SOFTWARE AND SERVICES MARKET, EUROPE

1992-1997

DISTRIBUTION SECTOR

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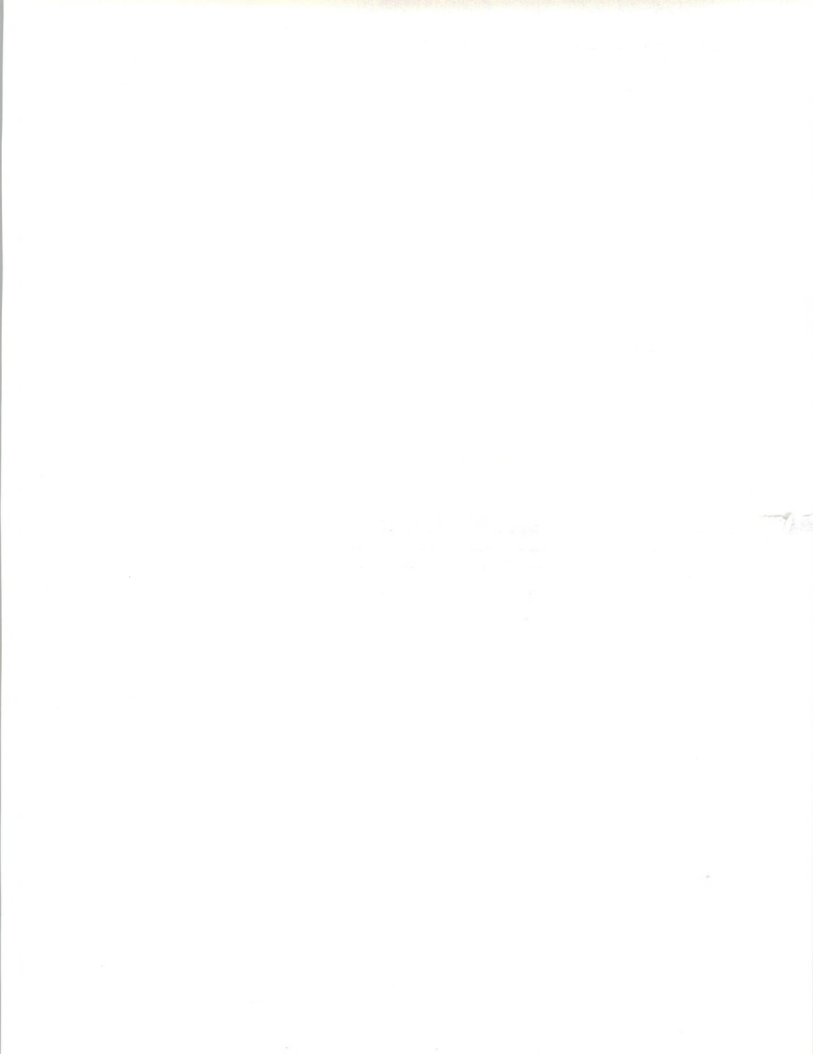
Information Services Programme—Europe
(IEMAP)

***Software and Services Market, Europe,
1992-1997—Distribution Sector***

Abstract

This report analyses the software and services market in the distribution industries of Europe and its growth potential over the period 1992 to 1997. A commentary is included on the emergence of "electronic commerce" during the 1990s.

The report provides market size estimates for 1991 and forecasts from 1992 to 1997 for the software and services market analysed into its component subsectors or delivery modes. Only services business specific to the sector are counted, so cross-industry products and services are excluded. The sectors covered are processing services, turnkey systems, applications software products, professional services, network services, systems integration and systems operations. These forecasts are provided for Europe as a whole and for France, Germany, the U.K., Italy and Spain.

Leading vendors are compared. Key user concerns and trends are discussed. The main issues and opportunities for vendors are identified.

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I
Introduction

A
Objectives

This report has been produced as part of INPUT's Information
Services Programme - Europe for the computer software and services
industry. The objective of the report is to provide a market
assessment for the distribution (retail and wholesale) sector in
Europe. The report contains material updated from previous reports
and may be read in conjunction with them. This assessment includes:

- An analysis of the overall size of the market and its subsectors

- A forecast for market growth for the period 1992-1997

- An analysis of the leading vendors active in this market sector

- A commentary on major forces shaping the market and the resulting
  implications for vendors

B
Scope

This report reviews the software and services market for the
distribution sector of Europe for the period 1992 to 1997.

Boundaries are blurring between retail and wholesale activities as
retailing becomes more and more concentrated in large companies.
The report covers software and services demand generated by
distribution companies seeking better control of costs, faster
movement of goods and improvements in customer service.

The distribution sector is defined as the wholesaling and retailing of products, including food, merchandise, automotive and hospitality. The market is identified by SIC codes 5000 to 5999 inclusive. It excludes physical transport of goods where ownership is not transferred to the shipper, and the financial services supporting trade. For example, EFTPOS (electronic funds transfer at point of sale) networks operated by the banks are covered in a separate INPUT report in the 1992 Information Services Programme - Europe. Manufacturers' warehousing software and services are included in INPUT sector reports on the process manufacturing and discrete manufacturing markets.

Geographically the study analyses and forecasts the following country markets:

· France

· Germany

· United Kingdom

· Italy

In looking at this industry sector, only business specific to the sector is counted, so that cross-industry products and services are excluded from the forecasts. The detailed analysis includes the following major categories: (Definitions are given in Appendix A.)

· Processing services

· Network services

· Applications software specific to this sector

· Professional services

· Turnkey systems

· Systems integration

Omitted from the analyses are what the user spends on:

· Systems software such as operating systems, databases, languages and development tools

· Related professional services including product training and technical consultancy

· Generic network services and on-line databases

· Cross-industry processing services such as transaction services

· Cross-industry applications such as accounting systems and office automation software products

C
Methodology

The research that contributed to this study was derived from the following sources:

· INPUT's ongoing research of the European software and services market, which includes the collection of revenue and product information from over 400 vendors annually.

· Interviews with senior managers from both independent software product and service vendors and equipment vendors.

· The use of INPUT's extensive library facilities, which include vendor literature and press releases as well as trade press, newspaper and magazine articles and previous INPUT reports relevant to the system software products market sector.

D
Report Structure

The remaining chapters of this report are organised as follows:

· Chapter II contains an executive overview of the key factors shaping this market.

· Chapter III examines the emergence of electronic commerce as a new mode of doing business, which is expected to radically alter the distribution supply chain.

· Chapter IV sets out INPUT's estimates and forecasts of user expenditures on software and services and the relevant revenues of leading vendors. These forecasts and vendor rankings are broken down by country market and by delivery mode.

· The Appendixes contain the forecast database, a consolidation between last year's forecast and this year's, and a glossary of EDI terms.

