their use of such systems by reversing the process. This is effected by getting the applications to drive the data conversion requirement and thus to convert data only as it becomes necessary.

Additionally the applications schedule can reflect the desirable aim of getting multiple applications running off the same data.

For example applications such as Transformer Load Management (TLM), Feeder Analysis and Outage Analysis are three that can all be run off the same database.

Supply Chain Management is an area coming strongly into focus as the Utilities industry seeks to reduce costs, reengineer internal processes and improve its external transactions with suppliers.

Supply chain management improvements are important to the Utilities industry because the value of materials and services purchased for capital or operational purposes are typically about 50% of non-fuel operating expenses.

Some indication of how valuable supply chain management improvements can be to the Utilities industry is given by the following statistics:

- Lead times for materials reduced by 90%+.
- Supply chain process expenses reduced by 40%+.
- Prices for goods and services reduced by up to 10%.

In addition Utilities firms that have implemented Supply Chain Management systems have cut inventories significantly and gained advantage from improved management data for financial control and operational support.

Data Mining/Warehousing technologies can also have significant potential for the Utilities sector.

Utilities sector organizations have amassed over the years a substantial volume of demographic, transactional and usage data.

Data mining and data warehousing applications offer the opportunity to exploit this data for competitive advantage and increased sales, for example through:

- Market segmentation and targeted offerings to consumers.
- Identifying potential new customers.
- Including cross selling where appropriate in monthly billing statements.
- Identifying the potential for possible added value services.

Other application areas are Computer Aided Design and Engineering (CAD/E), Document Management and Workflow systems.

The development of new business in the Utilities sector has placed document creation, production and control under the spotlight of cost reduction.

The typical document related problems of time spent keying and rekeying customer data, proofreading and collating documents are a major issue for Utilities organizations.

The Utilities industry thus represents a major opportunity for vendors to support the automation of document production and assembly in order to eliminate manual tasks and reduce costs.

If automated document production is controlled by the users within the organization, customer service is enhanced and productivity is improved because of the initial accuracy of the data entry being maintained throughout the system.

Document management is a particularly important application for the support of productive maintenance operations. Fast, consistent access to current data is what drives efficient repair processes.

D
Representative IT Vendors Serving the Utilities Industry

This section contains brief descriptions of the Utilities sector related activities and capabilities of a number of representative vendors serving the industry.

Not all of the firms identified in this section market their products or services in Europe. Those that do not would make ideal targets for co-operative marketing or re-selling arrangements.

1. Altris Software, Inc.

Altris Software provides document solutions to the Utility sector in both the United States and Europe.

Altris Software's products are designed as toolkits that can be linked to other applications. They are designed to do this in a way that does not require modification of the underlying applications database. The benefit of this to the Utilities operator is that this usually means that regulatory re-certification is not necessary.

Altris Software's client/server product components are available on a variety of platforms including UNIX (Sun Microsystems, H-P, IBM and Silicon Graphics) and Microsoft Windows systems.

2. Andersen Consulting

Andersen Consulting recognizes the Utilities sector as a major focus of its activities, as is evidenced by its *Utiligent* enterprise and its Utilities Industry Center of Expertise.

Andersen Consulting launched its Utiligent enterprise in June 1996. The purpose of the enterprise being the provision of a Utilities sector specific customer service system to be delivered on a subscription basis via a network.

One of the principal drivers for the Utiligent system was the need for more active customer management in newly opened Utility sector markets.

Through improved customer services functionality, a more pro-active form of customer management can be practiced in order to address the issue of customer retention.

In addition to customer service functions the system offers other customer related delivery functions geared to the de-regulation of the US Utilities market. These functions include flexible pricing capabilities as well as marketing functions.

The systems are delivered completely on client/server technology; the only mainframes involved are those operated by the Utility sector client. Once the system is connected to the Utiligent network the functions are accessed and purchased on a per-transaction basis.

The Utiligent system provides for advanced billing functionality in order to replace tasks that are often completed manually, customer commitment scheduling, customer outage information, customer-based billing and point-of-sale telemarketing of related services.

Andersen Consulting has formed a joint venture with BBN Corporation in order to establish the service over the Internet rather than on a private network. The network service is intended to provide:

- An electronic suite of essential business processes such as billing and order processing.
- Data operation centers delivering 24x7 service throughout the year.
- Secure network infrastructures to support multiple levels of privacy and fully meet client requirements for performance and availability.

The Utiligent system was based on a system developed and installed by Anderson Consulting at a US based utility, Northern States Power in Minneapolis.

Andersen Consulting also offers a Utilities Industry Solution as a configuration tool for use with SAP R/3 systems. It features:

- Fully configured tables.
- Configuration rationale.
- User scripts and Lotus Notes Screen Cams.

The Solution is claimed to be able to help utility organizations to understand how the R/3 software will impact the enterprise. It will also help the implementation teams to overcome the inertia present when projects get started.

In total the Andersen consulting Utilities sector industry practice counts on more than 2,500 professional staff, who assist clients with strategy development, benchmarking and the application of best practices, reengineering and change management.

The Utilities specific areas in which Andersen Consulting claims significant expertise include; consumer services, energy delivery energy management, marketing and trading, power generation and production, corporate services and organizational transformation/thought leadership.

3. Cincom

Cincom markets a system call AuroraDS to the Utilities sector, which is an applications solution for automating document production by placing the full control of the production of documents into the hands of the originating departmental users.

Cincom's Document Solution Group has systems partnerships with IBM, Hewlett-Packard, Digital and Microsoft.

Additional the Group maintains strategic relationships inter alia with Xerox Open solutions and Lexmark.

4. IBM

IBM Global Services partners with Siemens to provide Internet-based trading of electric power for the Utilities sector. This services, Energy Network Exchange, is similar to other services offered by IBM to specific communities, the Insure-Commerce services to the Insurance sector and the PetroConnect service in the energy sector.

5. Intergraph

Intergraph Corporation provides a number of products and applications solutions that are targeted at the Utilities sector. These extend to consulting, systems integration and migration services.

Intergraph's electric template, for example, is an industry-specific software product based on best practices to provide a shorter design and development cycle and faster start up.

The template includes extensible capabilities including a data model and symbols library, as well as capabilities to create and maintain the database, performs analysis and modeling functions that integrate with complementary operating systems.

The template, intended to be integrated into the facility model of the total enterprise workflow, includes the following functions:

- Facility, intersection and index locates.
- Reference documents.
- Network tracing.
- Construction prints.
- Primary circuit maps.

Intergraph Corporation also offers an extensive capability in the area of AM/F/GIS. Their complete facility asset management system enables existing data to be spatially enabled in order to integrate operational support systems (outage analysis, work management and engineering analysis).

This capability is also extended buy its capability to be interfaced to SAP's R/3 system. This means that corporate departments such as finance and accounting, manufacturing, and marketing and planning can now receive spatially enabled date from GIS which is integrated into CAP's R/3 business applications automatically.

Intergraph Corporation also markets a software development environment that complements its AM/FM/GIS products.

FRAMME, Facility Rulebase Applications Model Management Environment development software supports both tabular data and graphical data within a single environment.

6. Sema Group

The Sema Group has a number of important Utility sector contracts in Europe:

- Transco, the gas transportation arm of British Gas, is working with the Sema Group to develop its infrastructure management systems designed to enable Transco to operate in a newly created competitive gas supply environment.
- The Sema Group is part of the Swedish ComMet consortium, which is developing a number of value-added services, related to new systems for recording electricity usage. A pilot project has been set up with Botkyrka Energy.
- Thames Water has a seven-year outsourcing contract with the Sema group which includes commitments to service delivery for the Utility.
- The Sema Group has built command and control systems of power general for Electicite de France's new generation N4 nuclear PowerStations. This system is bases on the Sema Group's data processing and control system ADACS software product. It is also being used for the development of a national energy management system being built for EDF.

7. Syseca

Syseca is the software and services subsidiary of Thomson, the major French electronics group.

Syseca's overall offering to the Utilities sector is described as the 'Information Line for Energy' and is claimed to embody 25 years of energy industry experience.

The offering includes functionality for control and supervision, safety functions, specific process models, communication networks and information systems handling for geographic data, pricing and customer care.

The Syseca Information Line for Energy is based on open client-server principles in order that it can integrate all functions and provide interoperability with enterprise information systems and real-time systems such as SCADA.

In the UK APMS (Advanced Process Management System) was developed by Syseca Ltd. for National Power as a control and supervision system for optimizing the availability and profitability of generating plant.

The system is designed to meet generating firms' needs for improved efficiency in a competitive environment whist making maximum use of legacy systems.

The system architecture is based on a multi-processor Digital Alpha running UNIX, supporting the Hewlett-Packard RTAP/Plus database with enhancements made by Syseca.

Syseca continues to work very closely with EDF (Electricite de France) and is involved in a joint activity with EDF for the modernization of the Russian utility RAO EES ROSSIA, a corporation with Federation wide responsibility for managing and coordinating the whole of the Russian electrical energy sector.

8. Telco Systems

Telco Systems, headquartered in Norwood, Massachusetts, is a provider of integrated access solutions for telecommunications provision. These are of particular concern to Utilities organizations since many operate wireless communications and telemetry systems.

Telco Systems feature solutions for network access, broadband transmission to support voice, data, SCADA and protective relay communications.

Telcom Systems' Utility sector customers include Brazos Electric, Kamo Power and Grand River Dam Authority and Pan Energy.

9. Trajecta, Inc.

Trajecta, Inc., based in Austin, Texas, is a vendor that offers data mining software products.

Trajecta's data mining applications cover, cross selling, market basket analysis, fraud detection, pricing, prospecting, resource allocation and customer retention.

Trajecta, which utilizes the byline, Intelligent Intuition, focuses on all industries that make particular use of data mining. In addition to the

Utilities sector, it also addresses the Automotive, Financial Services, Pharmaceuticals, Insurance, Retail and Telecommunications sectors.

Trajecta has an alliance with Source Informatics and a VAR agreement with Acxiom.

10. Xerox.

Xerox Engineering Systems targets the Utilities sector with a number of document management products and services.

For example, the Xerox Virtual Printroom (XVP) is a document distribution system than can create automated, enterprise, wide access to technical documents.

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IV

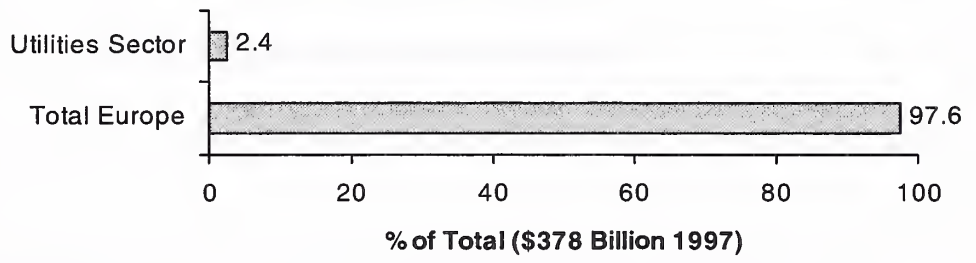
Utilities Sector IT Market

A
Total IT Budget for the Utilities Sector

The Utilities sector accounts for 2.4% of all IT related expenditure in the European market. Exhibit IV–1 shows the proportion of Utilities sector expenditure as a proportion of the total amount spent by European organizations on IT related items.

Exhibit IV-1

Utilities Sector IT Related Expenditure - Europe



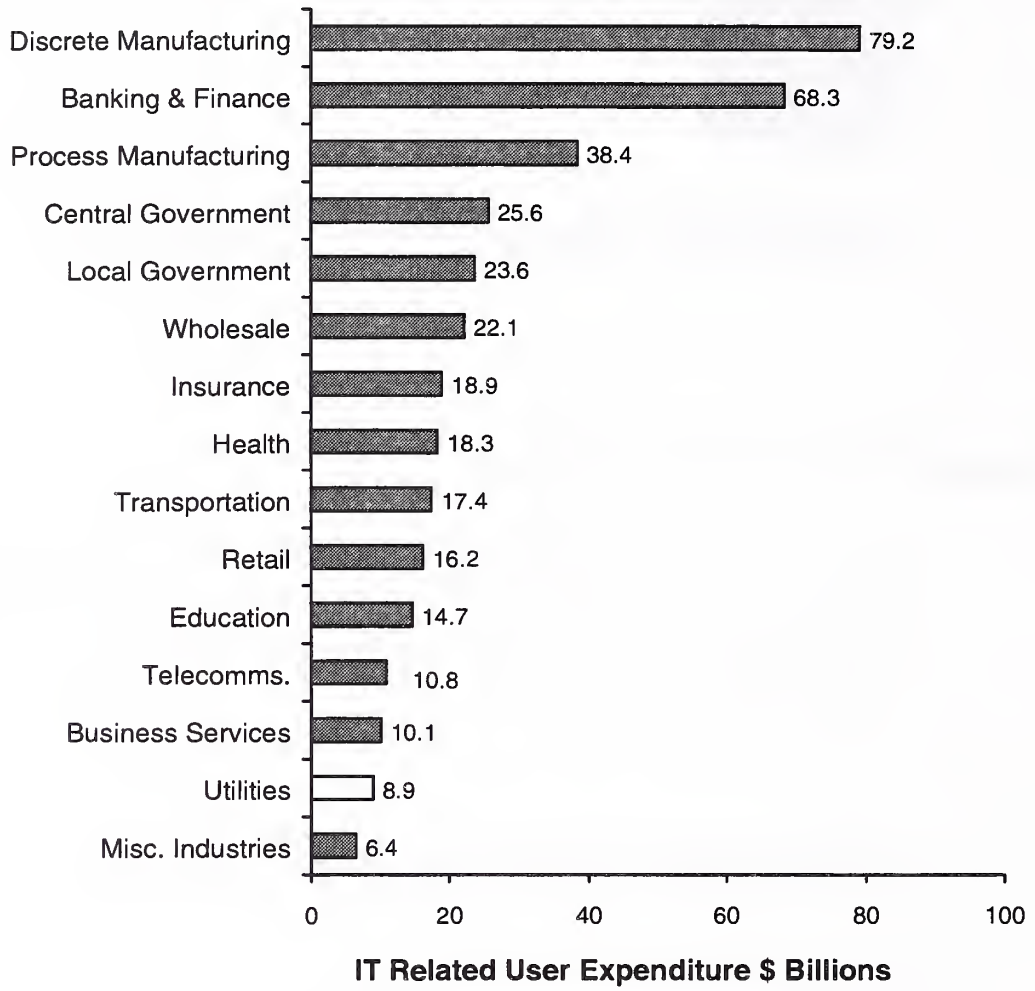
Source: INPUT

In comparison with other industry sectors the Utilities sector ranks only as the second smallest individual industry sector overall as is shown in Exhibit IV-2.

A fuller comparison of the Utilities sector with other industry sectors is provided in Section C of this Chapter below.

Exhibit IV-2

Industry Sector Comparison – Europe



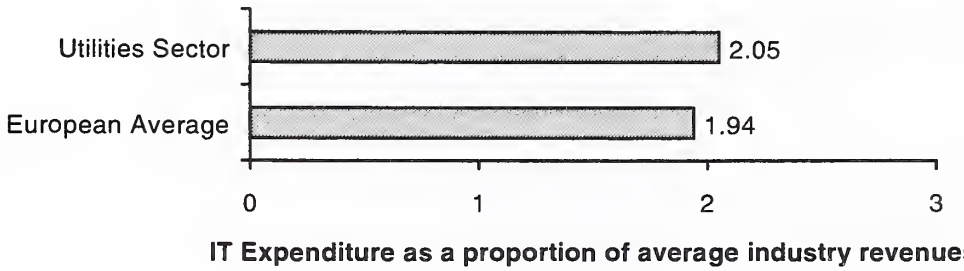
Source: INPUT

As a proportion of total industry output (the average for the individual organizations in the sector) the Utilities sector spent 2.1% of its revenues on IT in 1997.

Exhibit IV-3 shows the comparison of the Utilities sector with the average for all European organizations and Exhibit IV-4 in comparison with other major industry sectors.

Exhibit IV-3

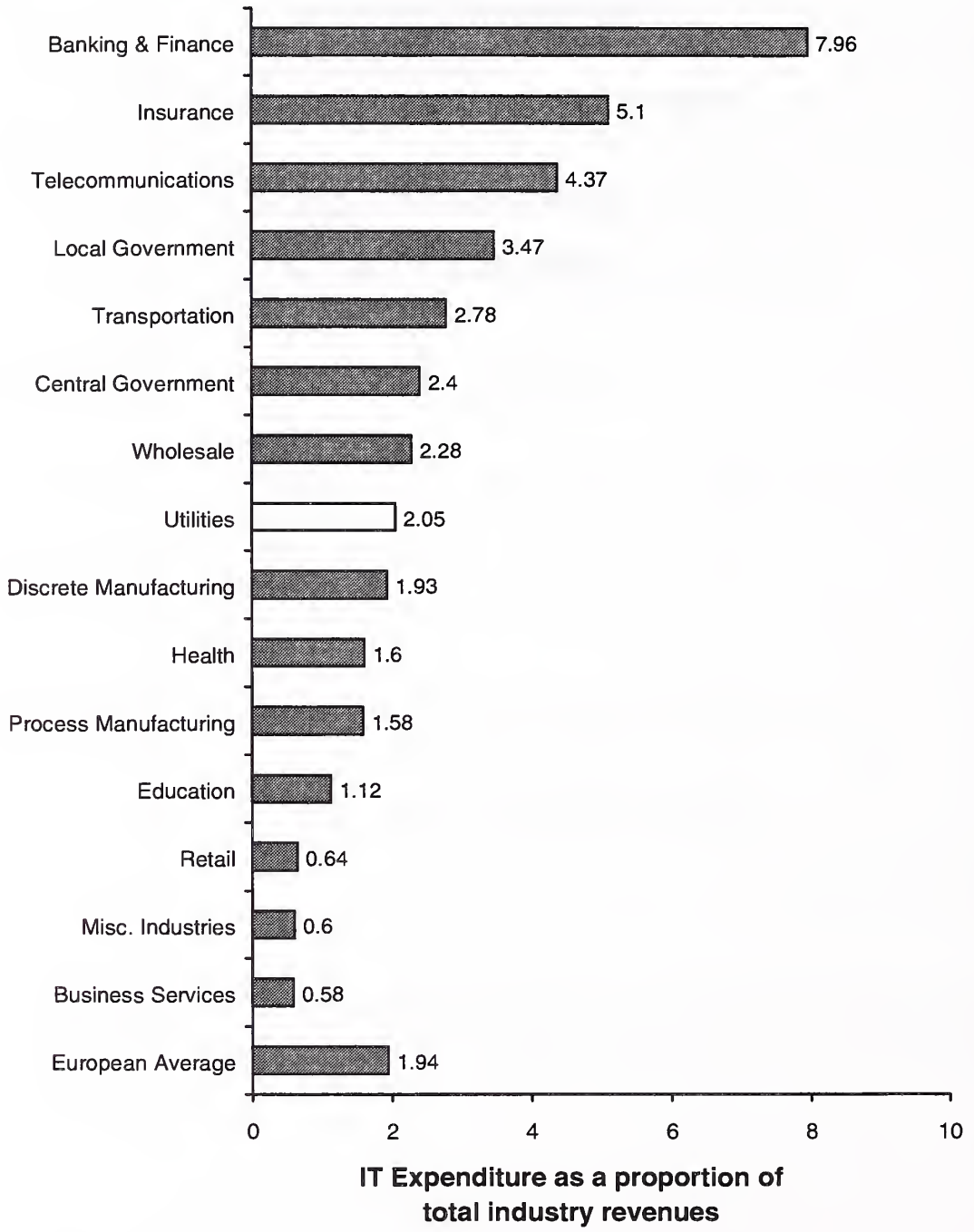
Utilities Sector IT Expenditure Comparison



Source: INPUT

Exhibit IV-4

Industry Sector Comparison – IT Expenditure Europe



Source: INPUT

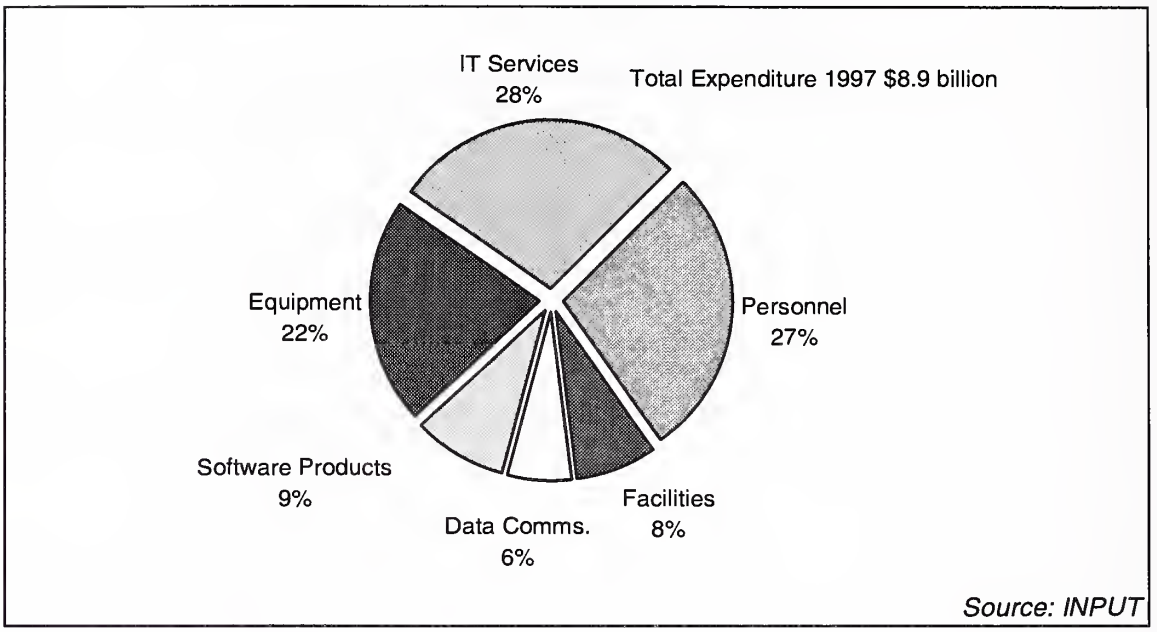
INPUT analyzes total IT related expenditure into six principal categories. Exhibit IV-5 shows the analysis of total IT expenditure for the Utilities sector in Europe.