E

Related INPUT Reports

Readers may find it useful to refer to other INPUT reports which relate to the findings of this report:

· Overall Western European market reviews:

- *The Western European Market for Computer Software and Services, Forecast and Analysis, 1992-1997* (December 1992)

· Industry sector reviews:

- *European Software and Services Market, 1992-1997 - Banking and Finance Sector* (incl EFTPOS)

- *European Software and Services Market, 1992-1997 - Transportation Sector*

- *U.S. Industry Sector Markets, 1991-1996 - Retail Distribution Forecast Update*

- *U.S. Industry Sector Markets, 1991-1996 - Wholesale Distribution Forecast Update*

· Network services reviews:

- *EDI Intertrends - Europe, 1992-1997*

- *International EDI Services*
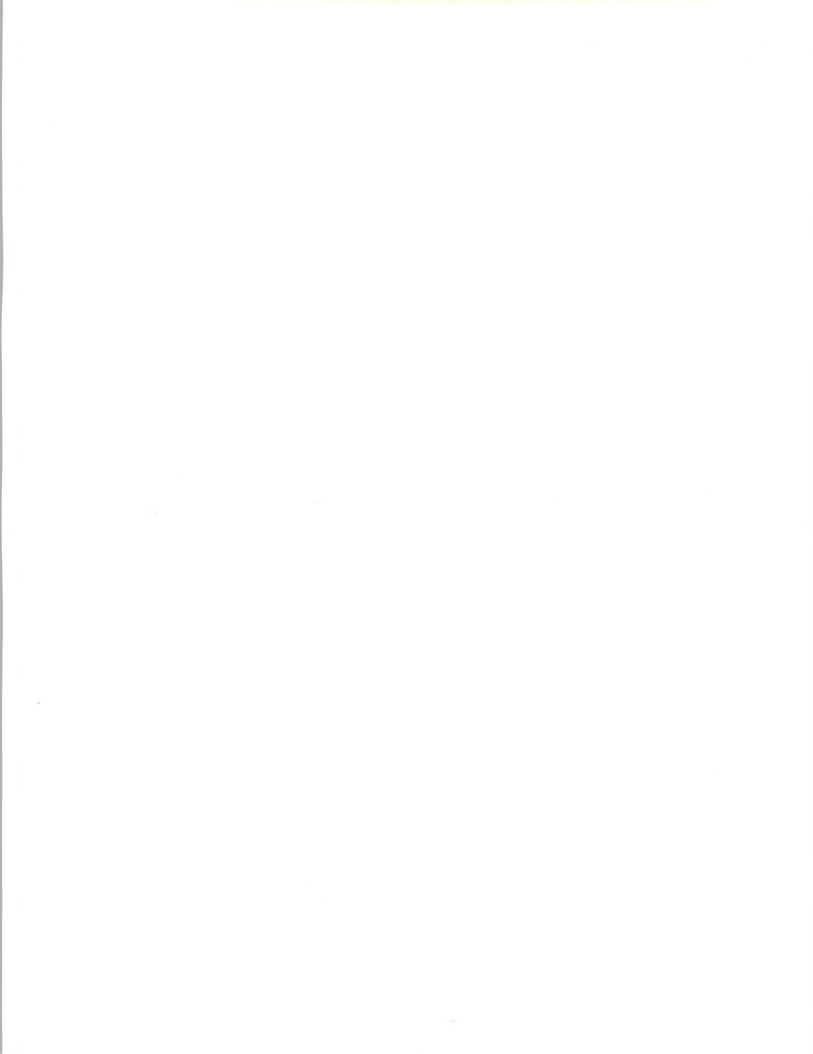
II
Executive Overview

A

Outlook - Recession and Downsizing Lower Growth Expectations

Deepening recession in most European markets means that achieving savings through faster product movement is still the top priority driving investment in information systems and services for European distribution businesses. INPUT forecasts that overall, the market for industry-specific software and services in retail and wholesale distribution in Europe will reach $5.0 billion in 1992, growing to $8.3 billion by 1997.

Exhibit II-1 lists some of the key trends moulding the market. Changing business practices and the use of scanning EPOS (electronic point of sale) terminals create demand for new applications and wider systems integration. As competition among retailers and wholesalers increases, so does demand for high-function application packages to replace in-house developments. To fully exploit the mountains of sales data being generated and speed the flow of information and products, companies are networking and integrating their systems, and traders are looking to share more information both internally and with customers and suppliers - a phenomenon INPUT calls electronic commerce, which is fully described in Chapter III.

By using information systems to help reduce lead times and inventory costs - still the biggest contributors to better profits - the market-leading retailers are raising consumer expectations for speed and quality of service. Consumer preference is now fueling demand for such improvements across the whole industry. At the same time, both retailers and wholesalers, already suffering with staff shortages, are faced with a shrinking labour pool. On top of that, transport and space costs are expected to increase rapidly over the next few years.

EXHIBIT II-1

Key Distribution Industry Trends
Software and Services, Europe

- Electronic commerce favoured

- Retailers bypass wholesalers

- Downsizing limits IS spending

- Manufacturers lead market

The information systems now in the hands of some major retailers is enabling them to push much of the risk in following consumer preference back to the wholesalers and manufacturers. Just-in-time (JIT) techniques applied by retailers are reducing stock levels and increasing stock-turns and forcing suppliers to take more of the risks in predicting demand and holding stocks. The value added by some wholesaling agents is reducing as EDI systems gain wider acceptance; retailers are bypassing wholesalers in some cases.

The trend to downsize - to move applications onto smaller lower-cost hardware and to buy application packages - is still dominant right across Europe. The effect is that users can buy more IS solutions even though they are restricting their budgets under the pressure of recession. For vendors, downsizing means that competition is becoming more intense and prices are being held down. In the retail sector especially, the market leaders are (and will remain) the suppliers of leading-edge hardware such as scanners, and software and services play a supporting role. For wholesalers, the software is the more key technology in achieving a competitive edge. Exhibit II-2 shows the forecast for these subsectors.

Trade barriers are set to fall around Europe, and distributors are implementing data links crossing national boundaries to both suppliers and customers. This is leading to significant cross-border investment and pan-European alliances. The result is demand for more expansive information systems and networks, with a fast growing number of major systems integration projects under consideration. The successful management of the large-scale complexities of these projects offers vendors potential for both high reward and high risk. Users are looking for vendors with a strong, successful track record both in the distribution industry and in major projects.

There are large differences among European countries in the structure of their local distribution markets, which leads to very different demands for solutions. Overall, it is the retailers that are becoming the driving force in stepping up the pace of business, as the spread of EPOS systems begins to generate a mass of immediate consumer preference data. Those distribution companies that can manage this data and convert it into valuable market information and business knowledge will gain the winning competitive edge.

B

Overall Market Forecasts

INPUT estimates that the industry specific computer software and services market in distribution for Europe was $4.5 billion in 1991. As Exhibits II-2 and II-3 illustrate, the overall market is expected to grow from $5.0 billion in 1992 to $8.3 billion in 1997, despite the current short-term recession fears in the industry.

This forecast represents a compound annual growth rate (CAGR) of 11%, which includes the predicted effects of inflation country by country around Europe. This rate compares to a forecast of 11% for the whole European market for software and services.

EXHIBIT II-2

Software and Services Market
Retail and Wholesale, Europe

	$ Billions		
Subsector	1992	1992-1997 CAGR (Percent)	1997
Retail	2.3	10	3.7
Wholesale	2.7	11	4.6
TOTAL	5.0	11	8.3
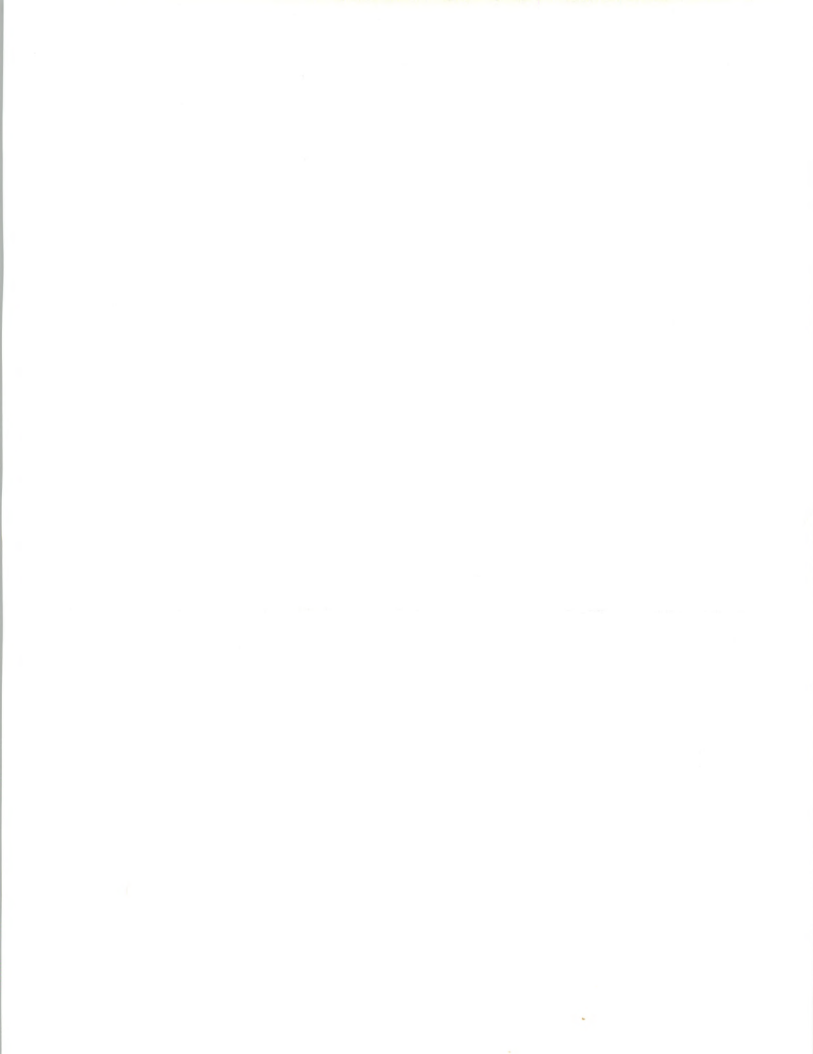
EXHIBIT II-3

Software and Services Market
Distribution, Europe

Subsector	$ Billions		
	1992	1992-1997 CAGR (Percent)	1997
Processing Services	0.3	3	0.3
Turnkey Systems	1.4	10	2.3
Applications Software	0.6	14	1.1
Professional Services	1.9	8	2.7
Network Services	0.3	19	0.8
Systems Operations	0.1	21	0.3
Systems Integration	0.4	16	0.8
TOTAL	5.0	11	8.3

As in many other industries, the information systems revolution is fueling a business revolution both in the supply chain and at the checkout counter. Cause and effect are difficult to separate. New information management techniques are paralleled by new working practices for the distributive trades.

The wholesale sector is the larger in Europe overall, but growing retail investment should eliminate the gap over the next five years. Driving this growth is a whole range of factors, all of which impact directly on the European software and services industry. The use of processing services is giving way to wider use of the international networks and the contracting out of internal operations as systems operations contracts. In-house applications have been the norm in this sector for many years. Many users can no longer afford such self-sufficiency in order to gain some competitive edge with their information systems. They are being attracted to applications packages that are easily tailored and highly functional.

As applications become distributed onto smaller hardware platforms, they have become more complex from a whole-enterprise viewpoint. Instead of looking to vendors for the traditional technical support on their products, users are now seeking business support and consultancy. User training has become a major issue as the part-time and casual labour force has grown in this sector. The most common consumer complaint about retailers is that there is a real shortage of knowledgeable and skilled sales staff. This reflects both the high turnover of part-time staff and the growing need for specialist skills in operating cash tills or doing stock checks.

Where there used to be an emphasis on implementing centralised integrated business systems, there is now a growing demand to move information across departmental and company boundaries, and across systems from a variety of vendors. The main benefit of shortening these communication paths is the faster movement of stock, which reduces the investment in product, space and staff wherever possible.

Network applications are key to the emergence of pan-European retailers and purchasing consortia - such as the alliance between Casino of France, Ahold of the Netherlands, Argyll of the U.K. and La Rinascente of Italy. Network applications are also key to the shortening of the supply chain through the use of EDI (electronic data interchange). In fact, EDI services are set to grow at two or three times the rate of the overall network services market over this period. However, for the retail sector, achieving this rate of growth will require some large companies to lay down the law to their suppliers - rather like Sears Roebuck has in the U.S., where it set a two-year deadline for its 7,000 suppliers to adopt national industry standards for EDI communications.

The major networking vendors all offer services specific to the distribution sector, indicating the level of commitment they have to this sector. There is a growing recognition that although networks are vital to the running of any large business, there are sound financial reasons for contracting out the supply of the services, rather than managing the whole network with in-house resources For example, WH Smiths has contracted Digital to supply its national network in the U.K., a move away from in-house network management.

Applications software products represent a major opportunity in the distribution sector. The turnkey systems market includes the applications products that are supplied packaged with hardware and professional services. The most visible trends in this solutions sector are the downsizing of packages - re-engineering them onto smaller/cheaper platforms - and the new co-operation among vendors as each tries to remain highly specialised rather then tackle every customer requirement single-handedly. There is still great potential for new applications products that:

· Can be easily tailored without programming

· Meet the wider integration needs of the European businesses

· Exploit the latest hardware and software platforms

· Give a fast pay-back on the client's investment

There is a strong move to buying-in applications based on packages, rather than developing them in-house or contracting for their development. This is changing the profile of the turnkey systems suppliers - for example, Siemens-Nixdorf. As such vendors offer functionally richer applications packages, they are reducing the level of custom development undertaken. Instead, this is becoming a system configuration exercise, and vendors can give more attention to helping the customer implement the system with consultancy and training. At this level there is also change. Clients are now far more willing to change their organisation to match the new working practices implied by applications packages. For example, in areas like DRP (distribution resource planning), previously discrete functions like purchasing and transport management are treated as related parts of a total logistics problem.

The professional services market is second in size only to turnkey systems in the distribution sector (see Exhibit II-3). The trend to contract out continues, but with a change of emphasis. The growing demand for custom software and technical support will slow somewhat, but this slowing will be compensated for by growth in consultancy, education and training.