These six categories are:

- Equipment sales — expenditure on computer and data communications hardware products.
- Personnel— expenditure on permanent in-house staff excluding all externally provided people and contractors.
- Software products — all expenditure on systems software products and applications software product licenses including support services where these are included within the basic license fee.
- IT services — all expenditure on professional services, systems integration, outsourcing, processing services, network services, turnkey systems and systems software product support services and applications software product support services but excluding the provision of any products whether hardware or software. (NB. This is a narrower definition of services than used by INPUT for its full assessment of IT Software & Services markets as provided in Section B of this Chapter below.)
- Communications — all expenditure on IT-related data communications services.
- Facilities — IT budget expenditure on overheads such as space, heating, lighting, furniture, vehicles etc.

Exhibit IV-5

Utilities Sector – IT Budget Analysis - 1997

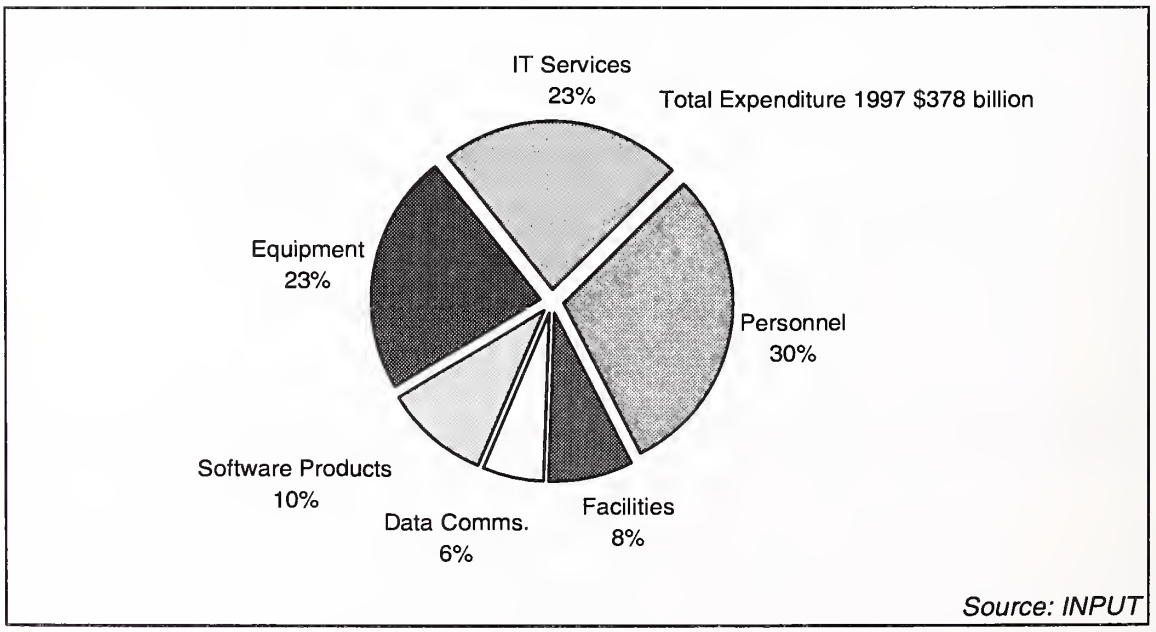


Source: INPUT

Exhibit IV-6 shows the same analysis (as in Exhibit IV-5) but for the whole European market.

Exhibit IV-6

Europe – IT Budget Analysis - 1997



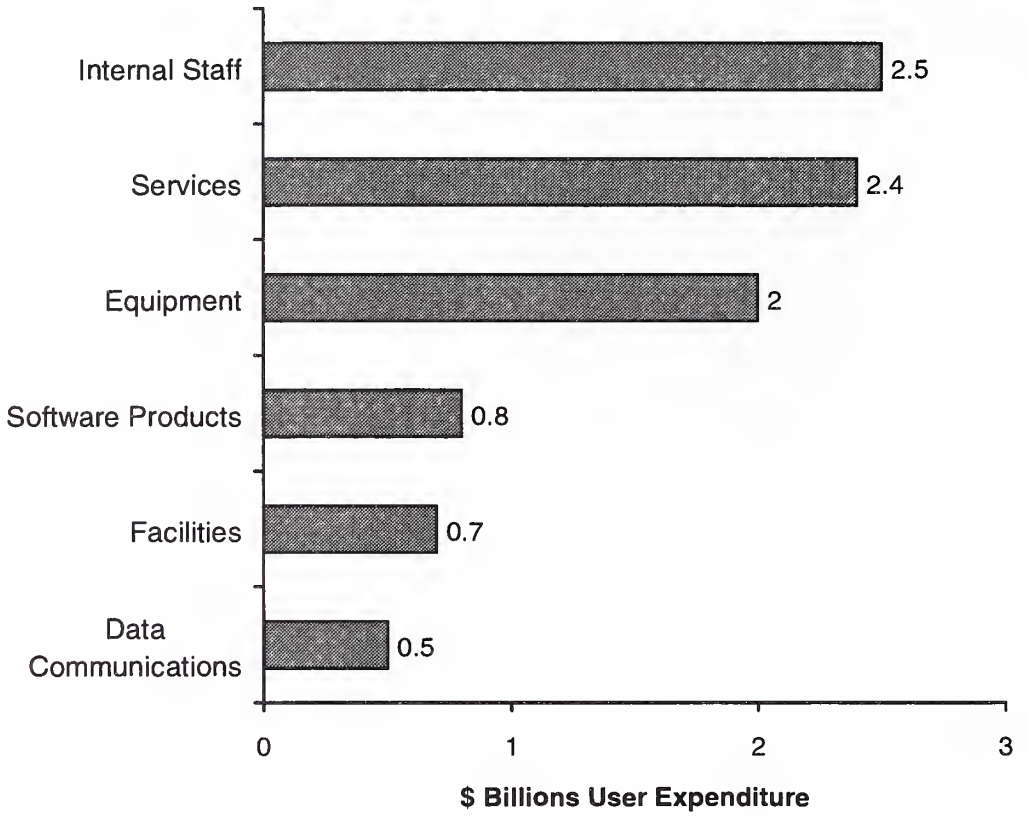
Source: INPUT

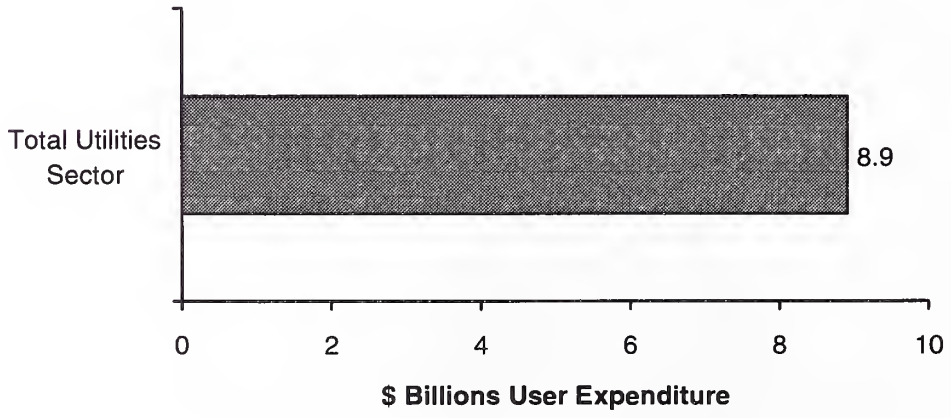
Exhibit IV-7 shows the relative size of each of the six principal segments of IT related expenditure for the Utilities sector.

Exhibit IV-8 shows the comparative table for the whole of the European market.

Exhibit IV-7

IT Related User Expenditures – European Utilities Sector, 1997

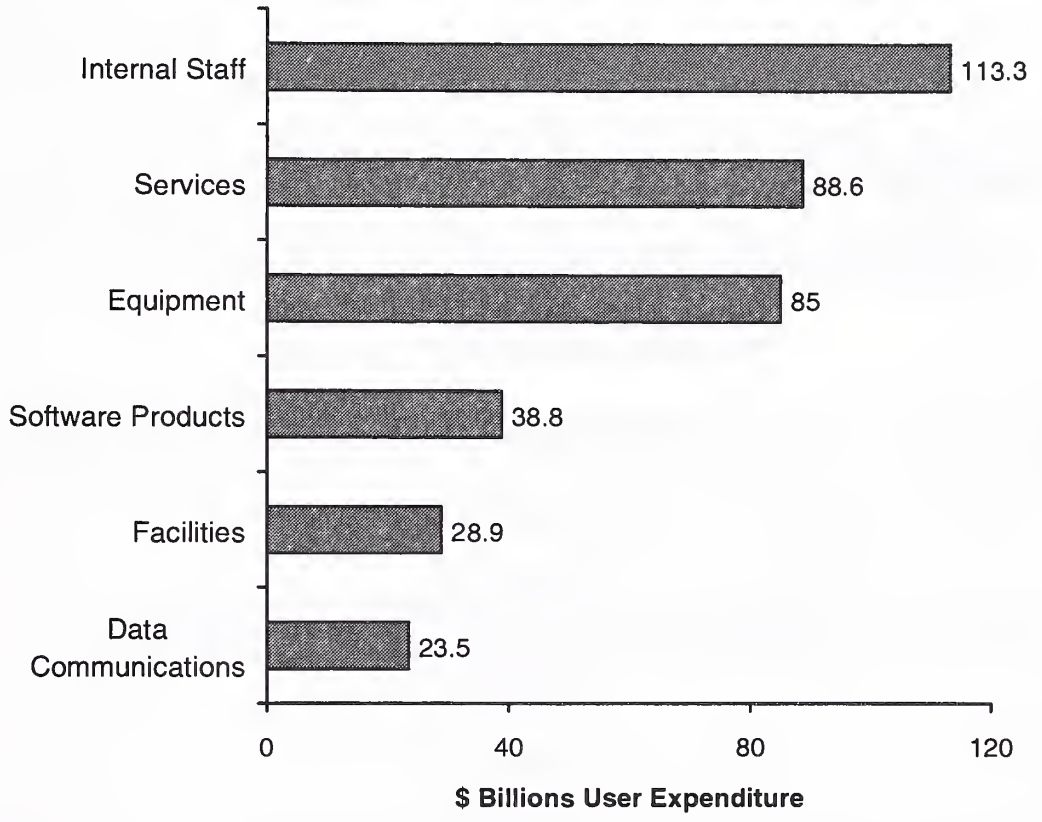


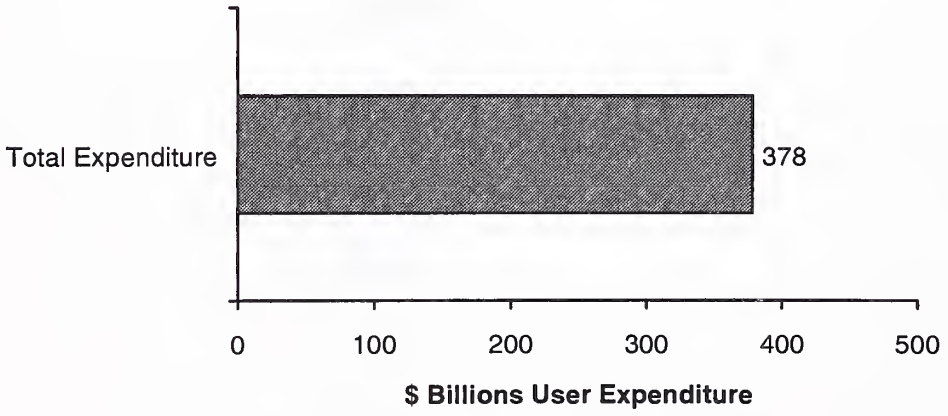


Source: INPUT

Exhibit IV-8

IT Related User Expenditures–Europe, 1997





Source: INPUT

B
IT Software & Services Market

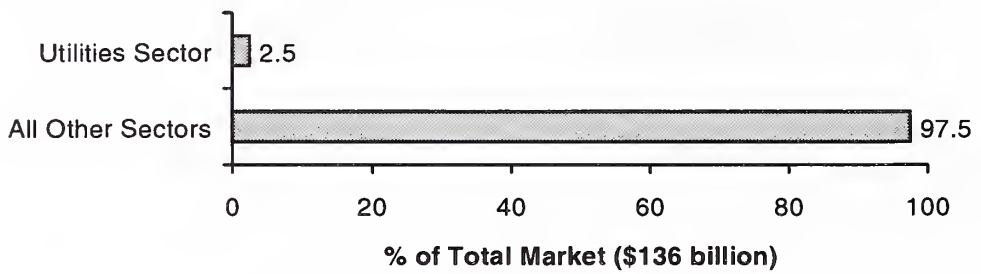
1. Total IT Software & Services Expenditure

a. Utilities Sector IT Software & Services Expenditure

Exhibit IV-9 shows the proportion of IT Software & Services expenditure within the Utilities sector in comparison to the total European market.

Exhibit IV-9

Utilities Sector IT Software & Services Expenditure – Europe, 1997

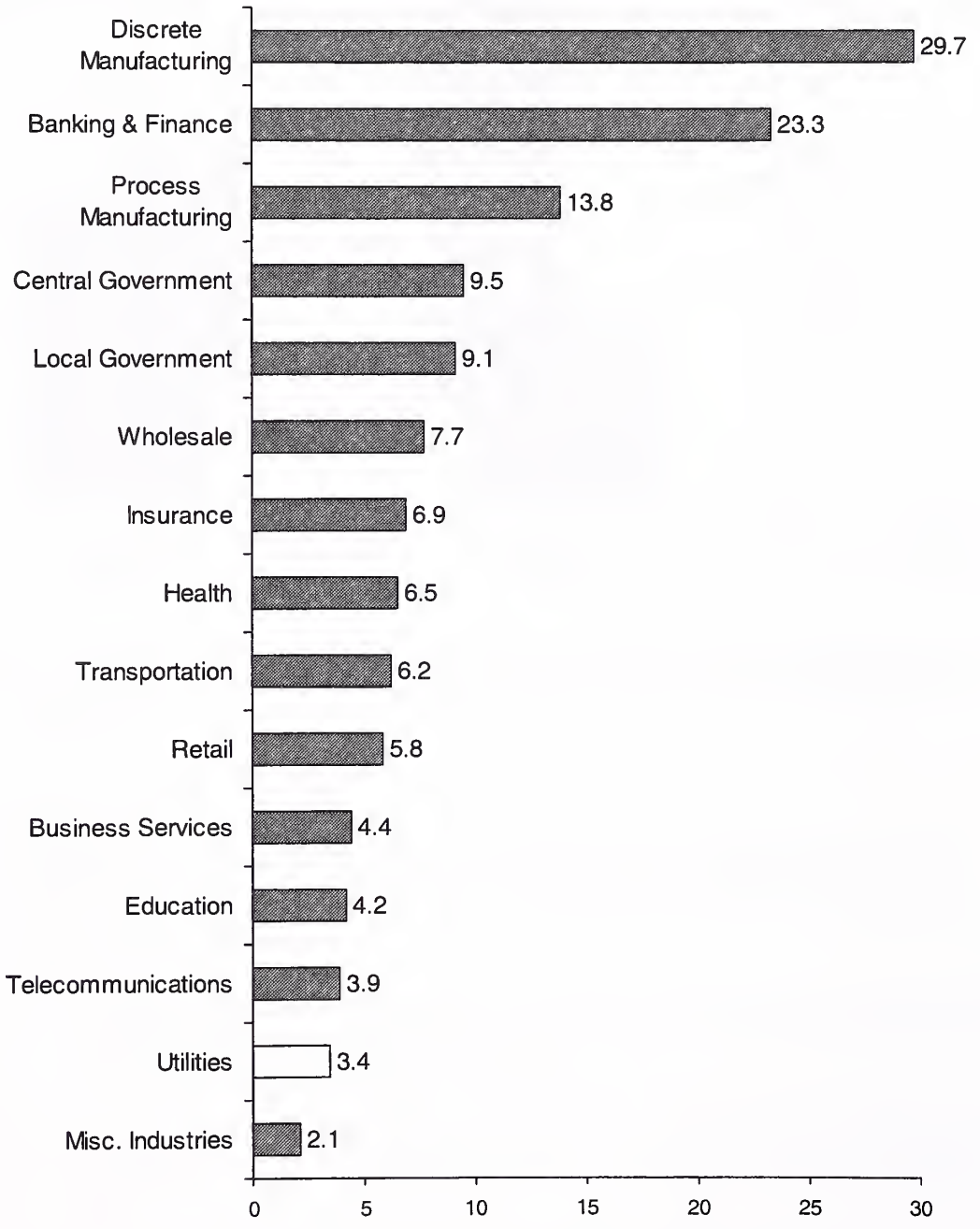


Source: INPUT

Exhibit IV-10 shows a comparison between the Utilities sector IT Software & Services market and other European industry sectors.

Exhibit IV-10

Industry Sector Comparison – IT Software & Services – Europe, 1997

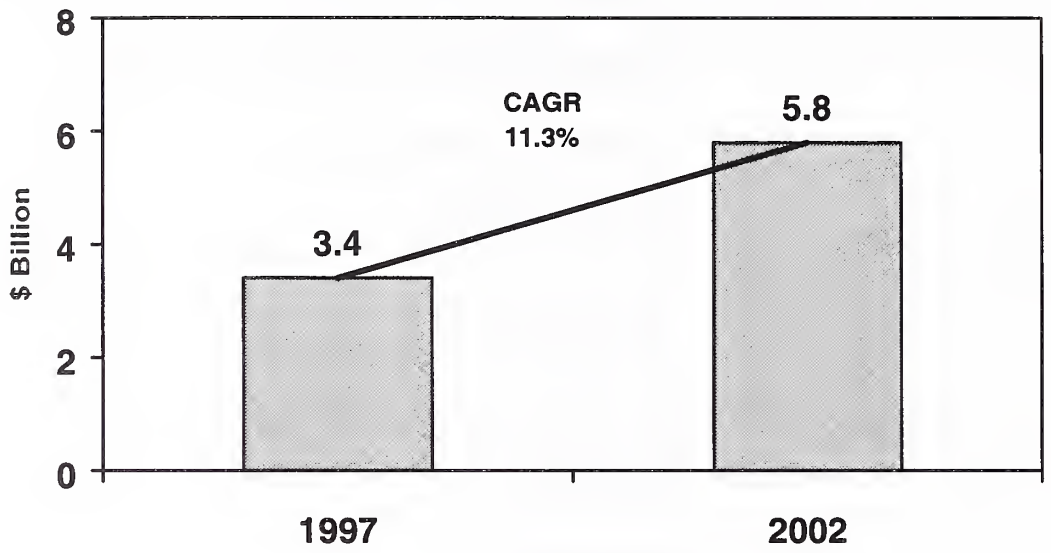


Source: INPUT

Growth expectations for the Utilities sector IT Software & Services market are shown in Exhibit IV-11 and in comparison with the total European market for IT Software & Services in Exhibit IV-12.