IBM is well-positioned to retain its market lead in the distribution sector. It is the platform of choice for more than half the hardware revenues in the sector. IBM is the software and services leader in all major countries. It has already taken minority interests in distribution sector applications software companies and continues to strengthen a myriad of other partnerships. It offers EDI and other networking services and has defined a retail version of SAA, its systems applications architecture. And IBM is taking systems integration very seriously indeed, as its proprietary hardware hold on the market continues to be eroded by PCM and open systems vendors.

Germany, France and the United Kingdom continue to dominate the European market with roughly 25% each. This picture tends to hide the wide differences in national infrastructures. France's retail sector is largely still in the hands of private families, and now boasts 800 hypermarkets. Germany has eight of the top 20 European distribution companies. In the U.K., the retail sector is dominated by large chains and is bigger than the wholesale sector. Italy, despite consumer retail spending being as high as in Germany, is still a country of the small business and as a result is late in exploiting software and services.

Exhibit II-4 gives a different perspective on the ranking by comparing IS investment with retailer revenues. This gives a relative measure of how much of the retailer revenue is going into distribution sector information systems in each country. U.K. retailers hold a lead position in their level of investment in IS. U.K. retailers are also the envy of other European countries and the U.S., in terms of their profit performance. INPUT expects the retail revolution already underway in the U.K. to be repeated in the rest of Europe over the next five years.

EXHIBIT II-4

Software and Services Expenditure as Percent of Retail Company Revenues

Country	Percent
United Kingdom	0.40
France	0.30
Germany	0.25
Italy	0.10

C

Market Development

Four technologies can be seen as powerful catalysts for change in the distribution sector:

· Bar coding - Article numbering standards and labels

· EDI (electronic data interchange)

· EFTPOS (electronic funds transfer at the point of sale)

· Image - Document image processing and video

Scanning checkout EPOS (electronic point of sale) terminals are already familiar to many shoppers. These terminals have an inherent ability to generate masses of consumer and product data for retailers. Little of this data is yet available to retail managers or their suppliers to aid the smooth development and running of the business. This data explosion is likely to occur further back in the supply chain as bar coding is adopted to mark containers rather than just consumer products. EDI promises to change the way distribution companies do business and the way their staff work. As information is shared along the supply chain, new economies and improvements will require management to rethink the traditional roles of buying, selling, delivering and inventory management. EFTPOS electronic payment systems are going through similar revolutionary changes. But country differences are large, as national banks more or less choose their own paces and techniques for cutting down on paper transactions.

Image processing is a rapidly emerging area of new activity. It is particularly relevant to distribution companies in document storage and retrieval, and in on-line sales catalogues. The storage of "proof of delivery" documents is now economically handled electronically, removing yet more paper from the trader's administrative workload. On-line or on-disk product catalogues with pictures of the goods may give a fresh boost to home shopping and the small shopkeeper.

With all the activity surrounding these new technologies in supply chain systems, it is easy to be misled into thinking that the industry is well down the development path. INPUT's analysis follows the five-stage evolution of systems in both large and small distribution organisations.

It starts with the most fundamental uses of IS in business automation - the capture of operational information in various departments or sites around a company:

· Stage 1 *Automation*: Generally this stage generates records of (past) activity within an area such as sales, deliveries, stocks or accounts. The large majority of small and medium-sized businesses are either at or have not even reached this stage of development.

· Stage 2 *Integration*: This may merely be the networking of several systems, or it may involve replacing some applications or databases to allow access among departments. This stage is often a move to regain centralised control of information flow.

· Stage 3 *Delegation*: Having centralised, the next step is to decentralise and provide local management with more decision support and autonomy. At this stage, companies are feeling they are properly managing their internal flow of information.

· Stage 4 *Communication*: Closer relations and connections with suppliers, customers and bankers become essential as competitors improve their services and reduce costs. Stage 4 involves EDI and other computer links to trading partners or home shoppers.

· Stage 5 *Regulation*: Corporate IT systems can help track trends, form plans, predict complex consumer preferences and provide firmer direction for the business. Here, the raw data has been converted to information and is now building up the managements' knowledge of how the business works.

This five-stage analysis is a further dimension in which vendors can segment distribution businesses when analysing market or customer potential. Most companies are still automating at stage 1. Few of the market-leading companies in Europe are well advanced beyond stage 2. Many small businesses have yet to start.

D

Leading Vendors

IBM has built a very strong business in the European distribution sector (see Exhibit II-5). It is probably IBM's largest sector in Europe. From this position of strength, IBM is putting in place a business strategy based on careful segmentation within each European country, by application and by size/type of business. In parallel, it has set up a co-ordinated attack on the systems integration market, particularly for multinationals seeking European supply chain

advantage. Underpinning these activities is its new, very open approach to partnerships. IBM is determined to generate over 50% of its revenues from software and services to counter its previous dependence on hardware margins, and to give customers more relevant reasons for buying IBM.

Siemens-Nixdorf looks well-positioned as a credible systems competitor for IBM in both retail and wholesale sectors. It is probably the only European manufacturer about which this can be said. GSI is the strongest and most specialised independent turnkey systems vendor in the wholesale market. Over half its revenues come from supply chain (logistics) businesses. CAP Gemini is now so large that it takes the number four spot, with a strong professional services element in its business. AT&T (NCR) derives over 25% of its European business from the sector, but has lost some business to rising retail stars like ICL.

EXHIBIT II-5

Leading Vendors
European Distribution Sector, 1991

Company	Estimated Revenues ($ Millions)	Country of Origin
IBM	440	U.S.
GSI	245	France
SNI	155	Germany
CAP Gemini Sogeti	150	France
ICL (Fujitsu)	135	U.K. (Japan)
Olivetti	135	Italy

III
EDI and Electronic Commerce

As business moves from being conducted in a paper-based to an electronic-based environment, profit opportunities change. Electronic systems - based on a combination of computer and telecommunication systems - particularly where software, services and intellectual property play a large value-adding role - bring about new distributions of costs, revenues and competition within an organisation, within an industry and within an entire economy.

Electronic systems allow for the introduction of new products and services to business and consumer markets. Furthermore, users and vendors of information services and technologies are finding that their respective business operations and strategies are becoming increasingly intertwined, with the user relying on the vendor for maintenance and upgrades and the vendor relying on the user to increase its market share and enhance its ongoing technical competence.

Moreover, because information systems are often equivalent or even identical to the value-adding function of the user's business itself, the user of information technologies may opt to sell its system (particularly software and services) and, in a way, replicate its business or a portion of its business for a profit. In this way, an information service user becomes an information service vendor.

The shifting profit opportunities and the intertwined, dual identities of market participants makes for a very dynamic competitive environment, one in which it is increasingly difficult for executives, managers and entrepreneurs to make strategic decisions about how to apply information technologies and where to look for new commercial opportunities and risks.
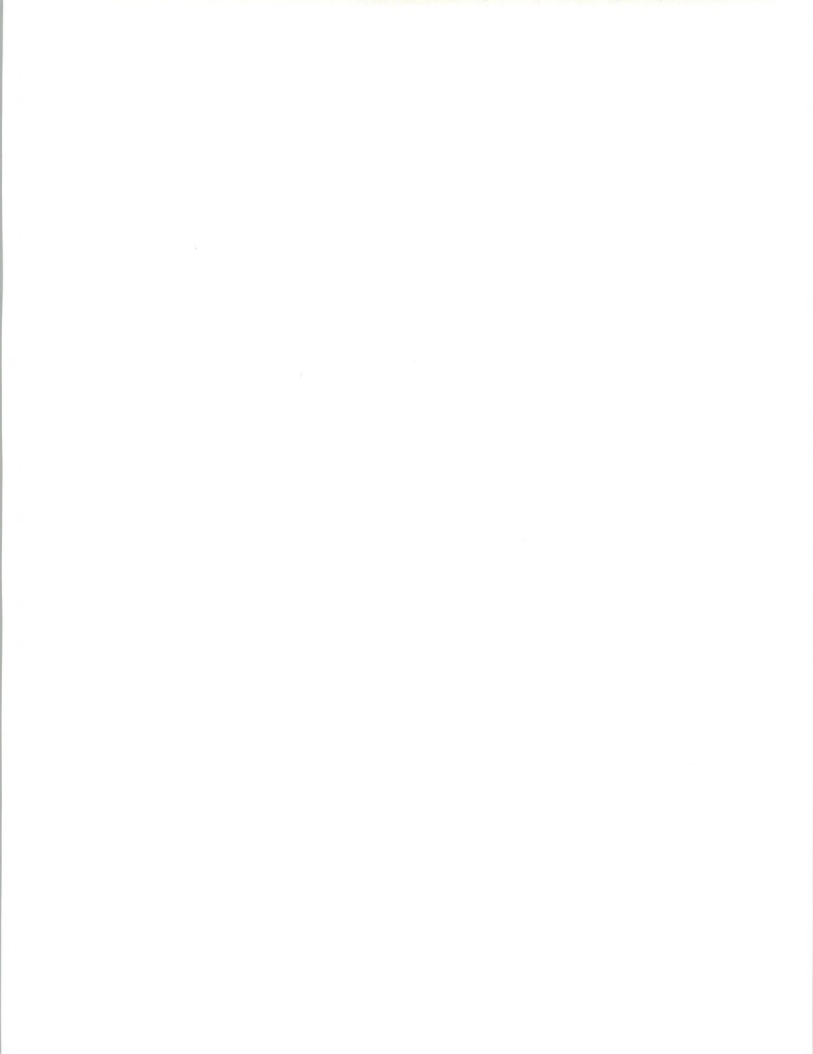
Besides the difficulty in assessing competitive opportunities and risks, the emerging electronic environment in which commerce is conducted is changing the nature of the economy. According to some estimates, "information work" accounts for as much as 70% of the GNP (gross national product) of the U.S. Since information work is the domain of electronic, information technologies, applying these technologies to economic activity portends a major reconfiguration of work, business organisation and productive resources.

A

Electronic Commerce

To describe this fluid techno-business environment, INPUT proposes the term *electronic commerce*. While this term has been used casually by others in the information services industry, INPUT has decided to make it a formal and distinct market classification and the basis for a commercial product: one of INPUT's market research and strategic planning services.

Examples of electronic commerce technologies can be found across all industries, for example:

· Retailing: point-of-sale (POS) and on-line purchasing systems to manage stock levels and pricing

· Distribution: electronic data interchange (EDI) and trade management systems that handle letters of credit, trade documentation, payments, shipping and so forth to reduce delays and paperwork

· Banking: ATMs and cash management systems to facilitate fast, cheap, reliable payment and to reduce the costs of brick and mortar branches

· Insurance: sales force automation and image technology for the management of paperwork and policy issues

· Airlines: reservation systems and on-line yield management and pricing systems that manage seat inventory to maximise yield and facilitate access by travel agents

· Manufacturing: purchasing systems, computer-integrated manufacturing and electronic data interchange to track unit costs and quality and to manage just-in-time inventories

· Magazine and newspaper publishing: satellite distribution to ensure timeliness

Many electronic commerce technologies can be utilised within a single company; electronic commerce technologies might include:

· On the income side:

  - Consumer electronic bill payment

  - The collection of rent payments from commercial tenants

  - Direct debit of insurance premiums

  - Direct debit of maintenance agreement fees

· On the operations side:

  - Cash concentration

  - Direct deposit of payroll

  - Direct deposit of travel expense compensation

· On the expense side:

  - Credit-line fee payments

  - Real estate rent payments

  - Utility payments

  - Payment of pension benefits

  - Annuity payments

  - Tax payments

  - Financial EDI to merchandise sources

Whether from an industry or an individual company viewpoint, electronic commerce is how corporations and consumers participate in market exchange using electronic communication technologies.

Commerce, by definition, is an act of communication between two or more human beings. Electronic commerce is the augmentation of human communication with electronic information technologies. In this context, INPUT's definition of electronic commerce is as follows:

· Electronic commerce is the electronic networked-based coordination of material, people and processes that facilitates commercial exchange.

The market for electronic commerce services is measured by counting all expenditures by consumers or corporations for products or services that facilitate a commercial exchange transaction where the product or service is delivered or conducted electronically, possibly but not exclusively over an electronic network. For example, the telephone charge for the person ordering pizza from the local pizzeria is counted as an electronic commerce service expenditure, but the value of the purchase is not. The charge to use an airline reservation system is an electronic commerce charge, but the cost of the tickets is not.

INPUT measures the annual cumulative transaction costs for market participants (buyers and sellers) to use electronic commerce as measured by how much electronic commerce vendors collect in revenues. INPUT is not yet willing to measure how much of the total value of trade within the economy (what portion of GDP or GNP) is conducted via electronic commerce. This second measurement would give an indication of how much information technologies are worth. The reason for this hesitation to make such a measurement is because the value is measured in opportunity cost, an assessment of which calls for a multitude of assumptions. For example, how much would it cost for someone to make an airline reservation without a computerised airline reservation system? Many assumptions about possible technical scenarios would have to be sorted through, a very time-consuming and ultimately inconclusive (because there are so many variables) enterprise.

It is important to note that commerce, as communication among people, happens among employees of the same organisation as well as among employees of different organisations. In a generalised concept, all enterprises are chains of customers. Within a single enterprise, for example, the shipping department's customers are in the manufacturing sections; manufacturing has customers in sales, and so on. The chain of customers within a corporation connects the corporation's suppliers to the corporation's customers - a connection that is part of a vertical industry "value chain" of customers that ultimately delivers a product to a final consumer.

Characterising organisations in this way, it can be said that electronic technologies are enabling electronic commerce to happen within as well as among firms. The inclusion of intra-organisational activity as commerce is important, because automating an organisation often leads to outsourcing an operation that was formerly performed by in-house staff. To be the most comprehensive in identifying the opportunities and possibilities that information technology generates, INPUT chooses to characterise commercial activity as occurring within companies as well as among them.

B

Technologies of Electronic Commerce

Electronic commerce facilitates the co-ordination and communication that occurs between suppliers and their customers throughout chains of value-adding activities and processes. The emerging electronic infrastructure that supports this communication allows for a wide spectrum of technologies and applications that go by a variety of names today.

A more descriptive, but not exhaustive list, of electronic commerce technologies is shown in Exhibit III-1.

A possible classification scheme for these technologies is shown in Exhibit III-2.