Exhibit IV-11

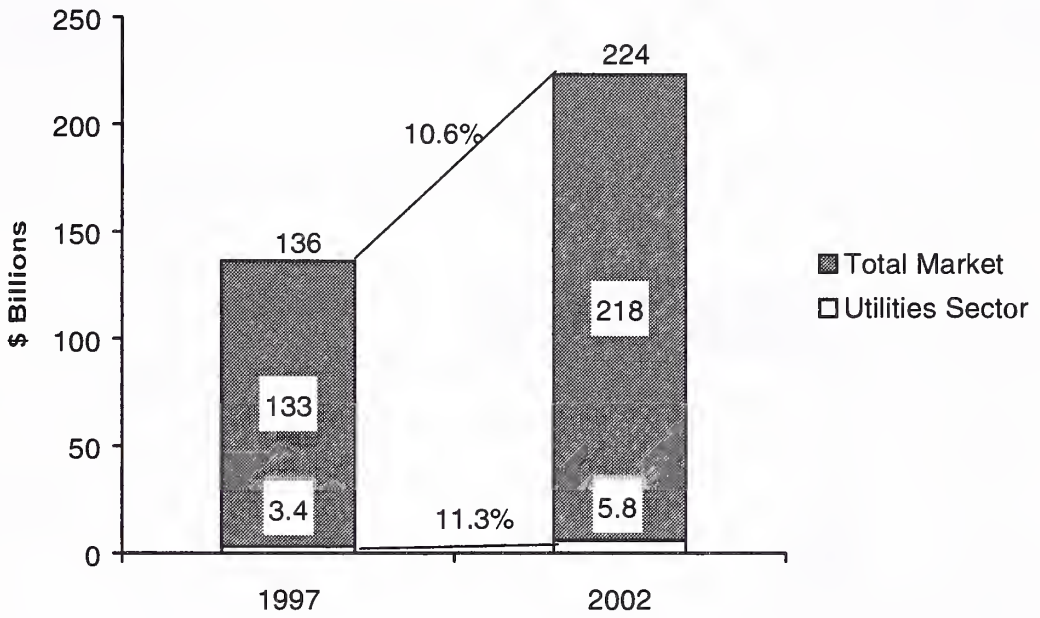
Utilities Sector IT Software & Services Market – Europe



Source: INPUT

Exhibit IV-12

IT Software & Services Forecast- Europe



Source: INPUT

b. Industry Sector Composition of IT Software & Services Markets

The total volume of expenditure for IT Software & Services in the Utilities sector, described above, is analyzed by INPUT into three separate categories:

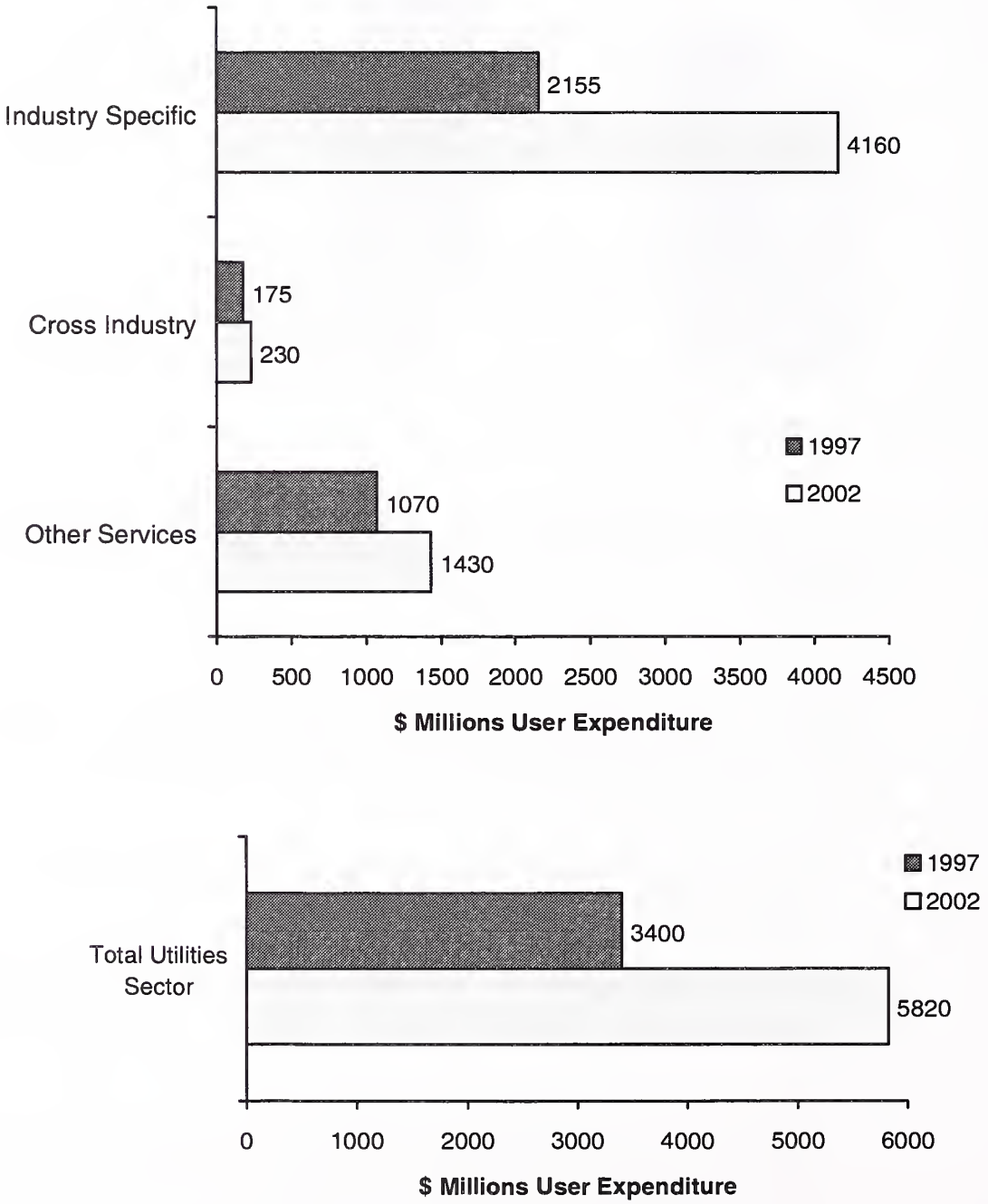
- Industry Specific expenditures – these are for services that are related specifically to the Utilities industry.
- Process or Cross-industry expenditures – these are for multi-industry applications such as human resource systems, accounting systems, etc.
- Other services expenditures – these are for general services that do not fall into the two categories described above. The two principal sectors classified in this 'other services' category are Systems Software Products and Equipment Services. The category also includes some types of expenditure in Processing services and Network Services.

The analysis of IT Software & Services expenditure within the Utilities sector according to this breakdown is shown in Exhibit IV-13.

Exhibit IV-14 provides a more detailed numerical tabulation of this analysis.

Exhibit IV-13

Total IT-Related User Expenditures–Europe



Source: INPUT

Exhibit IV-14

Analysis of IT Software & Services Expenditure – Utilities Sector Europe, 1997

Segment		User Expenditures $ Millions		
		Industry Specific	Cross Industry	Other Services
Professional Services	Total	700		
Systems Integration	Total	240		
	Software Products	65		
	Equipment	50		
	Other	125		
Outsourcing	Total	800		
Processing Services	Total	100	50	50
	Transactions	100	50	
	Other services			50
Network Services	Total	90		100
Applications Software Products	Total	145	105	
Turnkey Systems	Total	80	20	
	Software Products	30	8	
	Equipment	35	8	
	Other	15	4	
Systems Software Products	Total			420
Equipment Services	Total			500
Total		2,155	175	1,070

Source: INPUT

The relationship between the different classifications of expenditure can be readily seen from the two previous Exhibits (IV-13 and 14).

Exhibits IV-15 shows the breakdown of the total amount of equipment included within INPUT's IT Software & Services categories.

Exhibit IV-15

Equipment Expenditure – Utilities Sector

Sector	1997 Expenditure ($ millions)
Systems Integration	50
Turnkey Systems – Industry Specific	35
Turnkey Systems – Cross Industry	8
Utilities Sector TOTAL	93

Source: INPUT

Exhibit IV-16 shows the calculation of the total amount of Software Products that are included within INPUT's IT Software & Services categories.

Exhibit IV-16

Software Products Expenditure – Utilities Sector

Sector	1997 Expenditure ($ millions)
Systems Integration	65
Applications Software Products	250
Turnkey Systems – Industry Specific	30
Turnkey Systems – Cross Industry	8
Systems Software Products	420
Utilities Sector TOTAL	773

Source: INPUT

Exhibit IV-17 shows the summation of the three different components that combine to form INPUT's definition of the IT Software & Services market.

Exhibit IV-17

IT Software & Services Components – Utilities Sector

Sector	1997 Expenditure ($ millions)
Equipment	93
Software Products	773
Services	2,534
Utilities Sector TOTAL	3,400

Source: INPUT

Exhibit IV-18 shows the summation of the three different categories of services that comprise the total amount of expenditure on IT Software & Services within the Utilities sector in the Europe.

Exhibit IV-18

Total IT Software & Services – Utilities Sector

Sector	1997 Expenditure ($ millions)
Industry Specific	2,155
Cross Industry	175
Other Services	1,070
Utilities Sector TOTAL	3,400

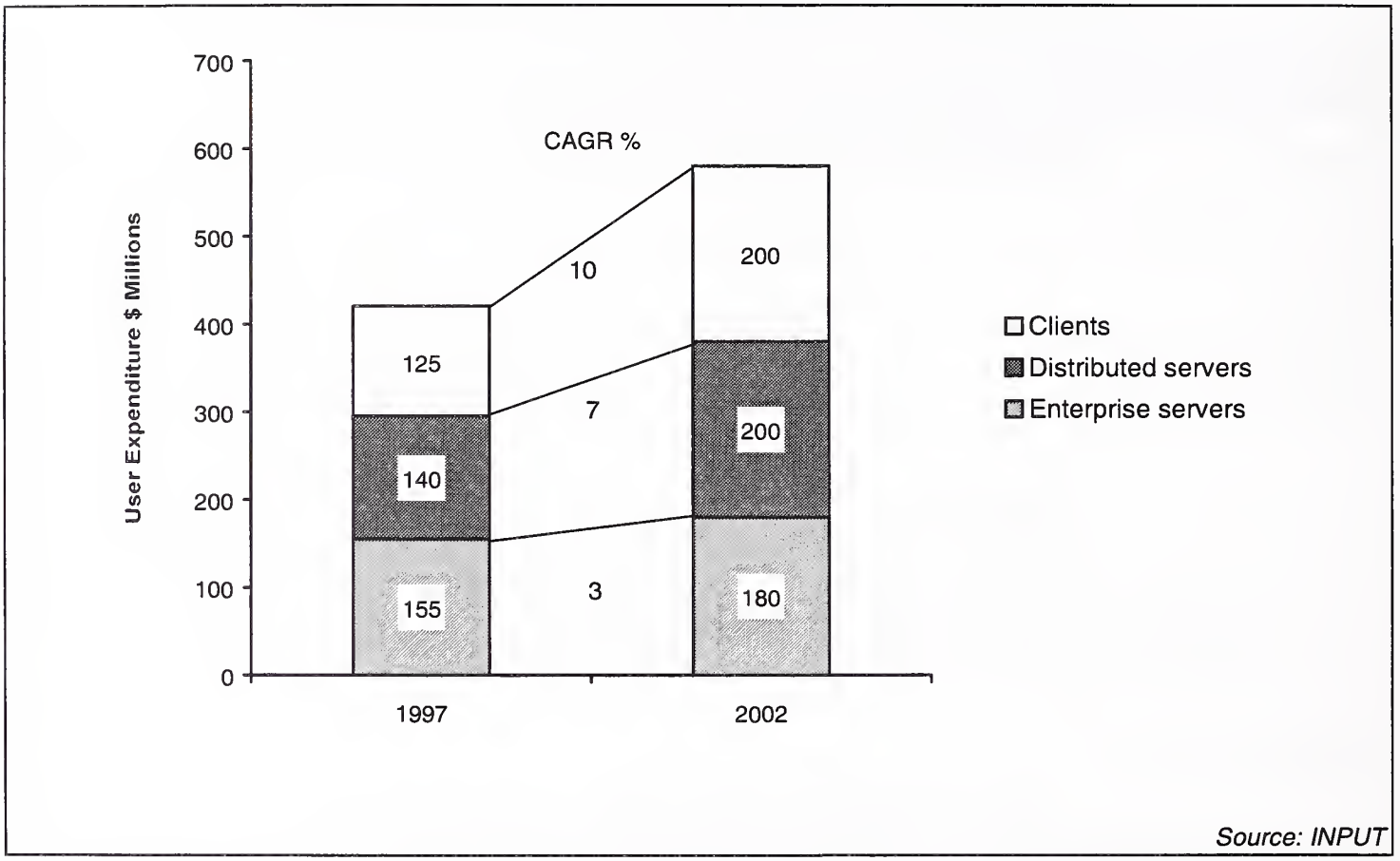
Source: INPUT

The two principal IT Software & Services categories that fall outside the Industry Specific classification are Systems Software Products and Equipment Services, they are briefly discussed below.

Exhibit IV-19 shows the forecast growth for Systems Software Products within the Utilities sector.

Exhibit IV-19

Utilities Sector - System Software Products Expenditure, Europe



Source: INPUT

System Software Products enable the computer/communications system to perform basic machine-oriented or user interface functions.

INPUT defines the System Software Products sector as comprising four submodes:

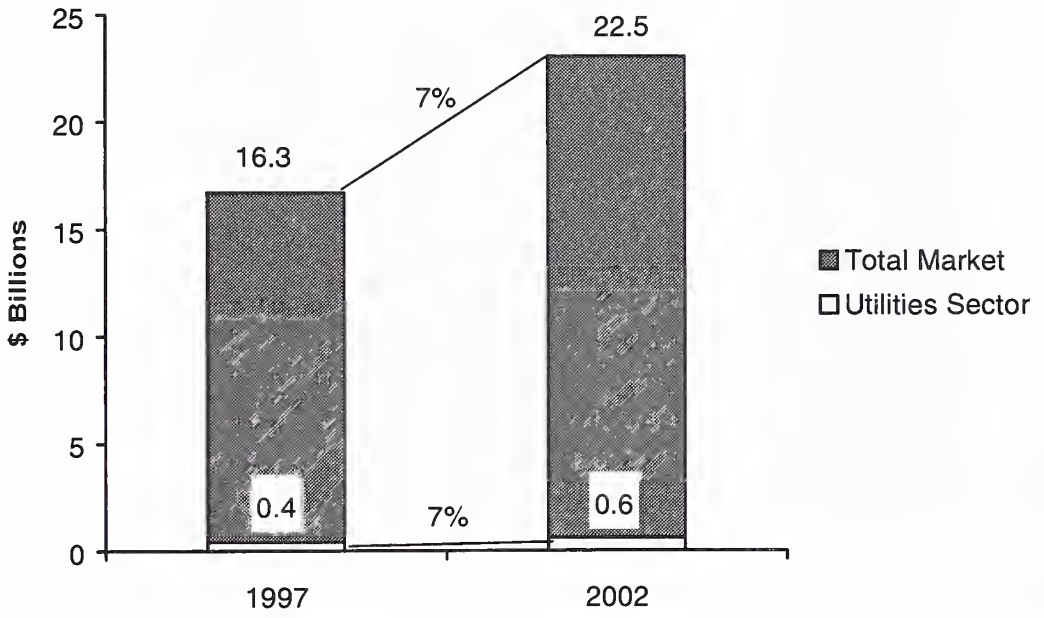
- Systems Control Products – the operating system, network control software etc.
- Operations management Tools – programs used by operational management, for example performance measurement and scheduling tools.

- Applications Development Tools – programming languages, database management systems and other development and productivity tools.
- Database Management Systems.

Exhibit IV-20 shows the comparison of the Utilities sector growth with that for the whole market in the Europe.

Exhibit IV-20

Systems Software Products Market Growth - Europe

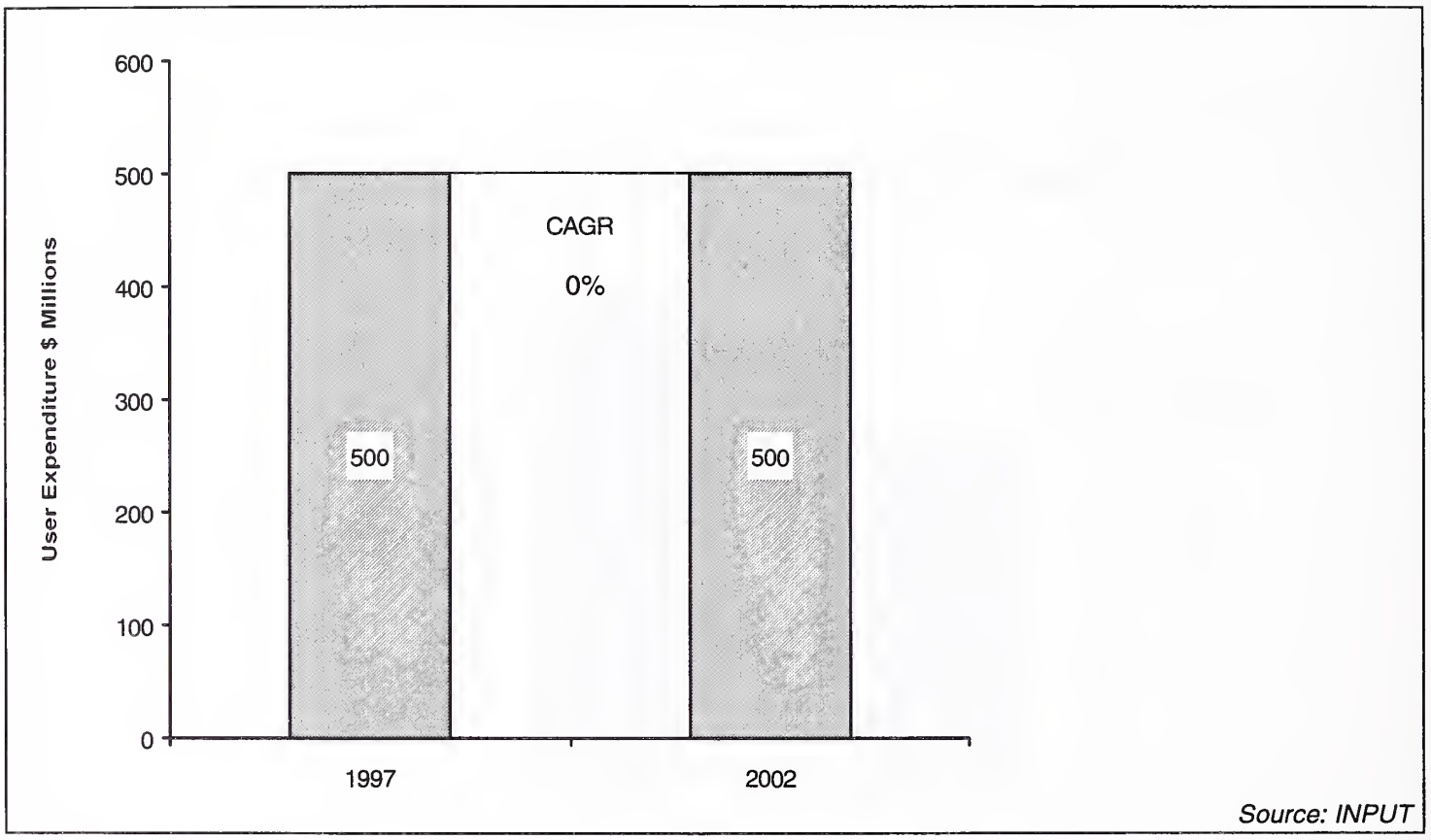


Source: INPUT

The Equipment Services expenditure that is generated within the Utilities Sector is analyzed in Exhibit IV-21 below.