INPUT estimates that users of electronic commerce services and systems in Europe spent $68 billion for these services in 1991. This figure does not include hardware expenses. Almost 80% of this amount ($53.6 billion) was expenditures on voice telephone services (calls for business purposes, free phone services, data communications changes and video communication charges). The remaining 21% (approximately $14 billion) was expenditures on transaction processing services (such as airlines reservation services, credit card authorisation services, payroll processing, etc.), information services (economic and financial databases, credit databases, news databases), value-added network application services (electronic data interchange, electronic mail, etc. - over and above the basic transport charges that are accounted for in the voice-based data service portion), and systems operations (data centre operations by an independent third party).

A breakdown of expenditures on electronic commerce by users is presented in Exhibit III-3.

EXHIBIT III-1

Technologies of Electronic Commerce
(Constitutive and Enabling)

- Data Network Services
  - Electronic data interchange (EDI)
  - Electronic mail (E-Mail)
  - Database and on-line information services including: price, financial and statistical data; bibliographic, news and archival full-text data; credit card authorisation data and credit history; product catalogues; directory services
  - Automatic vehicle location
  - Computer-aided dispatch
  - Electronic order entry
  - Electronic buy-sell bulletin boards
  - Electronic funds transfer
  - Home banking
  - Cash management
  - ATM and POS networks

- Image Network Services
  - Facsimile, including auto fax generation and group broadcast
  - Document transmission
  - Cheque clearing
  - Credit card processing

- Voice Network Services
  - Voice-mail networks
  - Interactive voice response
  - Third-party telemarketing
  - Third-party customer support

- Transaction Processing
  - Credit card processing
  - Reservation systems
  - Payroll processing
  - Freight-bill processing
  - Electronic securities trading

- Other Processing
  - Laser printing
  - Field sales support services
  - Microfiche publishing
  - Disaster recovery and back-up
  - Data entry

- Data Capture
  - Point-of-sale data capture
  - EDI transaction databases
  - Smart cards
  - Debit cards
  - Automatic identification (bar coding, radio transponders, etc.)

EXHIBIT III-2

EDI in the Context of Electronic Commerce

	Real time	Store and Forward
One-to-many	Bulletin boards Stock quotes Directories News D&B profiles Credit card data	Bibliographic databases Legal databases (Broadcast messaging)
One-to-one	OLTP	Messaging E-Mail Fax Voice mail

EXHIBIT III-3

European Market Size for
Electronic Commerce

	1991 Expenditures ($ Billions)
Data Services	
Transaction Processing Services	6.5
· Industry Specific (includes bank/ financial processing, airline reservation systems, credit card authorisation, etc.)	
· Cross Industry (includes payroll processing, accounting etc)	1.9
Information Services (financial and economic databases, etc)	3.3
Network Applications (EDI, E-Mail, VAN services, etc.)	1.1
Systems Operations	1.5
Total Data Services	14.3
Voice Services	
Local, Long-distance and International Business Calls (carrier revenues in Western Europe)*	35.0
Data Communications Leased	8.6
Total Voice Services	43.6

* Includes charges for data transmissions and video transmissions.

Source: INPUT
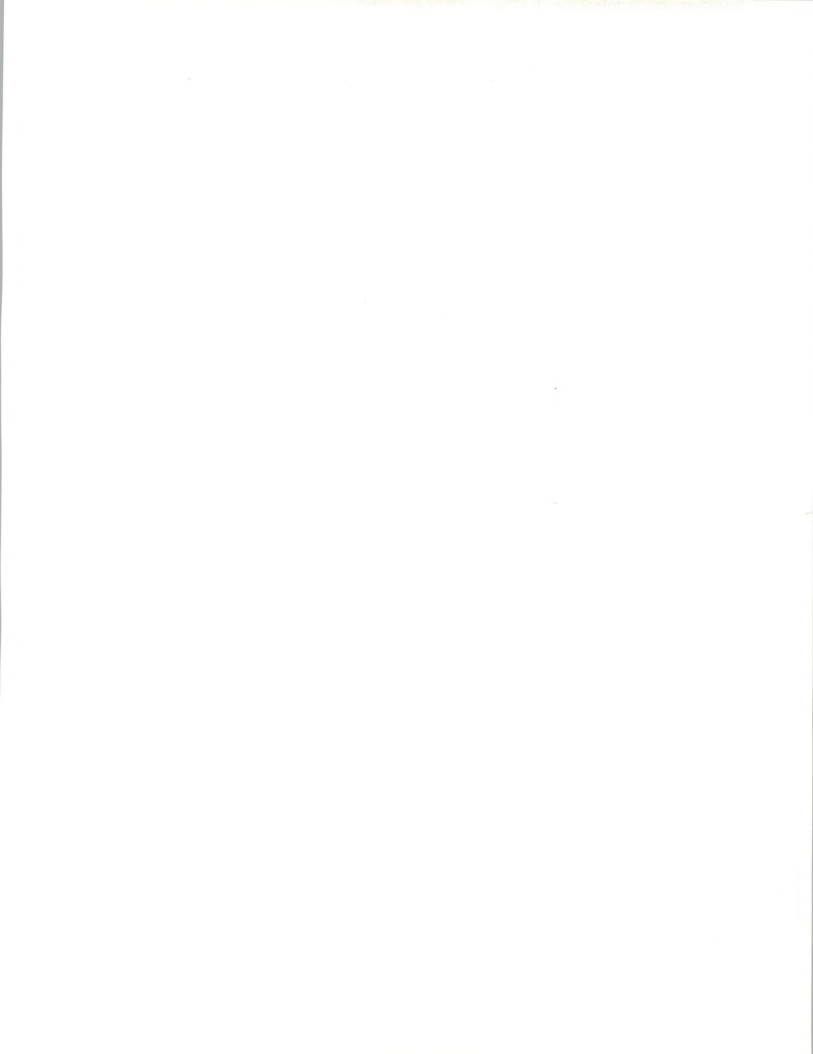
C

Impact of Electronic Commerce

The networked economy is producing new commercial phenomena such as global manufacturing, global financial markets and frequent buyer programs. There are many ways of bringing some kind of cognitive order/classification to the multifarious phenomena. We can look at how electronic commerce helps companies compete on cost and product differentiation (Porter's distinctions); how it helps markets clear and efficiently allocates resources (traditional economics approach); how it changes the business game - the playing field, the players, the rules, the strategies (a game theory approach).

To keep it simple, INPUT will examine the phenomenon of electronic commerce in terms of how it:

· Redefines organisational and industrial structures and the roles of employees

· Allows organisations to make new offers in the market-place

· Helps organisations reach new customers and block competition

· Helps organisations satisfy existing customers

1. Industrial and Organisational Restructuring

Incorporating electronic and automated procedures in a value chain or chain of customers allows for the removal of many intermediaries within the chain. Within a single organisation, back-office systems handle much rote, repetitive data processing that formerly required armies of clerks. Within a value chain (for example, the textile/apparel manufacturing/retail chain) whole businesses can be eliminated (for example, certain warehousing functions) because communication and co-ordination between the key value-adding agents is better.

· Many retailers have reduced reliance on distribution intermediaries and have direct deliveries made to stores from manufacturers. EDI has been responsible for this more efficient communication.