Exhibit IV-21

Utilities Sector - Equipment Services Expenditure, Europe



Source: INPUT

The Equipment Services category is comprised of two principal elements:

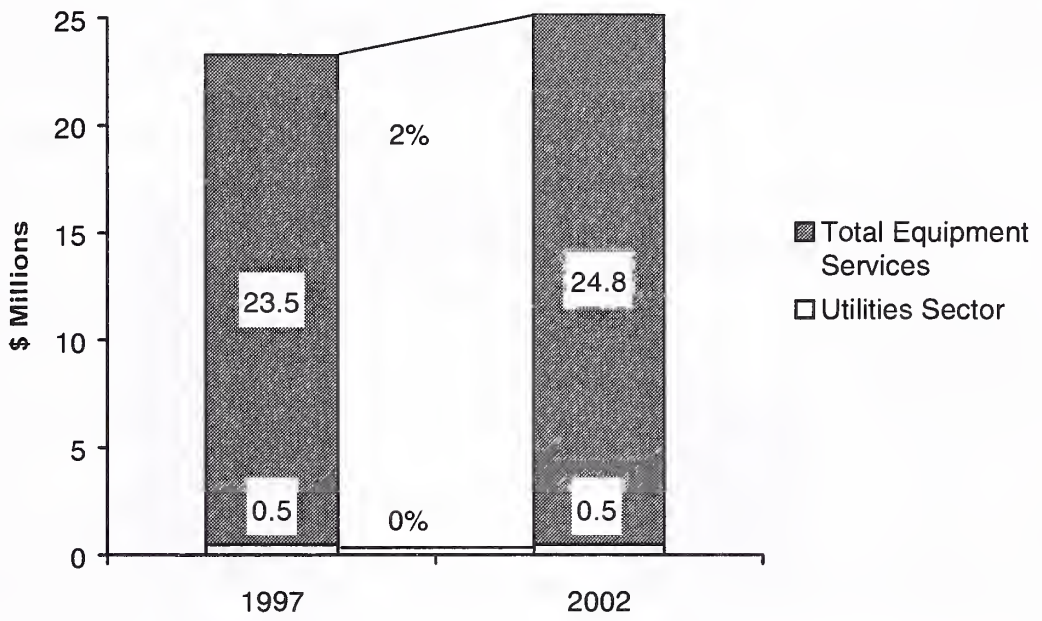
- Product Maintenance- services need to repair, diagnose and provide preventive maintenance both onsite and offsite for computer/communications systems including systems software products where these expenditures are not included within System Software Product License agreements.

- Environmental Services – planning and implementation services which affect the environments in which computer systems are operated. This category therefore covers; computer rooms, electrical power and HVAC systems, network attachments and associated building services.

Exhibit IV-22 shows the comparison of the Utilities sector growth with that for the whole market in the Europe.

Exhibit IV-22

Equipment Services Growth - Europe



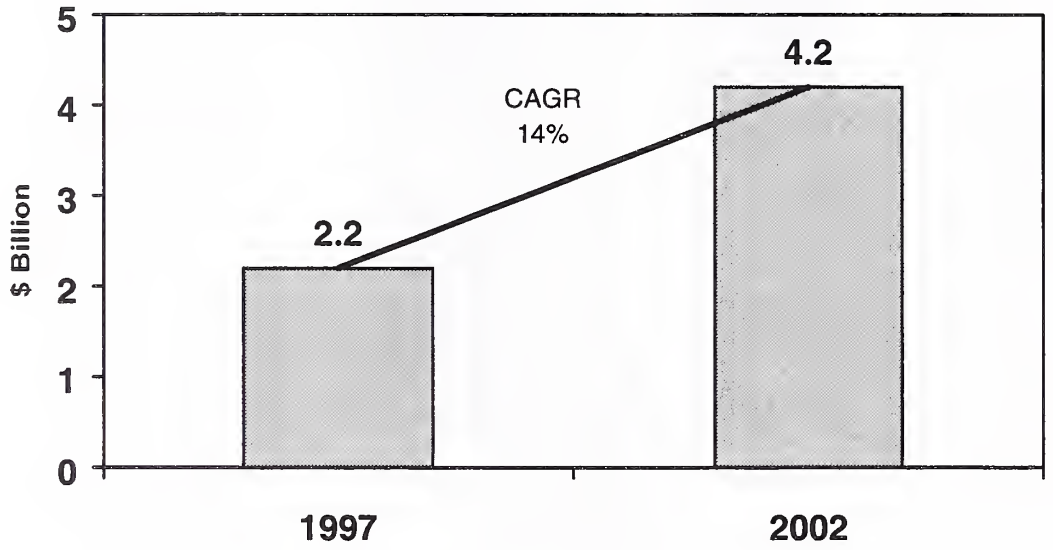
Source: INPUT

2. Industry Specific IT Software & Services Expenditure

This subsection focuses on the *Industry Specific* IT Software & Services market. Exhibit IV-23 shows the expected growth for all expenditure in this category for the Utilities sector in the Europe.

Exhibit IV-23

Utilities Sector Industry Specific IT Software & Services Market

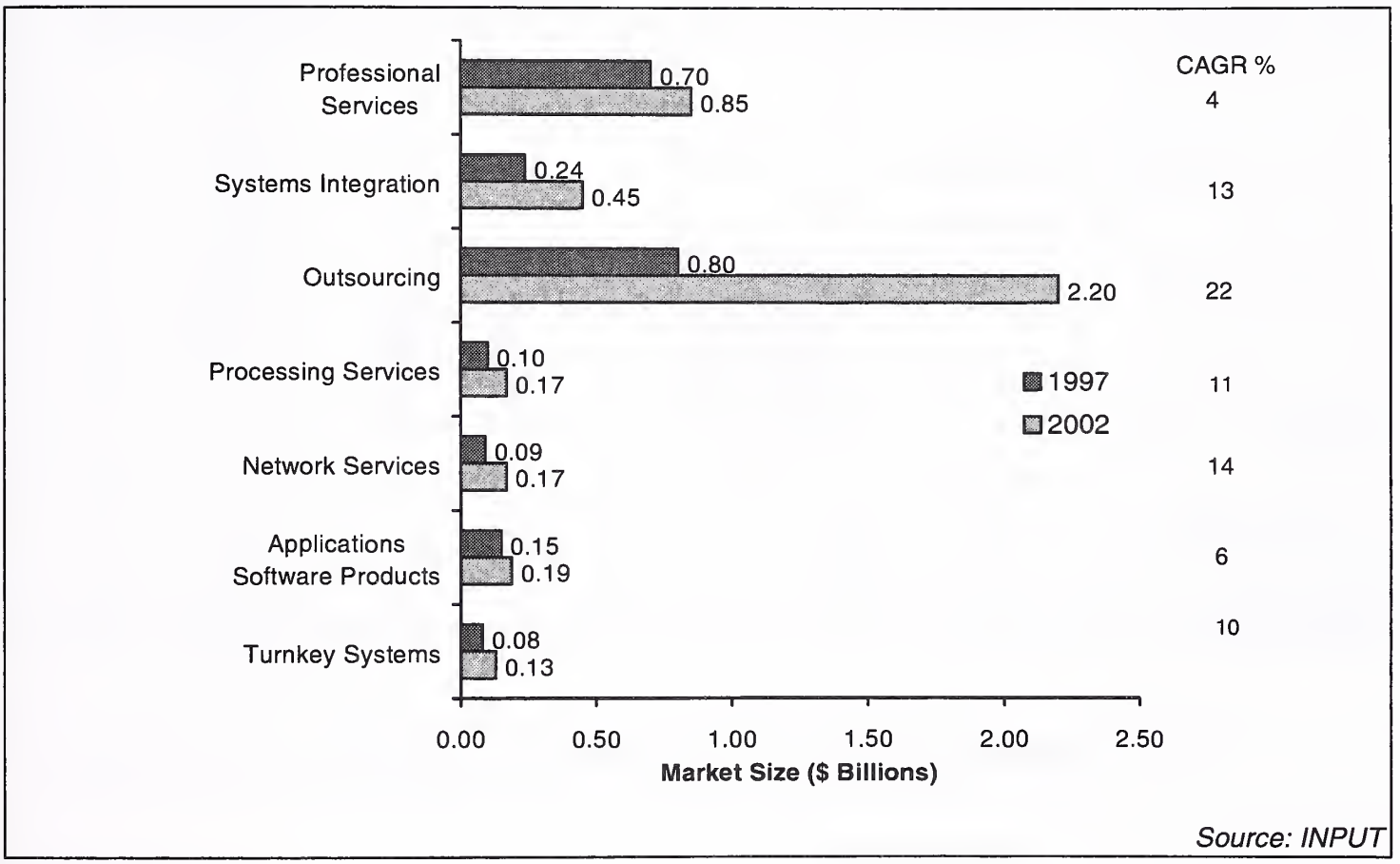


Source: INPUT

Exhibit IV-24 provides analysis of this sector by the principal forms of service delivery.

Exhibit IV-24

Analysis by Service Category – Utilities Industry Specific Market, Europe



Source: INPUT

Exhibit IV-25 provides a tabular analysis showing the detailed data.

Exhibit IV-25

Utilities Industry Specific IT Software & Services Market, Europe ($ Millions)

Sector	1997	CAGR	2002
Professional Services	700	4.0%	850
Systems Integration	240	13.4%	450
Outsourcing	800	22.4%	2200
Processing Services	100	11.2%	170
Network Services	90	13.6%	170
Applications software Products	145	5.6%	190
Turnkey systems	80	10.2%	130
Sector TOTAL	2155	14.1%	4160

Source: INPUT

Each of these principal service modes is described in more detail below.

a. Professional Services

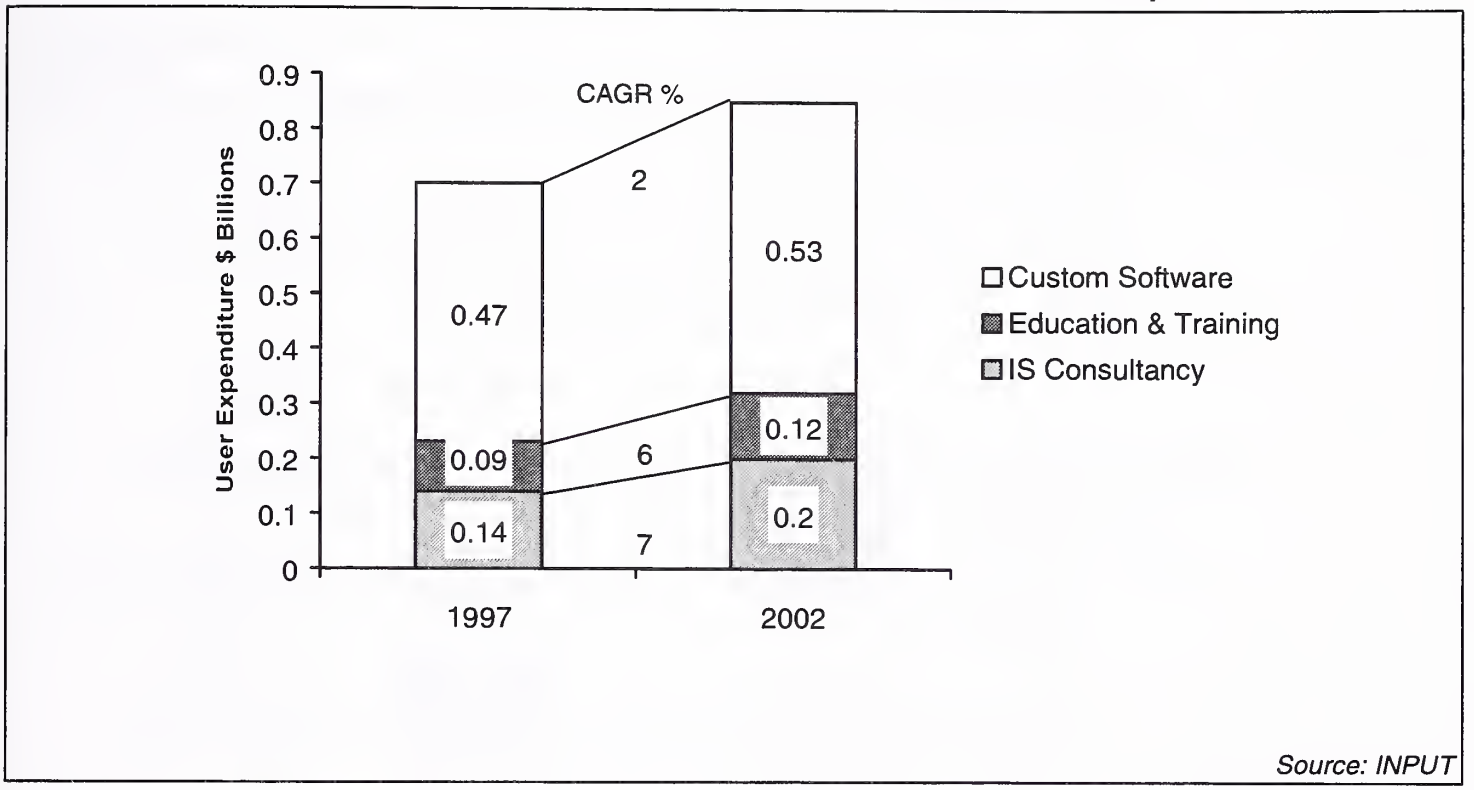
Exhibit II-26 shows the forecast for the Utilities sector Professional Services segment, the second largest individual services delivery mode in the sector.

The professional service category comprises three subcategories: consulting, education and training, and software development.

Software development is by far the dominant sector and will remain so over the forecast period even though it is predicted to grow more slowly than the other two subcategories.

Exhibit IV-26

Utilities Sector Professional Services Market - Europe



Source: INPUT

Exhibit IV-27 provides the detailed forecast data in tabular form.

Exhibit IV-27

Professional Services – Utilities Sector, Europe ($Millions)

Subsector	1997 Expenditure	CAGR	2002 Expenditure
IS Consulting	140	7.4%	200
Education & Training	90	5.9%	120
Software Development	470	2.4%	530
TOTAL	700	4.0%	850

Source: INPUT

b. Systems Integration

Systems Integration is a vendor delivered service that provides a complete solution to an information systems requirement.

The vendor meets the client's needs through the custom selection and implementation of a variety of information systems 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.

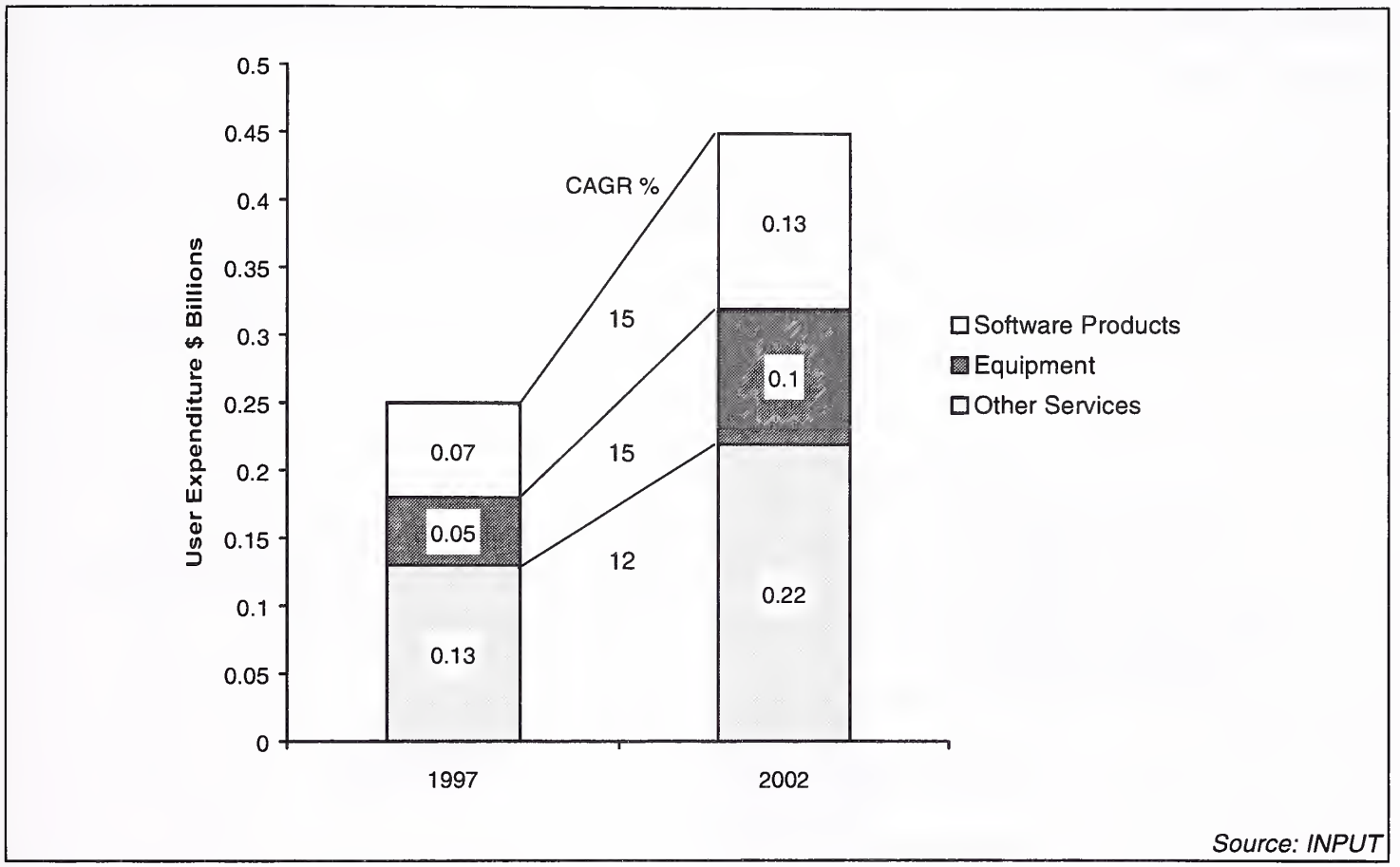
The principal components of a systems integration contract are:

- Equipment – the information processing and communications equipment required to build the systems solution.
- Software products – prepackaged applications and systems software products.
- IT-related professional services - the value added element that develops and implements the client solution.
- Other products and services – miscellaneous items such as engineering services, computer supplies and business support services.

Exhibit IV-28 shows the anticipated development of the Systems Integration market in the Europe.

Exhibit IV-28

Utilities Sector Systems Integration Market - Europe



Source: INPUT

Exhibit IV-29 shows the detailed forecast data in tabular form.

Exhibit IV-29

Systems Integration – Utilities Sector, Europe ($ Millions)

Subsector	1997 Expenditure	CAGR	2002 Expenditure
Software Products	65	14.9%	130
Equipment	50	14.9%	100
Other Services	125	12.0%	220
Utilities Sector TOTAL	240	13.4%	450

Source: INPUT

c. Operational Services

INPUT has in the course of 1997 introduced the term *Operational Services* to distinguish and group together those services that provide continuous computer/network operations and/or support.

The Operational Services sector comprises:

- Outsourcing services.
- Processing services.
- Network services including Internet services.

Each of these subsectors is described below.

i. Outsourcing

Outsourcing is a long-term (greater than one year) relationship between a client and a vendor in which the client delegates all, or a major portion, of an operation or function to the vendor.

The operation or function may either be solely information systems outsourcing based, or include information systems outsourcing as a major component (at least 30%) of the operation.

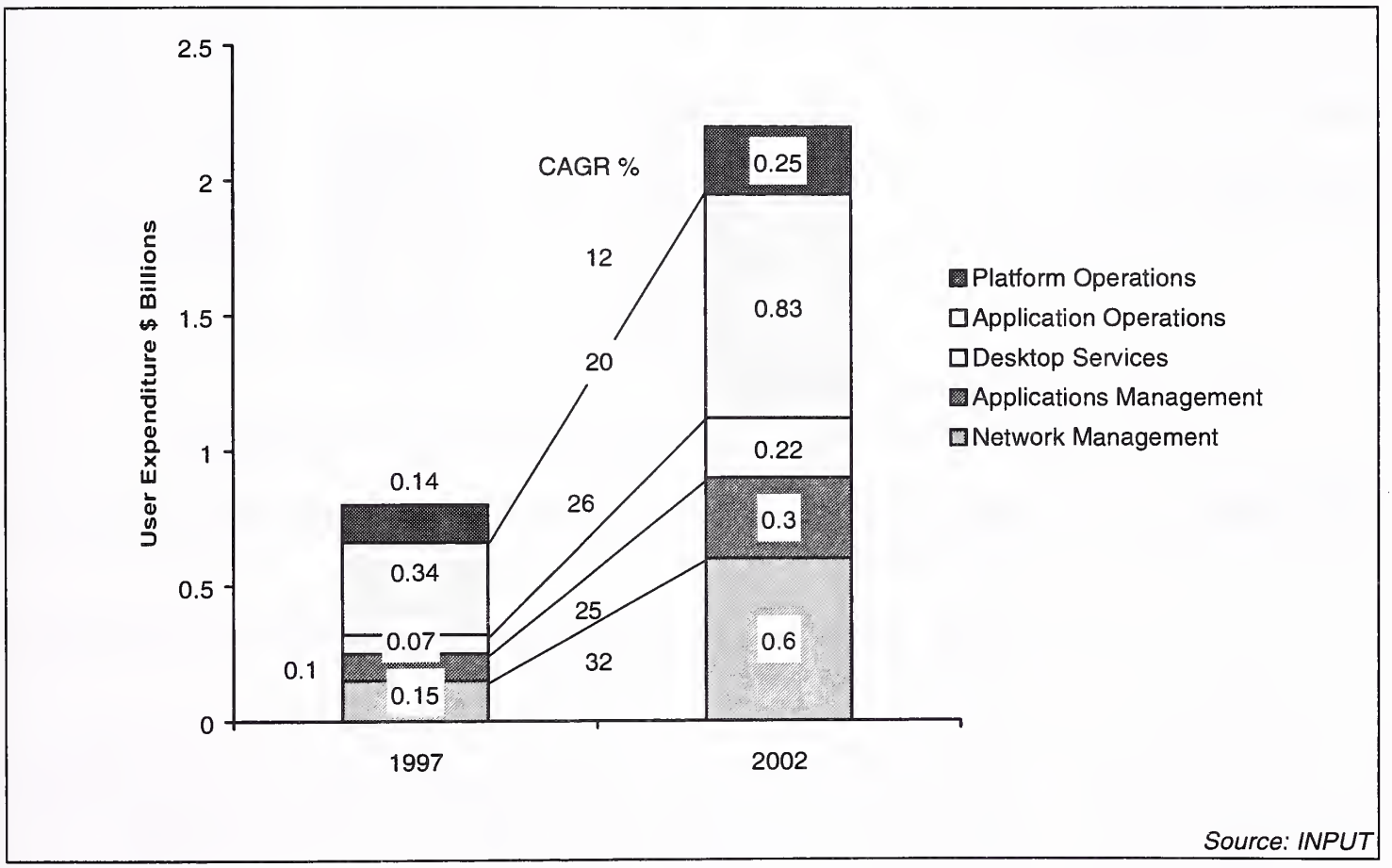
The critical components that define an outsourcing service are:

- Delegating an identifiable area of the operation to a vendor.
- Single-vendor responsibility for performing the delegated action.
- Intentional, long-term relationship between the client and the vendor.

Exhibit II-30 shows the growth forecast for the European Utilities sector outsourcing market.

Exhibit IV-30

Utilities Sector Outsourcing Market - Europe



Source: INPUT

Exhibit IV-31 shows the detailed forecast data in tabular form.

Exhibit IV-31

Outsourcing Services – Utilities Sector, Europe ($ Millions)

Subsector	1997 Expenditure	CAGR	2002 Expenditure
Platform Operations	140	12.3%	250
Application Operations	340	19.5%	830
Desktop Services	70	25.7%	220
Applications Management	100	24.6%	300
Network Management	150	32.0%	600
Utilities Sector TOTAL	800	22.4%	2200

Source: INPUT

ii. Processing Services

The Processing Services category contains three subcategories:

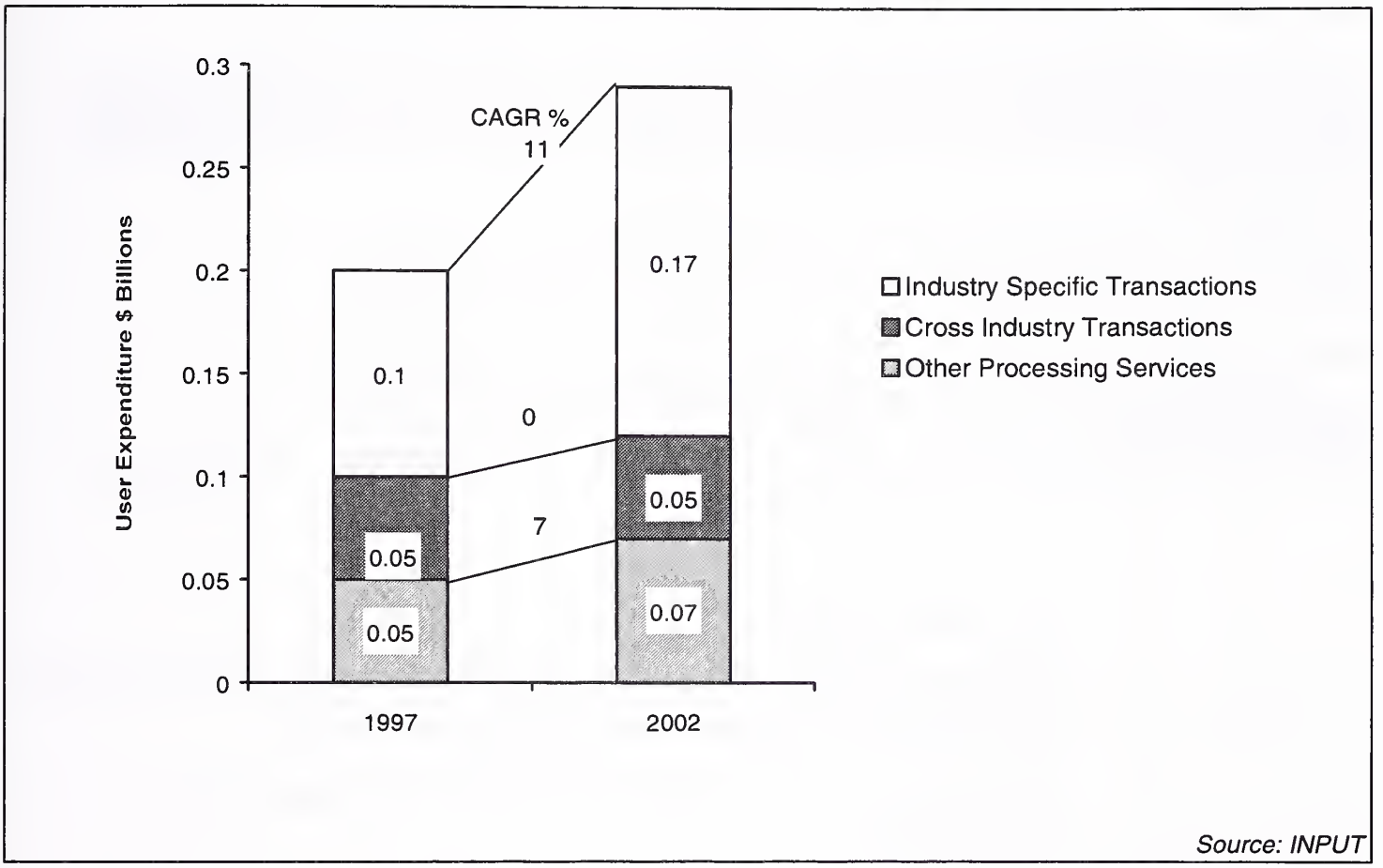
- Transaction processing – the processing of specific applications and client databases.
- Utility processing – clients develop and/operate their own programs or process data on the vendor' system.
- Other processing services – scanning and other data entry services, laser printing, computer output microfilm (COM), CD preparation and other data output services. This category also included backup, contingency and disaster recovery services.

Exhibit IV-32 shows the forecast for the European Utilities sector Processing Services market.

It should be noted that in this Exhibit only the portion marked Industry specific transactions is counted within the industry specific part of the market analysis.

Exhibit IV-32

Utilities Sector Processing Services Market - Europe



Source: INPUT

Exhibit IV-33 shows the detailed forecast data in tabular form.

Exhibit IV-33

Processing Services – Utilities Sector, Europe ($ Millions)

Subsector	1997 Expenditure	CAGR	2002 Expenditure
Industry Specific Transactions	100	11.1%	170
Cross Industry Transactions	50	0%	50
Other Processing Services	50	7.0%	70
Utilities Sector TOTAL	200	7.7%	290

Source: INPUT

iii. Network Services

Network Services include a variety of telecommunications-based functions and operations, including those relating to the Internet.

This category, as can be seen from Exhibit IV-34, contains two subcategories:

- Electronic Information Services.
- Network Application Services.

Electronic Information Services are based on databases that provide specific information via a communications network.

Typical applications include stock prices, legal documents, economic indicators, periodical journals, medical diagnosis and airline schedules.

The two main categories of electronic information services are:

- On-line databases – structured, primarily numerical, data on economic and demographic trends, financial instruments, companies, products and materials, etc.
- On-line News (Text) Services – unstructured, primarily textual information on people, companies events, etc. These are most often news services.

There are four types of Network Applications Service:

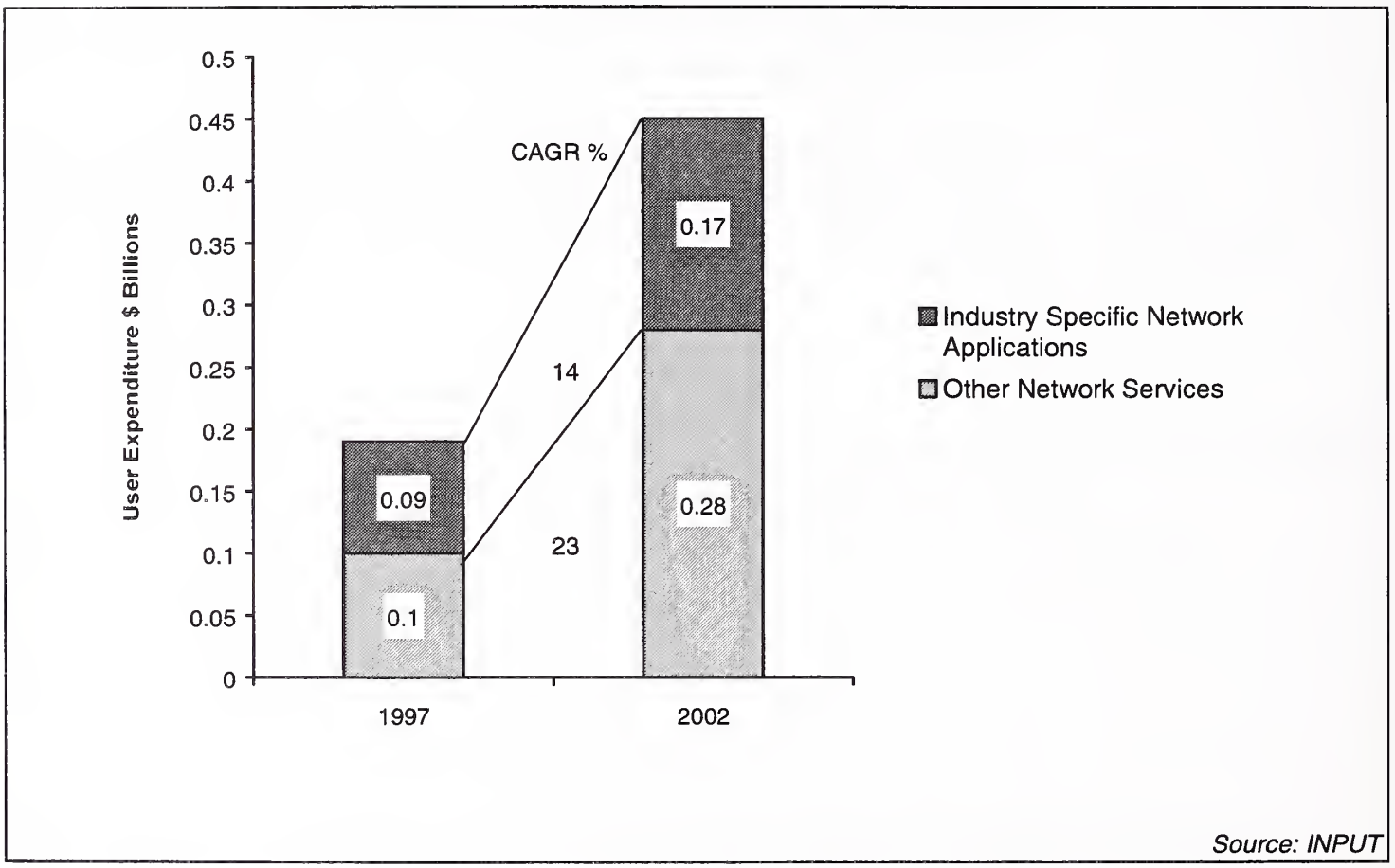
- Value Added Network Services (VAN Services) – are enhanced transport communications services.
- Electronic Commerce Services – a category that is going to become increasingly significant with the commercial exploitation of the Internet.
- Electronic Data Interchange (EDI) Services – traditional electronic commerce provided as application to application electronic exchange of business data between trade partners or facilitators.
- Electronic Information Interchange – the transmission of messages across an electronic network managed by a services vendor, including electronic mail, voice mail and messaging and including bulletin board services.

Exhibit IV-34 provides the forecast for the European Utilities sector Network Services market.

It should be noted that Network Services are categorized only as falling within the Industry Specific or Other Network services categories.

Exhibit IV-34

Utilities Sector Network Services Market - Europe



Source: INPUT

Exhibit IV-35 provides the detailed forecast data in tabular format.

Exhibit IV-35

Network Services – Utilities Sector, Europe

Subsector	User Expenditures ($ Millions)		
	1997	CAGR	2002
Industry Specific Network Applications	90	13.6%	170
Other Network Services	100	22.9%	280
Utilities Sector TOTAL	190	18.8%	450

Source: INPUT

d. Applications Software Products

Applications software products are defined as products that enable a user or a group of users to support an operational or administrative process within an organization.

Examples include accounts payable, order entry, project management and office systems.

Applications software products are classified into two groups:

- Industry specific applications software products.
- Cross-industry or process applications software products.

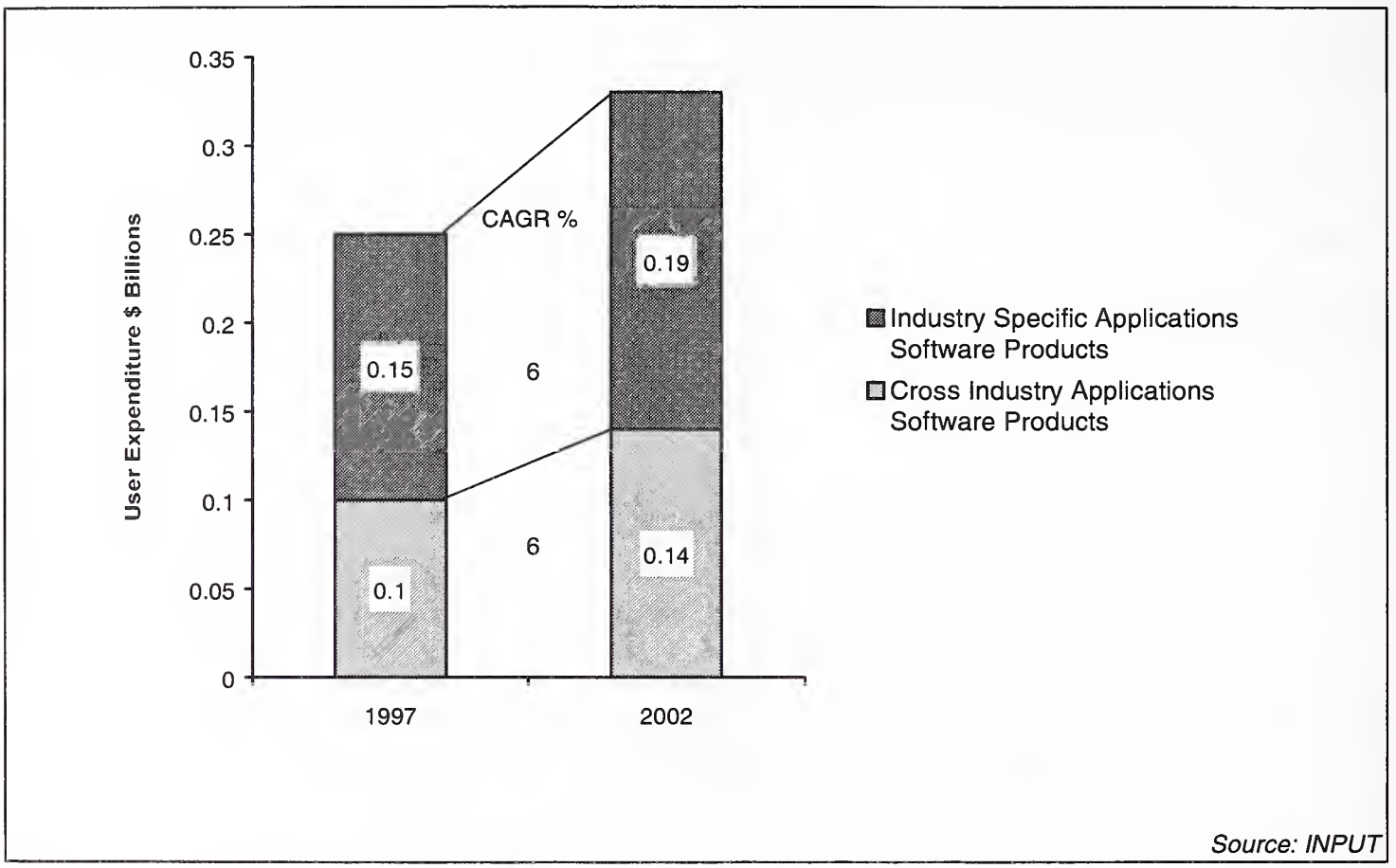
In this section we are only concerned with industry specific applications software products for the Utilities sector.

Industry specific applications products perform functions related to fulfilling business or organizational needs unique to a specific industry market and sold to that market only, in this case the Utilities industry.

Exhibit IV-36 provides the forecast for the European Utilities sector Applications Software Product market.

Exhibit IV-36

Utilities Sector Applications Software Product Market - Europe



Source: INPUT

Exhibit IV-37 provides the forecast data in tabular form.

Exhibit IV-37

Applications Software Products – Utilities Sector, Europe

Subsector	User Expenditures ($ Millions)		
	1997	CAGR	2002
Industry Specific Applications Software Products	145	5.6%	190
Cross Industry Applications Software Products	105	5.9%	140
Utilities Sector TOTAL	250	5.7%	330

Source: INPUT

e. Turnkey Systems

A turnkey system integrates equipment, systems software products and packaged applications software products 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 professional services provided.

INPUT classifies turnkey systems into two groups as it does for applications software products, systems that are industry specific and those that address a cross-industry process market. This section is only concerned with those systems specifically targeted at the Utilities sector.

Most turnkey systems are sold through channels known as value-added resellers (VARs) and defined as:

- A VAR adds value to computer hardware and/or software products and then resells it.
- The major value add is usually applications software products but may include many of the other components of a turnkey system solution , such as professional services, software product support and applications upgrades.

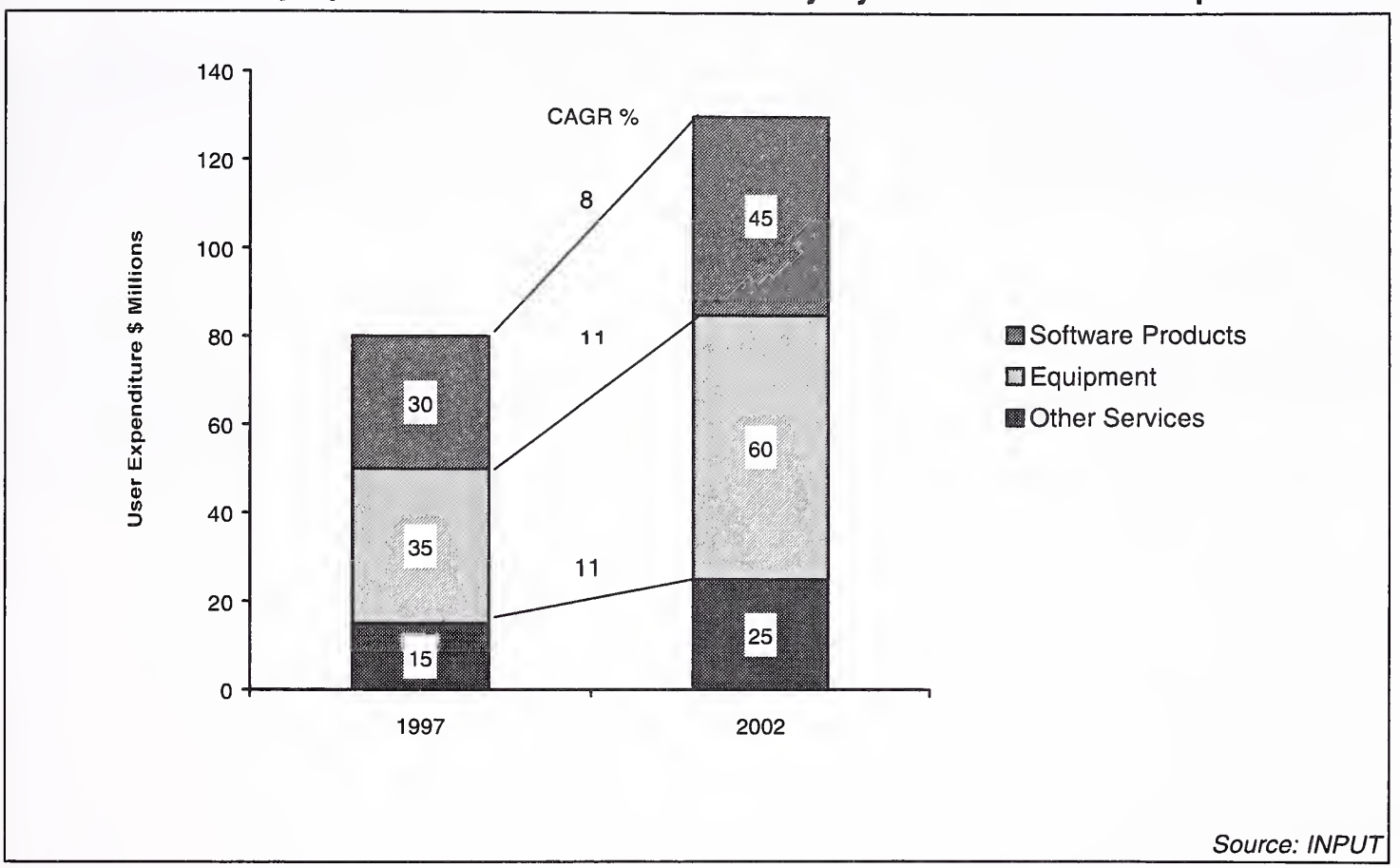
Turnkey systems have three components:

- 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.