· A specific example of how electronic commerce can fundamentally restructure an industry is the library subscription business.

Another way electronic commerce reshapes an industry is that it allows companies - even competitors - to share market information

where all participants benefit. For example, many pharmaceutical distributors and hospital buying agents have formed EDI consortia. A consortium contracts with a network processor to create aggregate sales reports from EDI traffic that flows through the network. The consortium is better able to manage its sales and hospital buying contracts.

Electronic commerce allows companies to restructure functional groups such as accounting or purchasing within the business. Many multi-divisional companies, for example Hewlett-Packard, use EDI to centralise their purchasing. Centralised purchasing is desirable because of potential volume discounts, more leverage with vendors and reduced company purchasing department costs through the elimination of unnecessary organisational redundancy.

Small customs brokerage houses and transportation companies are becoming information clearing-houses, software system resellers and integrators, rather than just offering their original services. For example, AT&T is now a credit card/finance company.

2. Reduced Transactions

Another way of looking at the industrial and organisational restructuring that takes place as a result of electronic commerce is how it reduces the number of transactions associated with a commercial exchange. Transactions arise as a result of one person (or agency) transferring to another person or agency part of the work that goes into the delivery of the product or service. Costs are directly proportional to number of transactions. Whether it is taking out a mortgage, purchasing supplies, or transporting freight to a foreign destination, electronic technologies can reduce the number of transfers, and thereby, transaction costs.

As pointed out above, reducing transactions can fundamentally alter the way work is accomplished not only in organisations but also in whole industries or value chains. Some industries (for example, agenting and distribution) exist merely to handle differentials in transaction costs. With electronics, these industries, as collections of people, have no need to exist.

Eliminating the superfluous, secondary exchanges of a targeted commercial transaction is one of the goals of electronic commerce systems.

3. Redistributed Resource Usage

Telecommuting - people working at home using a computer connected to a network - illustrates how electronic commerce shifts resource use. The potential implications of telecommuting on traffic, the automotive industry, office property prices, city tax bases, urban and rural land usage, etc. are vast.

4. Variable-Cost Manufacturing versus Fixed-Cost Manufacturing

The industrial apparatus and economic system is becoming more and more reliant on network technologies. The corporation's cost structure (and industry cost structure) is becoming more and more one of fixed overhead costs rather than variable, labor-based costs as companies invest in more capital-intensive, technology-based systems. Electronic commerce is intrinsically a highly capital-intensive organisation of the economy.

Information technology eliminates the many intermediaries within organisations; and within value-chains, goods and services can be moved from producer to consumer with fewer transactions. Fewer people are needed to accomplish the same results. Like agriculture's transition from being the principal employer at the turn of the century, many of today's industries are providing greater output with far fewer people (particularly, for example, in banking).

Consolidation is occurring in one industry after another - banking, airlines, autos, oil, retail, utilities. Information technology is spurring this consolidation because it allows a company to increase the scale of operations without necessarily increasing its labor component. With companies increasing their volume of service, the market soon has a production overcapacity. The surviving companies of an industry consolidation resemble utilities, or administrative monopolies. The cost structures of utilities are carefully regulated and optimised. Investments in the utility infrastructure are recouped by setting consumer prices based on fair rates of return. This same kind of product pricing may apply to companies advanced in EDI or other electronic commerce markets.

5. Changing Employee Roles

One of the chief impacts of information technology is the reduction of clerical labor. Also, the portion of managers' and professionals' work that is devoted to clerical functions can be greatly reduced.

Sales representatives and procurement officers - the two sides of the commercial transaction between typical large companies - are freed of the bureaucratic chores of paperwork and can concentrate on relationship building.

D

New Product Offerings

In addition to allowing a company to spin off entirely new products, electronic commerce allows a company to "fine tune" its offerings of existing products through product-feature and price differentiation.

1. Product Differentiation

Electronic commerce systems support flexible, customised manufacturing because of the better co-ordination of productive resources that EC engenders. For example, the National Bicycle Company of Japan can make a bicycle for a customer in literally millions of different product configurations, options, colours, etc. This capability will appear shortly in the automotive industry. Thus, electronic commerce supports absolutely unique product manufacture: no two products are the same.

Another aspect of product differentiation is when a company that develops information technology (software or a processing utility) for its own internal purposes decides to commercialise the development and sell it externally. This is another way of characterising the restructuring of business.

2. Price Differentiation

Electronic commerce also supports the "customisation" of price. Frequent buyer programs, first introduced by airlines and now being used in grocery stores for consumer goods, may lead to a situation in which all prices are unique. The customer (who identifies him/herself at the point of sale with an electronic identification card or number) is given price discounts on products depending on how much of the product he/she has purchased in the past.

Frequent buyer (also known as yield management) programs rely heavily on discounting prices, changing them - in the case of the airlines - millions of times per day. In the area of airline yield management systems, the aim is to ensure that (1) when a plane takes off it carries the highest profit, (2) that there are no empty seats that could have been sold at another discount, and (3) no seats are filled by passengers who paid a low fare while full-fare travellers were turned away. Only information technology, where purchasing activity can be monitored and prices can be updated by the second, makes yield management possible.

Frequent buyer/yield management programs are being introduced by credit card companies (namely, Citibank). Thus, purchases of any product entitle the purchaser to certain discounts as long as he/she uses the same credit card or payment facility.

Frequent buyer technology is being applied for corporate purchases. Hospitals have agents purchase pharmaceutical supplies for hospitals. Agent buying allows hospitals to get bulk purchase discounts. Pharmaceutical manufacturers like selling in bulk because it is more reliable and costs less per transaction. Nevertheless, to purchase in this way is information intensive. The administration of complex contracts that spell out which products, over what period of time are available from which suppliers and available to which hospitals must be managed. With electronic commerce they can be. Only electronic commerce systems permit this to happen.

In the commercial transactions between manufacturers and distributors (especially in grocery and pharmaceuticals), the distributor/buyer is often given a 2% (or some percentage) discount if it pays the invoice within 10 (or some other number) of days. Distributors negotiate these terms individually. Often it is these terms and the cash flow/float that derives from the payment timing that is a critical profit maker. A 2% price discount is an important benefit that offsets the foregone interest when a company acquires inventory.

Price differentiation, however, is tricky and companies must be careful to distinguish it from price discrimination, in order not to fall foul of laws dealing with unfair pricing and competition.

3. Market Clearing (Supply Equalling Demand)

Another way of looking at price differentiation (as mentioned above) is that electronic commercial systems help to clear markets. Whether for computer-assisted securities trading or airline reservations, computers can help buyers and sellers agree on price. (Critics argue that programmed trading may introduce greater instability to already reactive market-places, and an investigation by the U.S. Securities and Exchange Commission is examining this issue.) San Francisco-based Marketel International Inc. has software that makes it possible for each airline flight to have an infinite number of fares. The electronic market-place can be extended to any relatively standard commodity.

E

Reaching New Customers

All markets are confined one way or another by physical constraints. Geographic distance (between buyers and sellers) has traditionally been the leading constraint. The constraint of electronic commerce is the requirement that any participant must have some kind of hardware device that connects him/her to the general commercial network. These devices are listed in Exhibit III-4.