Exhibit IV-38 provides the forecast for the European Utilities sector industry specific Turnkey Systems market.

Exhibit IV-38

Industry Specific Utilities Sector Turnkey Systems Market - Europe



Source: INPUT

Exhibit IV-39 provides the detailed forecast data in tabular form.

Exhibit IV-39

Industry Specific Turnkey Systems – Utilities Sector, Europe

Subsector	User Expenditures ($ Millions)		
	1997	CAGR	2002
Software Products	30	8.4%	45
Equipment	35	11.4%	60
Other Services	15	10.8%	25
Utilities Sector TOTAL	80	10.2%	130

Source: INPUT

For the sake of completeness Exhibit IV-40 provides the detailed forecast data for the non-industry specific Turnkey Systems sold into the Utilities sector.

Exhibit IV-40

Cross Industry Turnkey Systems – Utilities Sector, Europe

Subsector	User Expenditures ($ Millions)		
	1997	CAGR	2002
Software Products	8	13.4%	15
Equipment	8	17.6%	18
Other Services	4	11.8%	7
Utilities Sector TOTAL	20	14.9%	40

Source: INPUT

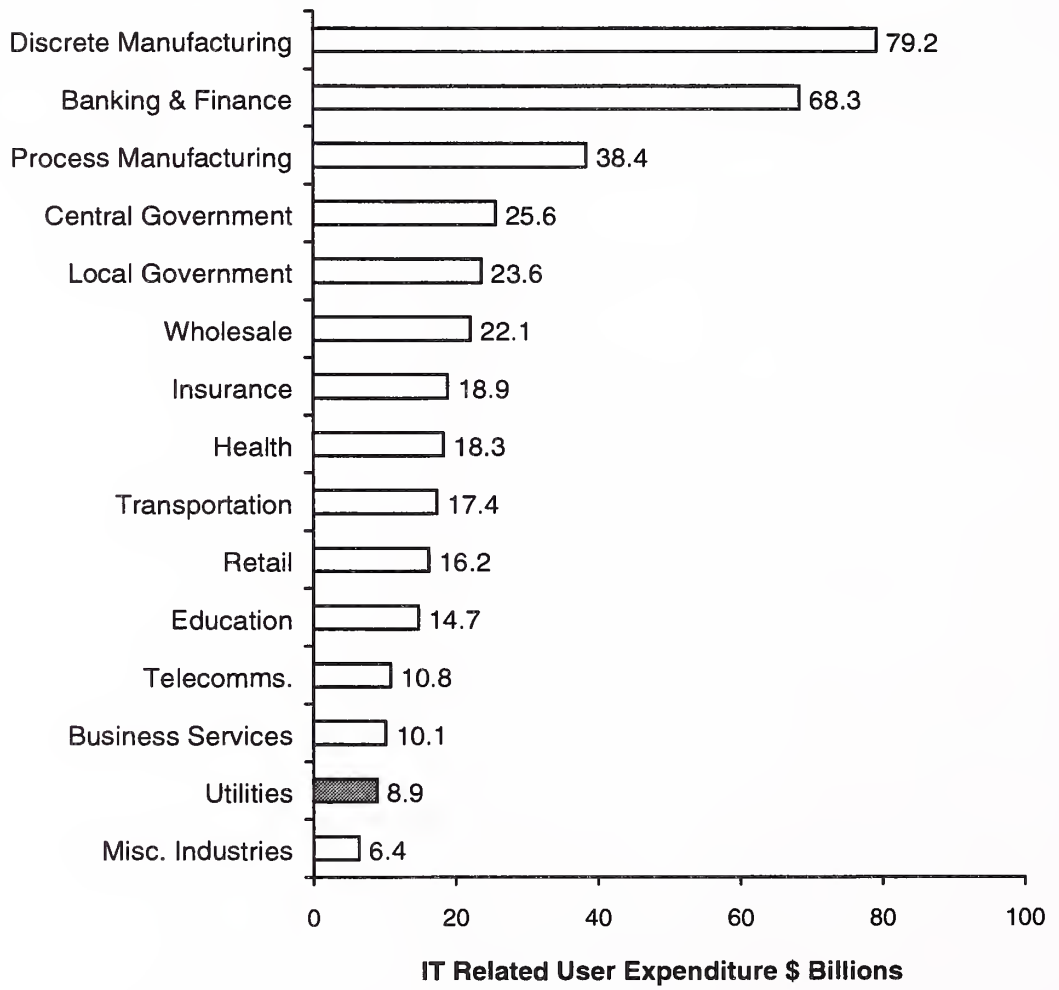
C
Comparison to Other Sectors

This section provides a comparison between the Utilities sector and the other industry sectors in the Europe IT Software & Services market for a number of key statisitcs.

Exhibit IV-41 shows a comparison of the total IT expenditure for each of the European industry sectors.

Exhibit IV-41

Industry Sector Comparison – Europe

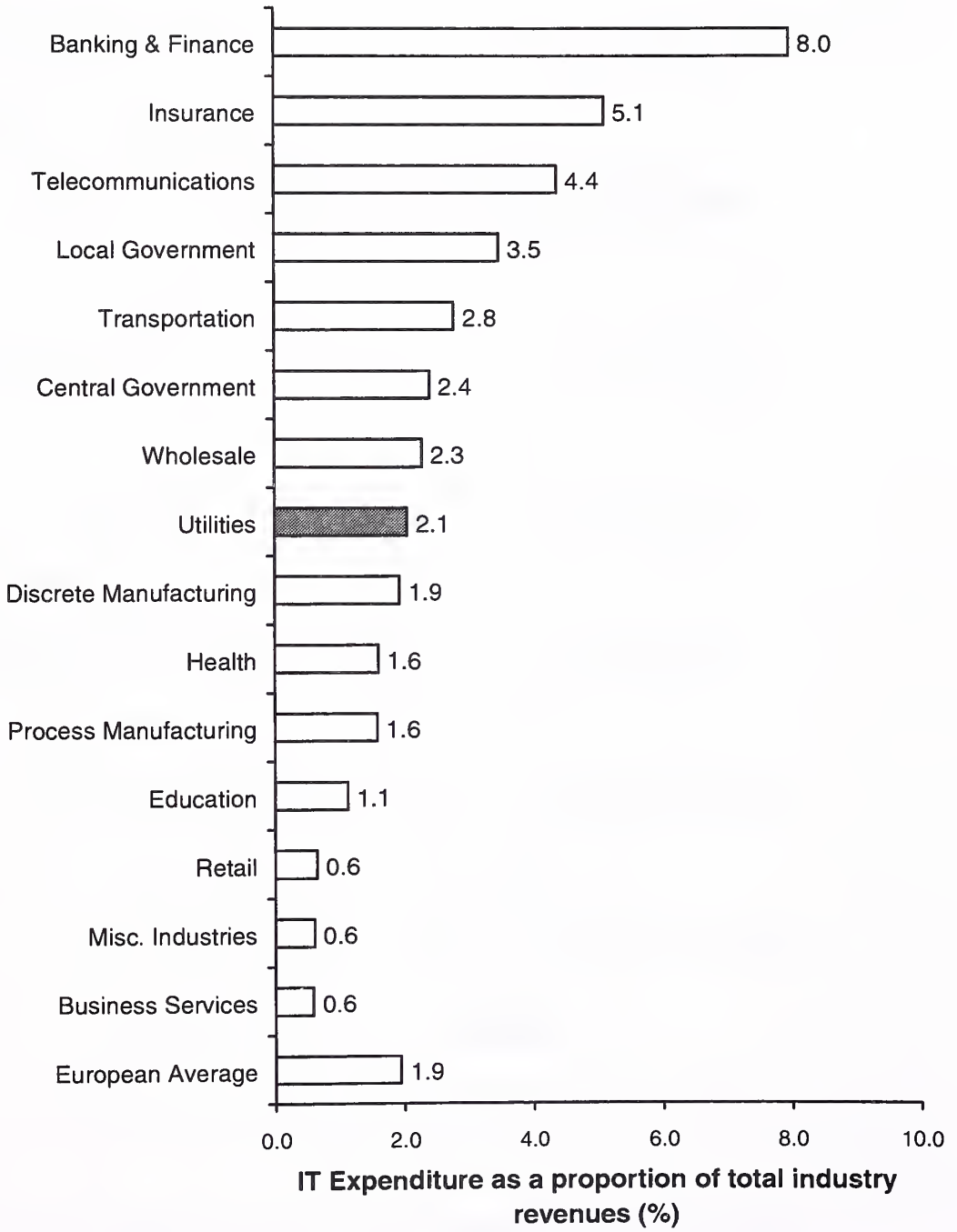


Source: INPUT

Exhibit IV-42 shows the comparison of the percentage of annual revenues spent on average on IT across the different industry sectors.

Exhibit IV-42

Industry Sector Comparison – IT Expenditure Europe

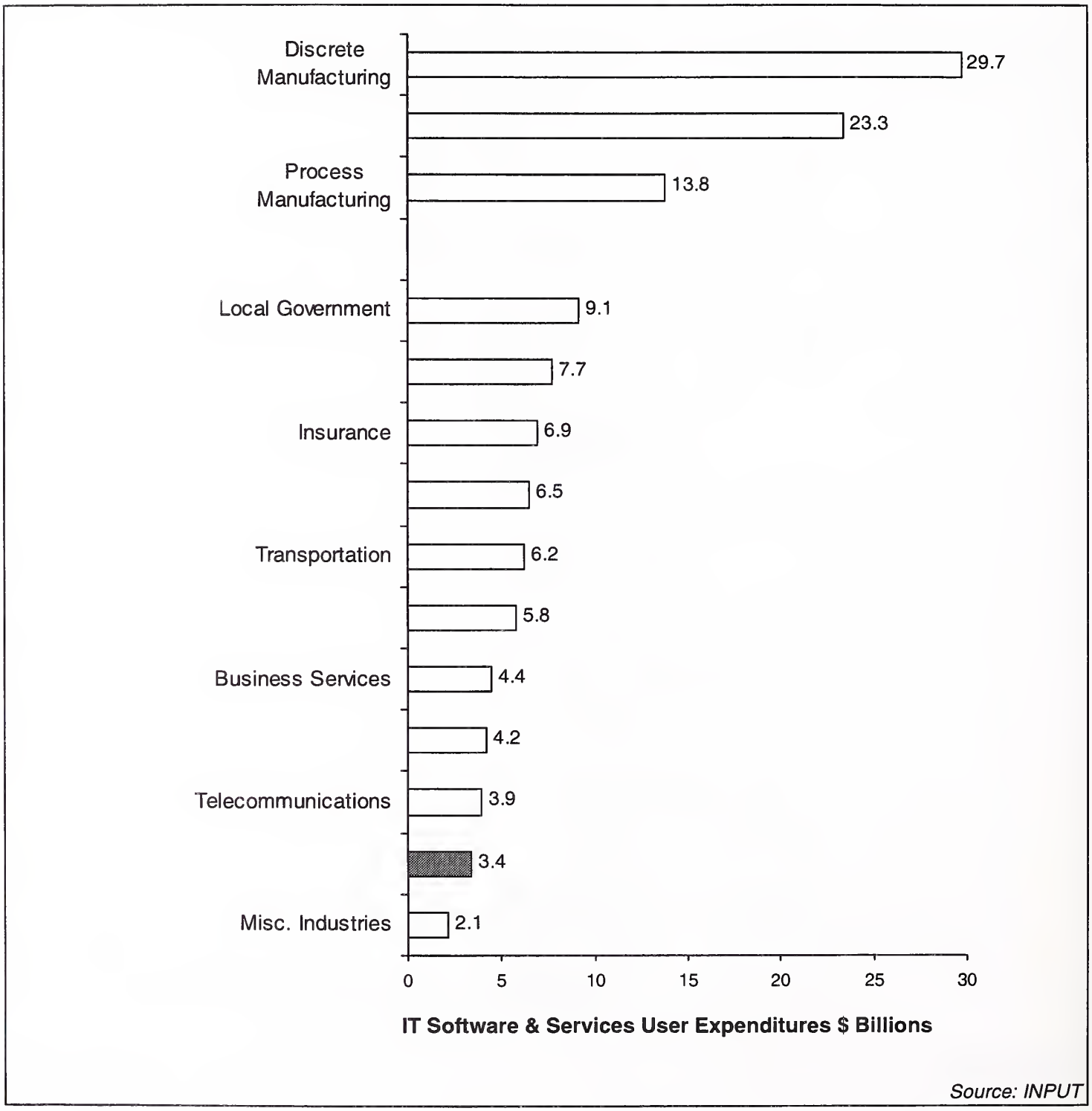


Source: INPUT

Exhibit IV-43 shows the comparison for total IT Software & Services expenditure across the different industry sectors.

Exhibit IV-43

Industry Sector Comparison – IT Software & Services – Europe, 1997

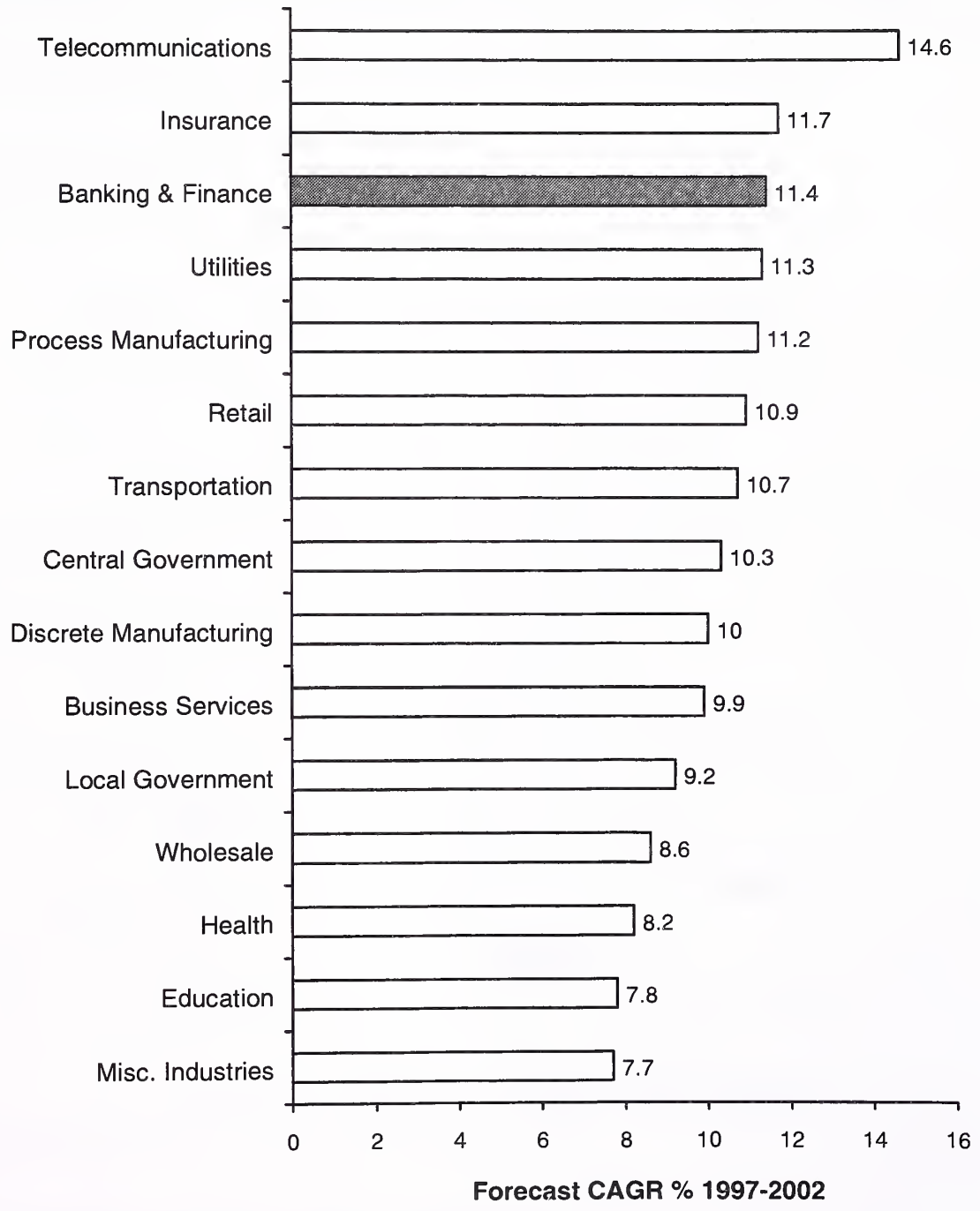


Source: INPUT

Exhibit IV-44 provides a comparison of the expected growth in IT Software & Services for each individual industry sector.

Exhibit IV-44

Industry Sector IT Software & Services Growth Comparison – Europe

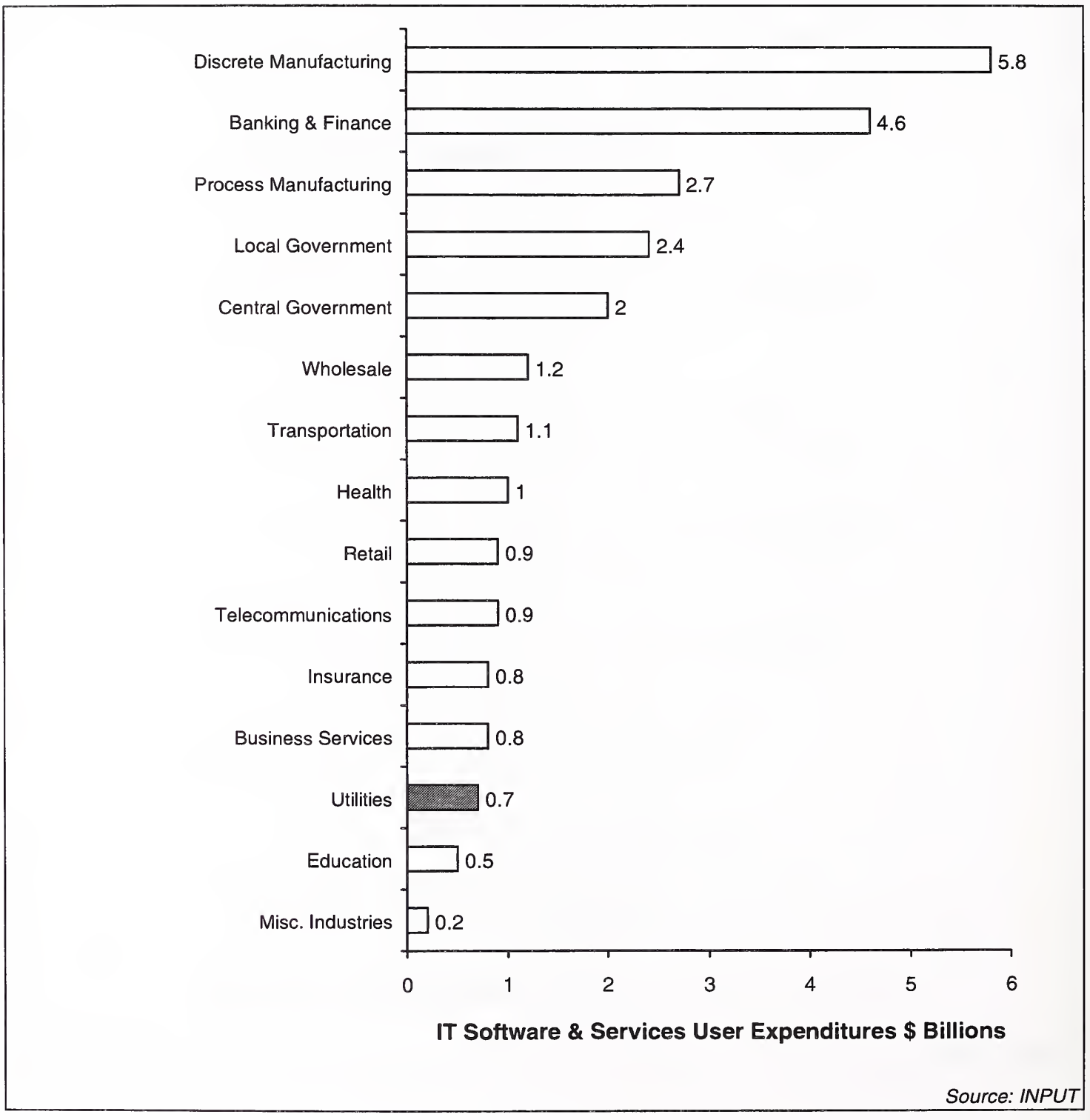


Source: INPUT

Exhibits IV-45 through 47 show comparative industry sector tables for the respectively the Professional Services, Systems Integration and Outsourcing sectors.

Exhibit IV-45

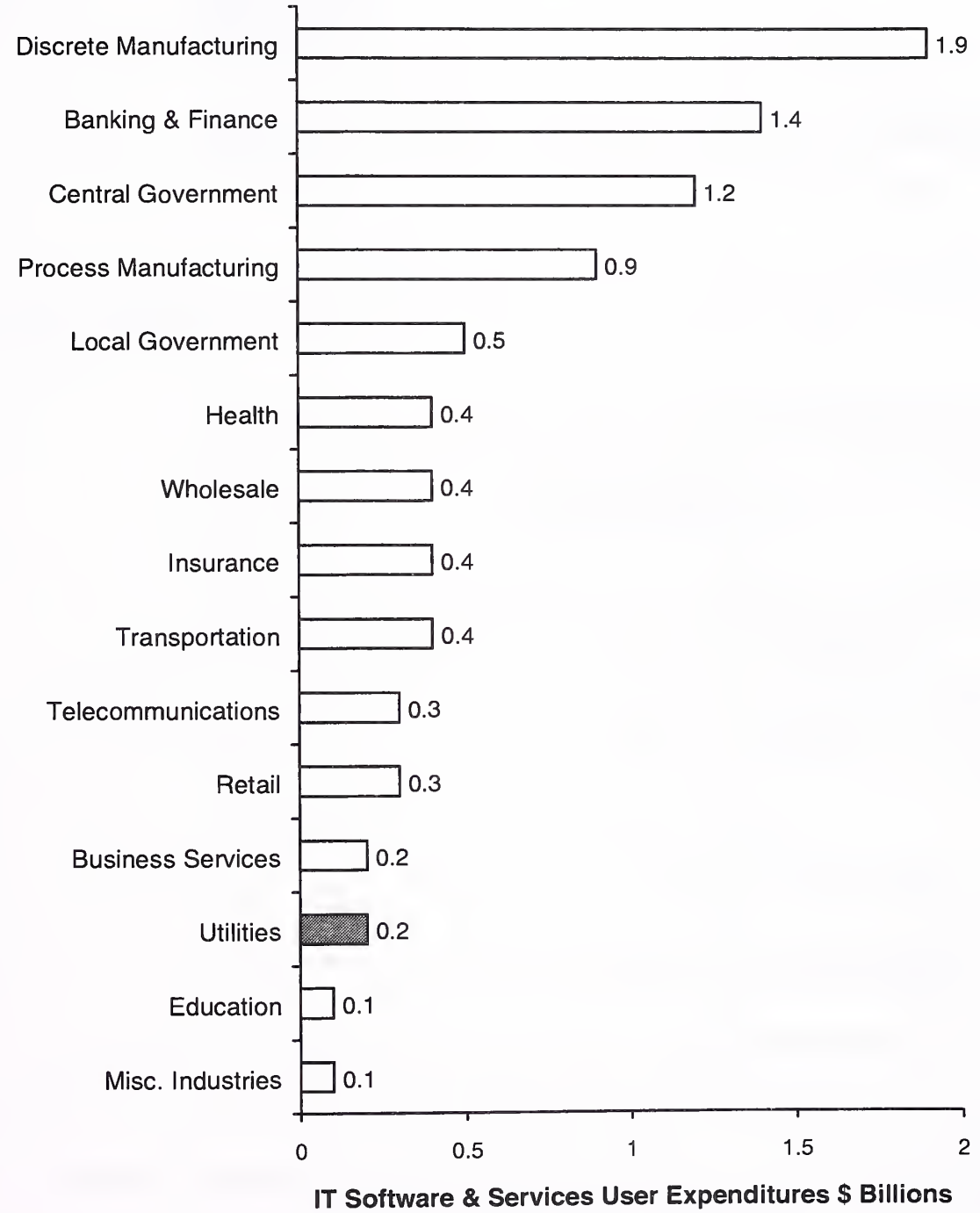
Industry Sector Comparison – Professional Services – Europe, 1997



Source: INPUT

Exhibit IV-46

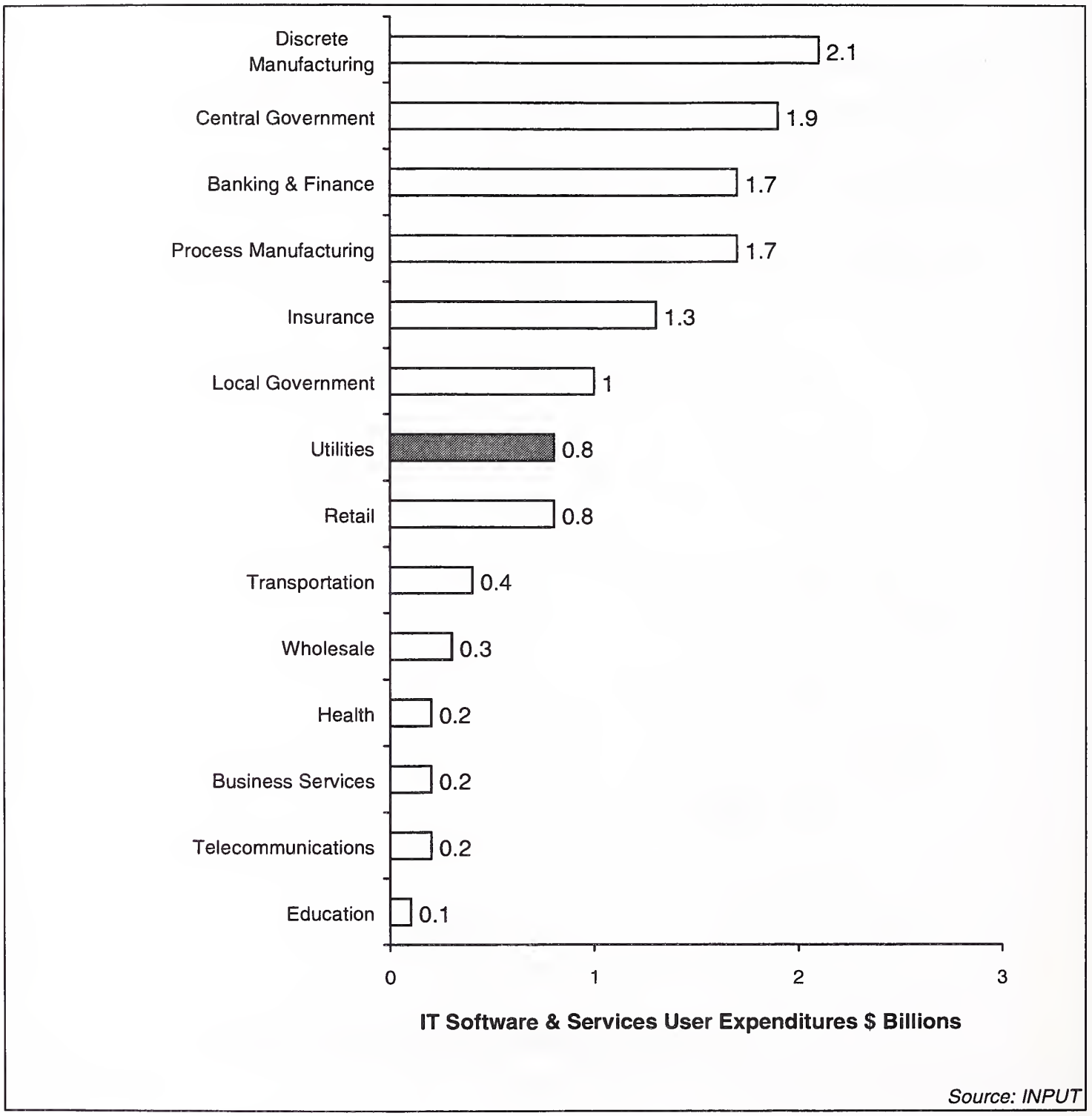
Industry Sector Comparison – Systems Integration – Europe, 1997



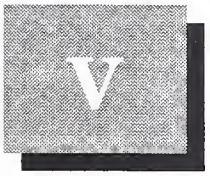
Source: INPUT

Exhibit IV-47

Industry Sector Comparison – Outsourcing – Europe, 1997



Source: INPUT



Electronic Business Directions

A
Electronic Business Futures

New competitive pressures in the Utilities business are forcing industry players to implement significant change within their organizations in order to meet increasingly demanding customer needs and stay competitive.

This new open competitive market is presenting the Utilities industry with unprecedented demands to operate more efficiently.

As a result Utilities organizations have to address the following key issues:

- Reduce service time to market.
- Cut operating expenses.
- Meet regulatory requirements.
- Improve engineering and operations work processes.
- Address competitive open market pressures.

Utilities organizations are looking to the implementation of IT based systems to support them in these endeavors.

Thus the development of advanced IT based systems has not only been one of the main enablers of an open competitive market environment for power generation and supply, it is also one of the key supports for effective operation in that environment.

In order to fully benefit form the application of IT to their business, Utility organizations need to implement Electronic Business (EB) systems.

Electronic Business is the combination of Information Technology and business process to form a new way of working.

Electronic Business is all about enterprise wide change. It impacts strategy, business processes, the use of technology, not just IT, and the interactions of the people involved in the enterprise.

Some of the problems and challenges being faced by the Utilities sector that can be addressed by the implementation of Electronic Business solutions include:

- Capturing new market opportunities.
- Creation of a market-driven culture.
- Improvements in customer service.
- Process rationalization.
- Redesigning the business.

The remaining sections of this Chapter cover:

- The definition and description of Electronic Business and its distinction from Electronic Commerce.
- The impact of the Internet on the development of Electronic Business systems and processes.
- The effect of Electronic Business developments on corporate computing.

B
Electronic Business and Electronic Commerce

The term 'Electronic Business' is frequently used as a synonym for Electronic Commerce, the latter term being used to describe the conduct of business transactions electronically.

In the past 10 to 15 years, Electronic Commerce implied the use of EDI (Electronic Data Interchange) systems, now the focus has switched to the possibilities for conducting commerce over the Internet.

The term 'Electronic Business' is however used by INPUT to signify something much deeper and more profound about the way that organizations are adapting IT systems, including the Internet, to reengineer and redesign the fundamental processes and value chains of their business.

There is a clear need to be precise about the way in which we use these two terms and what exactly we mean by them.

1. Electronic Commerce Definition

INPUT defines Electronic Commerce as the use of IT systems to carry out the interorganizational business processes of buying and selling goods and services.

This basic definition has been extended by contemporary use to include Electronic Retailing. Usually Electronic Retailing is referred to as Business-to-Consumer (B-to-C) Electronic Commerce and interorganizational trade as Business-to-Business (B-to-B) Electronic Commerce.

Electronic Commerce places emphasis on activities that are external to the organization, how customers are grouped and the firm's interactions with them.

Electronic Commerce is, however, only a part of the wider phenomenon of Electronic Business.

2. Electronic Business Definition

The Electronic Business revolution is possibly the most important change affecting organizations as we go forward into the 21st century.

Whilst Electronic Commerce places emphasis on activities that are external to the organization, Electronic Business places emphasis on the reengineering and/or automation of internal processes based on IT systems, see Exhibit V-1.

Exhibit V-1

What is Electronic Business?

- **Embedding of IT into an organizational process**
  - **IT enables the process to operate**
  - **Differs form old IT support model**
- **Process may be industry or function specific**

Source: INPUT

Electronic Business is the embedding of IT into a business process to create a system that would not be possible without IT support, IT enables that process to operate.

The Electronic Business model differs form the old or traditional model of IT use where it was used just to support the operation of a process which hitherto had run without the use of computer technology at all.

A critical test for an Electronic Business process is whether or not that process can operate at all if the IT system is inoperable.

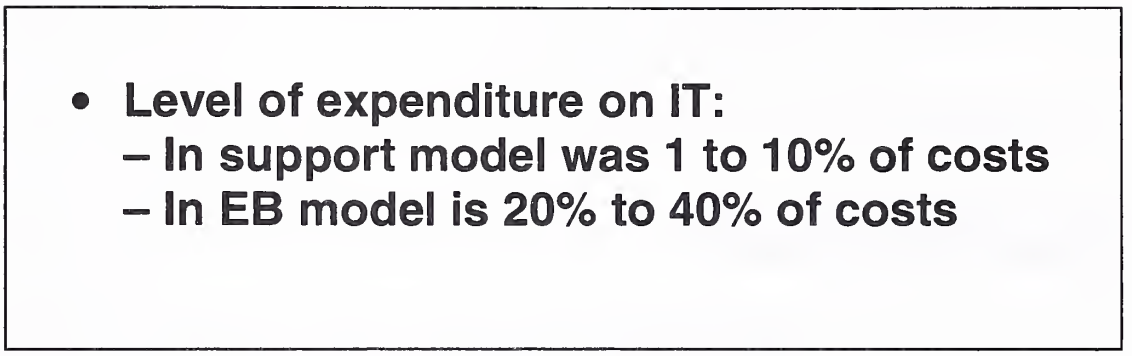
For example, a reservation clerk that uses a reservation system to make airline bookings is not an example of Electronic Business.

An on-line system that allows a passenger to make a booking, obtain a ticket and a boarding pass electronically without intervention of a reservations clerk, is an example of Electronic Business.

In the 'old' IT support model the expenditure on IT is typically in the range of one to five percent of an organizations annual revenues, see Exhibit V-2.

Exhibit V-2

Electronic Business Expenditure



Source: INPUT

In Europe, as was shown in Exhibit IV-4 earlier, the average for all industries is currently just under two percent with only the Financial Services sectors of Insurance and Banking & Finance spending on average above these levels.

The Banking & Finance sector in Europe shows the highest level proportionally of IT expenditure that averages about 8% for the European industry.

The comparative statistics for the United States are, as might be expected, significantly higher than this, for example as high as 10% to 15% in the highly information intensive industries such as banking and brokerage. See also INPUT's companion study on the US Utilities sector for comparable statistics.

In the Electronic Business model IT expenses are going to be commonly measured in the range of 20% to 40% of organizations revenues or total expenses. In some cases they will be even higher as we continue our journey in the 21st century towards the electronic society.

In the past competitive advantage was based on structural characteristics like market presence/power, economies of scale and the comprehensiveness of a firm's product range.

Today, and increasingly in the future, competitive advantage is based on capabilities that consistently deliver superior value to customers. For example capabilities such as better internal co-ordination, workflow management, product and service customization and supply chain management.

Electronic Business is thus going to have a major impact on the way that commerce and industry, government and consumers conduct business in the 21st century.

C
Impact of the Internet

Improvements in transportation technology, the railway system from the middle of the 19th century, the road systems from the middle of the 20th century, reduced transportation costs and thus revolutionized the movement of goods and people.

Now the Internet is in the process of revolutionizing the transport of information as a result again of a drastic reduction in costs, this time for the transport of bits.

The Internet is particularly important as an enabler of both Electronic Business and Electronic Commerce.

The fabric of business and commerce is transactions.

The broad categorization of business transactions is:

- Transactions for acquiring data and information.
- Transactions for disseminating information.
- Transactions between business parties, B-to-B transactions.
- Transactions between a business and a consumer, B-to-C transactions.

To date there still exist some reluctance to use the Internet.

Characteristics of message handling of importance tot trading partners are:

- Integrity – assurance that the message has not been altered.
- Confidentiality – message not viewed by third party.
- Non-repudiation – senders/receivers cannot deny sending/receiving.
- Authentication – assurance that message did come from the indicated party.

For Electronic Business and Commerce to flourish many common business services need to be established that will provide an infrastructure for facilitating inter firm transactions and the buying and selling process.

We are still at the stage where the technical infrastructure is being established.

D
Issues for Corporate Computing

The movement towards Electronic Business is going to have important implications for corporate computing.

We have already witnessed the march of the Outsourcing business.

We are now seeing the start of the Business Process Outsourcing phenomenon.

One of the most significant impacts on corporate computing has been the Intranet.

Intranets are still most commonly used for low-value applications.

The primary motive for their use is to extend the reach of IT within an Organization, not reduce cost. This is an interesting sign of EB.

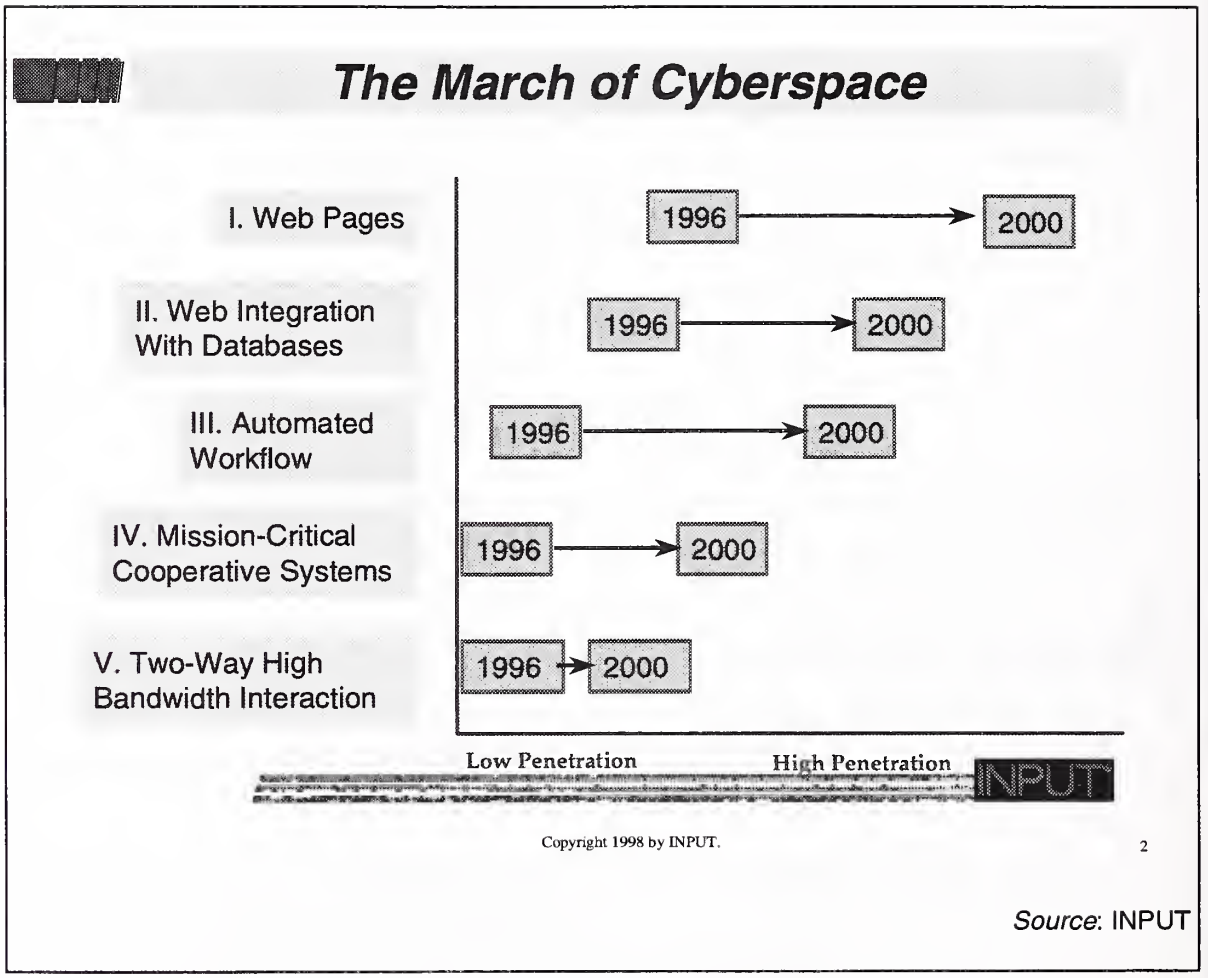
To date Intranets have tended to be funded from centralized budgets and largely been developed in-house.

They are still in early phase of use, mostly used for internal distribution of information and of most help to administrative staff.

Five phases of development are envisaged and observable now, see Exhibit V-3.

Exhibit V-3

Internet Development



Source: INPUT

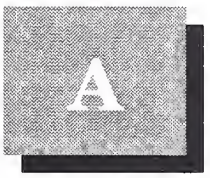
I Static info distribution, e.g. policies, directories, registers.

II. Information sharing between units/departments. E.g. product plans, financial data, customer services records and sales contacts.

III. Group collaboration. Project management, GroupWare and desktop conferencing.

IV. Integration of existing systems with Intranet. Web enabled data warehouse, front-end to legacy database, live customer queries.

V. Replacement of legacy systems.



Utilities Sector Database, 1997-2002, Europe

This appendix contains data tables from the main body of the report to provide a convenient reference source.

AA
Total IT Software & Services

Exhibit A-1

Analysis of IT Software & Services Expenditure – Utilities Sector Europe, 1997

Segment		User Expenditures $ Millions		
		Industry Specific	Cross Industry	Other Services
Professional Services	Total	700		
Systems Integration	Total	240		
	Software Products	65		
	Equipment	50		
	Other	125		
Outsourcing	Total	800		
Processing Services	Total	100	50	50
	Transactions	100	50	
	Other services			50
Network Services	Total	90		100
Applications Software Products	Total	145	105	
Turnkey Systems	Total	80	20	
	Software Products	30	8	
	Equipment	35	8	
	Other	15	4	
Systems Software Products				420
Equipment Services				500
Total		2,155	175	1,070

Source: INPUT

Exhibit A-2

Equipment Expenditure – Utilities Sector

Sector	1997 Expenditure ($ millions)
Systems Integration	50
Turnkey Systems – Industry Specific	35
Turnkey Systems – Cross Industry	8
Utilities Sector TOTAL	93

Exhibit A-3

Software Products Expenditure – Utilities Sector

Sector	1997 Expenditure ($ millions)
Systems Integration	65
Applications Software Products	250
Turnkey Systems – Industry Specific	30
Turnkey Systems – Cross Industry	8
Systems Software Products	420
Utilities Sector TOTAL	773

Exhibit A-4

IT Software & Services Components – Utilities Sector

Sector	1997 Expenditure ($ millions)
Equipment	93
Software Products	773
IT Services	2,534
Utilities Sector TOTAL	3,400

Exhibit A-5

Total IT Software & Services – Utilities Sector

Sector	1997 Expenditure ($ millions)
Industry Specific	2,155
Cross Industry	175
Other Services	1,070
Utilities Sector TOTAL	3,400

AB
Industry Specific IT Software & Services

Exhibit A-6

Utilities Industry Specific IT Software & Services Market, Europe (Millions)

Sector	1997	CAGR	2002
Professional Services	700	4.0%	850
Systems Integration	240	13.4%	450
Outsourcing	800	22.4%	2200
Processing Services	100	11.2%	170
Network Services	90	13.6%	170
Applications software Products	145	5.6%	190
Turnkey systems	80	10.2%	130
Sector TOTAL	2155	14.1%	4160

Exhibit A-7

Professional Services – Utilities Sector, Europe (Millions)

Subsector	1997 Expenditure	CAGR	2002 Expenditure
IS Consulting	140	7.4%	200
Education & Training	90	5.9%	120
Software Development	470	2.4%	530
TOTAL	700	4.0%	850

Exhibit A-8

Systems Integration – Utilities Sector, Europe (Millions)

Subsector	1997 Expenditure	CAGR	2002 Expenditure
Software Products	65	14.9%	130
Equipment	50	14.9%	100
Other Services	125	12.0%	220
Utilities Sector TOTAL	240	13.4%	450

Exhibit A-9

Outsourcing Services – Utilities Sector, Europe (Millions)

Subsector	1997 Expenditure	CAGR	2002 Expenditure
Platform Operations	140	12.3%	250
Application Operations	340	19.5%	830
Desktop Services	70	25.7%	220
Applications Management	100	24.6%	300
Network Management	150	32.0%	600
Utilities Sector TOTAL	800	22.4%	2200

Exhibit A-10

Processing Services – Utilities Sector, Europe ($ Millions)

Subsector	1997 Expenditure	CAGR	2002 Expenditure
Industry Specific Transactions	100	11.1%	170
Cross Industry Transactions	50	0%	50
Other Processing Services	50	7.0%	70
Utilities Sector TOTAL	200	7.7%	290

Exhibit A-11

Network Services – Utilities Sector, Europe

Subsector	User Expenditures $ Millions		
	1997	CAGR	2002
Industry Specific Network Applications	90	13.6%	170
Other Network Services	100	22.9%	280
Utilities Sector TOTAL	190	18.8%	450

Exhibit A-12

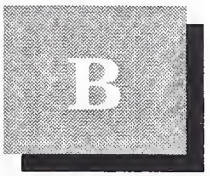
Applications Software Products – Utilities Sector, Europe

Subsector	User Expenditures ($ Millions)		
	1997	CAGR	2002
Industry Specific Applications Software Products	145	5.6%	190
Cross Industry Applications Software Products	105	5.9%	140
Utilities Sector TOTAL	250	5.7%	330

Exhibit A-13

Industry Specific Turnkey Systems – Utilities Sector, Europe

Subsector	User Expenditures ($ Millions)		
	1997	CAGR	2002
Software Products	30	8.4%	45
Equipment	35	11.4%	60
Other Services	15	10.8%	25
Utilities Sector TOTAL	80	10.2%	130



Market Forecast Reconciliation

Exhibit B-1

European IT Expenditure

Forecast Reconciliation – Utilities Sector 1997

$ Millions

PRODUCT/SERVICE CATEGORY	1997 Market			
	1996 Report	1997 Report	1996 – 1997 Variance (Amount)	%
Internal Staff	3,040	2,500	(540)	18
Services	3,880	2,400	(1,480)	38
Equipment	1,710	2,000	290	17
Software Products	920	800	(120)	13
Facilities	1,095	700	(395)	36
Data Comms	650	500	(150)	23
Total	**11,295**	**8,900**	**(2,395)**	**21**

Source: INPUT

Exhibit B-2

European IT Software & Services
Forecast Reconciliation – Utilities Sector 1997
$ Millions

PRODUCT/ SERVICE CATEGORY	1997 Market				2001 Market				1996 Report %CAGR (Fcst)	1997 Report %CAGR (Fcst)
	1996 Report	1997 Report	1996 – 1997 Variance		1996 Report (Fcst)	1997 Report (Fcst)	1996 – 1997 Variance			
			(Amount)	(%)			(Amount)	(%)		
Professional Services	1,720	700	(1,020)	59	2,300	820	(1,480)	64	9	4
Systems Integration	750	240	(510)	68	1,450	400	(1,050)	72	18	13
Outsourcing	210	800	590	280	250	1,800	1,550	620	12	22
Processing Services	275	100	(175)	64	380	150	(230)	60	19	11
Network Services	155	90	(65)	42	300	150	(150)	50	21	14
Applications Software Products	160	145	(15)	9	45	180	(270)	60	28	6
Turnkey Systems	310	80	(230)	74	550	120	(430)	78	13	10
Total Industry Specific	**3,580**	**2,155**	**(1,425)**	**40**	**5,680**	**3,620**	**(2,060)**	**36**	**13**	**14**

Source: INPUT

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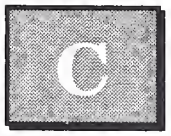


Terms and Definitions

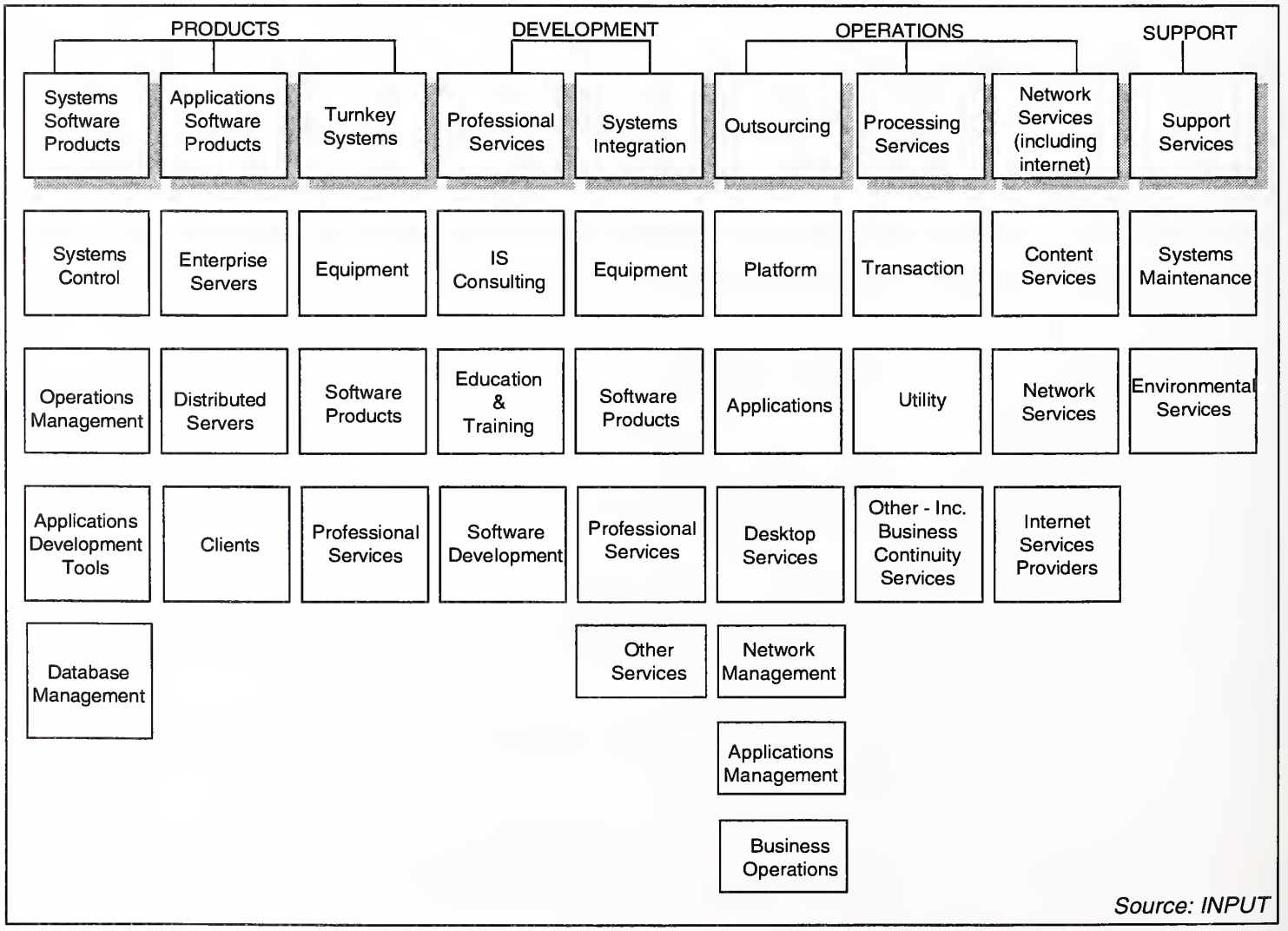
CA
IT Market Structure

- INPUT now recognizes two broad market segments, Electronic Business (EB) and IT Software & Services .
- IT Software & Services expenditures are a component of total user expenditure on IT which also includes equipment and in-house personnel.
- INPUT provides an analysis of total user IT expenditure in its World-wide Market Forecast Program. In this analysis it recognizes six major discrete components of expenditure:
  - Equipment – expenditure on computer and data communications hardware products.
  - Communications – all expenditure on IT - related data communications services.
  - Software Products – all expenditure on systems software products and applications software product licences including support services where these are included within the basic license fee.
  - IT Services – all expenditure on professional services, systems integration, outsourcing, processing services, network services, turnkey systems.
  - Staff – direct in - house staff costs directly concerned with IT or the support of it.
  - Facilities – IT budget expenditure on overheads such as space, heating, lighting, furniture, vehicles etc.

- INPUT's service sectors, described in detail below, can involve the delivery of a combination of components of people, computer processing and software products.
- The six categories defined above represent, however, the basic components or `inputs' to the operation of IT by a user
- N.B that the IT Services category defined above does not correspond to INPUT'S definition of the IT Software & Services market since the latter includes all software products and the equipment delivered through service channels.
- The structure and components of the IT Software & Services market are shown in Exhibit C-1.

Exhibit C-1

IT Software & Services Market Structure



CB
Industry Sectors

1. Industry Sector Definitions

Industry sectors are based on the most recent revision of the Standard Industrial Classification (SIC) code system, as shown in Exhibit C-2.

Exhibit C-2

Industry Sector Definitions

Industry Sector	SIC Code	Description
Discrete Manufacturing	23xx	Apparel and other finished products
	25xx	Furniture and fixtures
	27xx	Printing, publishing, and allied industries
	31xx	Leather and leather products
	34xx	Fabricated metal products, except machinery and transportation equipment
	35xx	Industrial and commercial machinery and computer equipment
	36xx	Electronic and other electrical equipment and components, except computer equipment
	37xx	Transportation equipment
	38xx	Instruments; photo/med/optical goods; watches/clocks
	39xx	Miscellaneous manufacturing industry
Process Manufacturing	10xx	Metal mining
	12xx	Coal mining
	13xx	Oil and gas extraction
	14xx	Mining/quarrying nonmetallic minerals
	20xx	Food and kindred products
	21xx	Tobacco products
	22xx	Textile mill products
	24xx	Lumber and wood products, except furniture
	26xx	Paper and allied products
	28xx	Chemicals and allied products
	29xx	Petroleum refining and related industries
	30xx	Rubber and miscellaneous plastic products
	32xx	Stone, clay, glass and concrete
	33xx	Primary metal industries
Transportation Services	40xx	Railroad transport
	41xx	Public transit/transport
	42xx	Motor freight transport/warehousing
	43xx	U.S. Postal Service
	44xx	Water transportation
	45xx	Air transportation (including airline reservation services in 4512)
	46xx	Pipelines, except natural gas
	47xx	Transportation services (including 472x, arrangement of passenger transportation)

Source: INPUT

Exhibit C-2 (continued)

Industry Sector Definitions

Industry Sector	SIC Code	Description
Telecommunications	48xx	Communications
Utilities	49xx	Electric, gas and sanitary services
Retail Trade	52xx 53xx 54xx 55xx 56xx 57xx 58xx 59xx	Building materials General merchandise stores Food stores Automotive dealers, gas stations Apparel and accessory stores Home furniture, furnishings and accessory stores Eating and drinking places Miscellaneous retail
Wholesale Trade	50xx 51xx	Wholesale trade - durable goods Wholesale trade - nondurable goods
Banking and Finance	60xx 61xx 62xx 67xx	Depository institutions Nondepository credit institutions Security and commodity brokers, dealers, exchanges and services Holding and other investment offices
Insurance	63xx 64xx	Insurance carriers Insurance agents, brokers and services
Health Services	80xx	Health services
Education	82xx	Educational services

Source: INPUT

Exhibit C-2 (continued)

Industry Sector Definitions

Industry Sector	SIC Code	Description
Business Services	65xx	Real estate
	70xx	Hotels, rooming houses, camps, and other lodging places
	72xx	Personal services
	73xx	Business services (except hotel reservation services in 7389)
	7389	Hotel reservation services
	75xx	Automotive repair, services and parking
	76xx	Miscellaneous repair services
	78xx	Motion pictures
	79xx	Amusement and recreation services
	81xx	Legal services
	83xx	Social services
	84xx	Museums, art galleries, and botanical/zoological gardens
	86xx	Membership organizations
	87xx	Engineering, accounting, research, management, and related services
	89xx	Miscellaneous services
Federal Government	9xxx	
State and Local Government	9xxx	
Miscellaneous Industries	01xx	Agricultural production - crops
	02xx	Agricultural production - livestock/animals
	07xx	Agricultural services
	08xx	Forestry
	09xx	Fishing, hunting, and trapping
	15xx	Building construction - general contractors, operative builders
	16xx	Heavy construction - contractors
	17xx	Construction - special trade contractors
Personal Households	88xx	

Source: INPUT

2. Process or Cross-Industry Sector Definitions

- These sectors or markets involve multi-industry applications such as human resource systems, accounting systems, etc. In order to be included in an industry sector, the service or product delivered must be specific to that sector only. If a service or product is used in more than one industry sector, it is counted as cross-industry.

- INPUT only includes the turnkey systems, applications software products, and transaction processing services in the cross-industry sectors.

- The cross-industry markets are:

a. Accounting/Finance

- Consists of such functions as:
  - General ledger
  - Financial management
  - Accounts payable
  - Accounts receivable
  - Billing/invoicing
  - Fixed assets
  - International accounting
  - Purchasing
  - Taxation
  - Financial consolidation.

- Excluded are accounting products and services directed to a specific industry, such as tax processing services for CPAs and accountants within the business services industry sector.

b. Human Resources

- Human resources companies:
  - Benefits administration.
  - Government compliance.
  - Employee relations.
  - Manpower planning.
  - Compensation administration.
  - Applicant tracking.
  - Position control.
  - Payroll processing.

c. Education and Training

- Education and training consists of education and training for information systems professionals and users of information systems delivered as a software product, turnkey system, or through processing services. The market for computer-based training tools for the training of any employee on any subject is also included.

d. Office Systems

- Office systems companies the following six categories:
  - (1) *Integrated Office Systems (IOSs)* - IOSs integrate the applications that perform common office tasks. Typically, these tasks include the following core applications, all of which are accessed from the same terminal, microcomputer, or workstation:
    - Electronic mail/groupware.
    - Decision support systems.
    - Time management/workflow.
    - Filing systems/document management.

- (2) *Text Processing* - is the most common microcomputer application and is a basic application within the office systems sector. Text processing addresses several levels of functionality, from the production of simple correspondence to large document generation in which many people from different departments have input.

- (3) *Desktop Publishing (DTP)* - refers to the page-design software programs that allow small and midsized organizations to publish printed documents (brochures, catalogs, newsletters, reports, etc.) from the desktop. The primary functions of DTP software include the manipulation of the following functions:

  - Layout and design of columns
  - Text manipulation (font type)
  - Graphic manipulation
  - Print Control (color type, paper type)

- (4) *Electronic Publishing* - includes composition, printing, and editing software for documents containing multiple typefaces and graphics, including charts, diagrams, computer-aided design (CAD) drawings, line art, and photographs. Electronic publishing products may also have different data formats such as text, graphs, images, voice and video.

- The fundamental difference between electronic publishing and desktop publishing is that electronic publishing facilitates document management and control from a single point, regardless of how many authors/locations work on a document. Desktop publishing (DTP), on the other hand, is considered a personal productivity tool and is generally a lower-end product residing on a personal computer.

- (5) *Graphics* - Graphics packages that are used for presentations or freehand drawings and/or are ancillary to desktop publishing are part of office systems. Thus, the graphics component of office systems sector includes the following elements:

- Presentation graphics represent the bulk of office systems graphics. Most presentations involve a combination of graphs and text. They are used to communicate a series of messages to an audience rather than to analyze data.

- Paint and line art drawing programs are used for illustrations, while page layout programs are used to integrate text and graphics.

- Electronic form programs allow users to create and print forms in-house. Some applications work with OCR scanners, allowing users to scan pictures and logos directly onto forms.

  – (6) *Document Imaging Software* - allows users to manipulate (store, retrieve, print) images that have been scanned from paper documents. The applications that imaging software generates include: full text retrieval, document management, and database management. Document imaging software is a component of an imaging system. Hardware components of imaging systems include: scanners, image servers, workstations, optical drives, printers, and storage devices.

e. Engineering and Scientific

- Engineering and scientific activities encompass the following applications:

  – Computer-aided design and engineering (CAD and CAE).

  – Structural analysis.

  – Statistics/mathematics/operations research.

  – Mapping/GIS (Geographic Information Systems).

  – Computer-aided manufacturing (CAM) or CAD that is integrated with CAM is excluded from the cross-industry sector, as it is specific to the manufacturing industries. CAD or CAE that is dedicated to integrated circuit design is also excluded because it is specific to the semiconductor industry.

f. Planning and Analysis

- Planning and analysis consists of software products and information services in four application areas:

  – Executive Information Systems (EIS).

  – Financial modeling or planning systems.

  – Spreadsheets.

- Project management.

g. Sales and Marketing

- Sales and marketing encompasses the following marketing/sales applications:
  - Sales analysis.
  - Marketing management.
  - Demographic market planning models.

h. Other Processes

- Two other process areas that are emerging as significant cross-industry sectors are Customer Services and Logistics. They comprise the following:
- Customer Care/Services:
  - Support.
  - Repair/diagnostics.
  - Help desk.
  - Consulting.
- Logistics:
  - Invoice management.
  - Replenishment.
- Distribution.

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