Investing in hardware, although a necessary condition for participation in an electronic market-place, is usually not sufficient. Technical compatibility of the devices must be worked out, a process that has competitive consequences. Authorisation and promises to pay access fees to be on the network are other important issues. The technical-political domain of the market-place - who is permitted to participate - is a central competitive issue. Below are some aspects of this issue.

1. Locking In Customers, Locking Out Competition

Electronic commerce systems, because they rely on a networked, technical platform, usually have some entry costs for the market participants. These costs include system components, terminals, network charges and the integration of terminals with existing applications. Airline reservations systems and on-line hospital ordering systems for medical supplies are well-known examples.

EXHIBIT III-4

Access Devices to Electronic Commerce Markets

- Computer Terminal
- Phone
- Facsimile
- Computer
- Other data entry, collection and output devices
- Interactive T.V.

Network of buyers and sellers
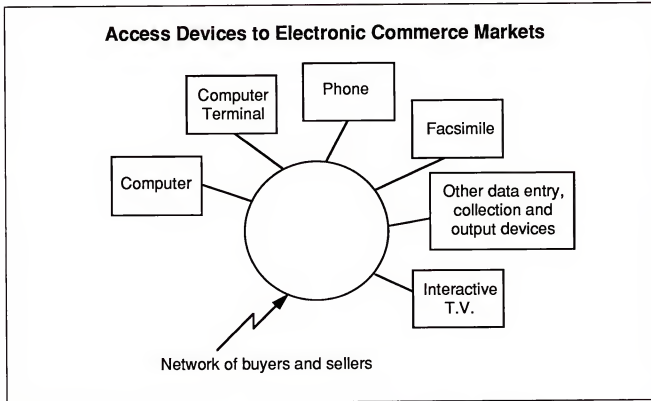
Also, large network-based markets can be dominated by a single vendor that implements its own standard for communication (often referred to as a proprietary EDI system). Some examples are SWIFT's SWIFT I network, the LACES cargo-handling systems for London airport and even the SEDAS distribution sector standard that was implemented in German-speaking countries - all of which could be considered proprietary.

When a company first offers an electronic ordering system, it wants to keep it proprietary, thus preventing its competitors from selling to its customer base. After a certain point, however, the company's customer base wants all of the market's suppliers to be reachable through a single, uniform system. The original vendor of the proprietary system can opt to allow its competitors into its own proprietary pipeline or to migrate its system to a standardised one. Standardised systems, in the end, are less costly for the vendor because the customers and competitors in the market can directly pick up the cost of building and maintaining the equipment and software infrastructure that maintains the electronic market.
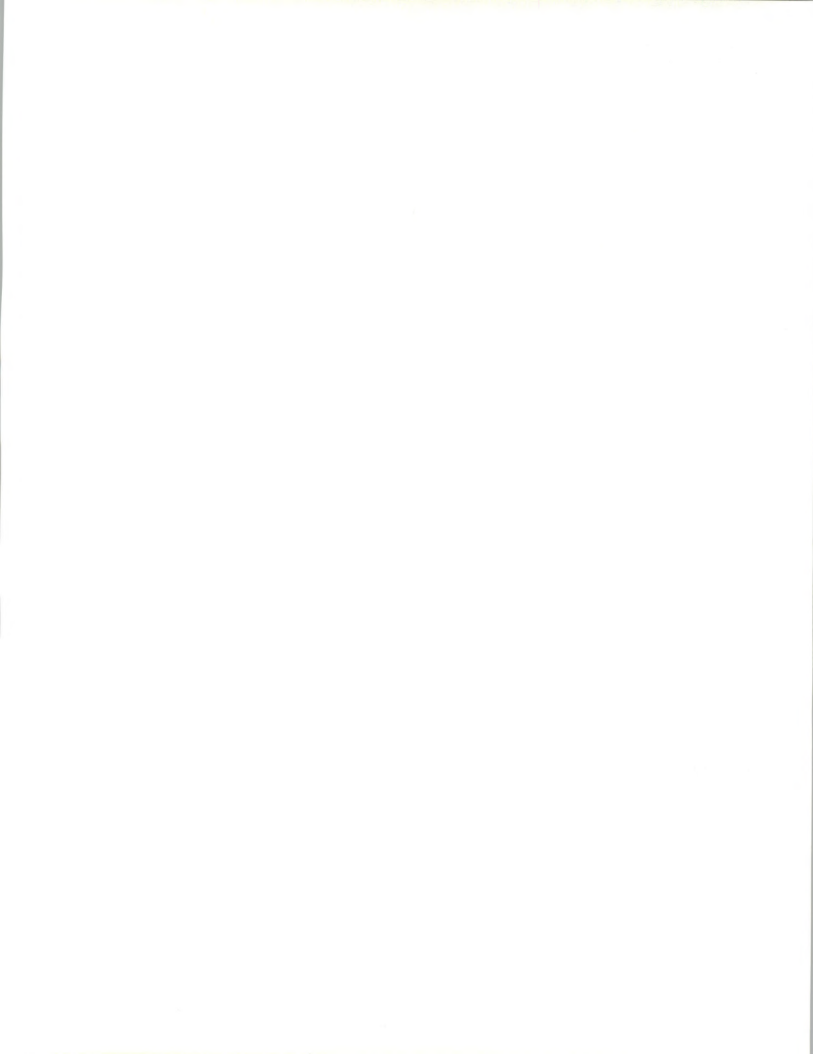
2. Access and Flexibility

Electronic commerce systems allow greater flexibility in that they deliver more options to buyers and sellers.

The U.S. federal government (General Services Administration and the Defense Logistics Agency) is devising a system that would broadcast all government request for quotations (RFQs) to a central database repository. Any vendor throughout the country would be able to access the database to make a response. By broadcasting the RFQs over a network, more vendors can respond than if it were broadcast by other means. International trade leads, gathered throughout the world by embassy business attaches, are also broadcast over bulletin boards. The European Commission host (ECHO) offers TED (Tenders Electronic Database) as an on-line service to organisations wishing to tender for commission projects.

3. Standardisation

Integrated, inter-organisational systems of production typically require the co-ordination and operation of many complementary constituent parts. Industries that provide the parts for these systems will adopt standards to allow many vendors to provide compatibility among their respective products and allow users to assemble the necessary systems. Multicomponent, multiagent industries can be called networked industries; historical examples include railroads, electric power utilities and telephone industries. All such industries utilise increasing-returns technologies that link their users - physically or otherwise - in a network. The dynamics of networked industries, which have strategic competitive implications for both users and vendors of network technologies, are highly relevant to electronic data interchange and other electronic commerce markets.

World commerce is being transformed from a paper standard to an electronic standard for business communication. The standardisation of the new electronic environment has competitive and efficiency implications. Locking in on a certain standard (such as UNIX, or SPARC chips, or X12 rather than EDIFACT) determines the subsequent path of commercial development and opportunity. A standard may prove to be imperfect (such as the QWERTY keyboard) and a better one may be devised (the Dvorak keyboard) but, because the installed base of the suboptimal standard is large, the costs of retrofitting are too high. In many cases the better standard is never implemented.
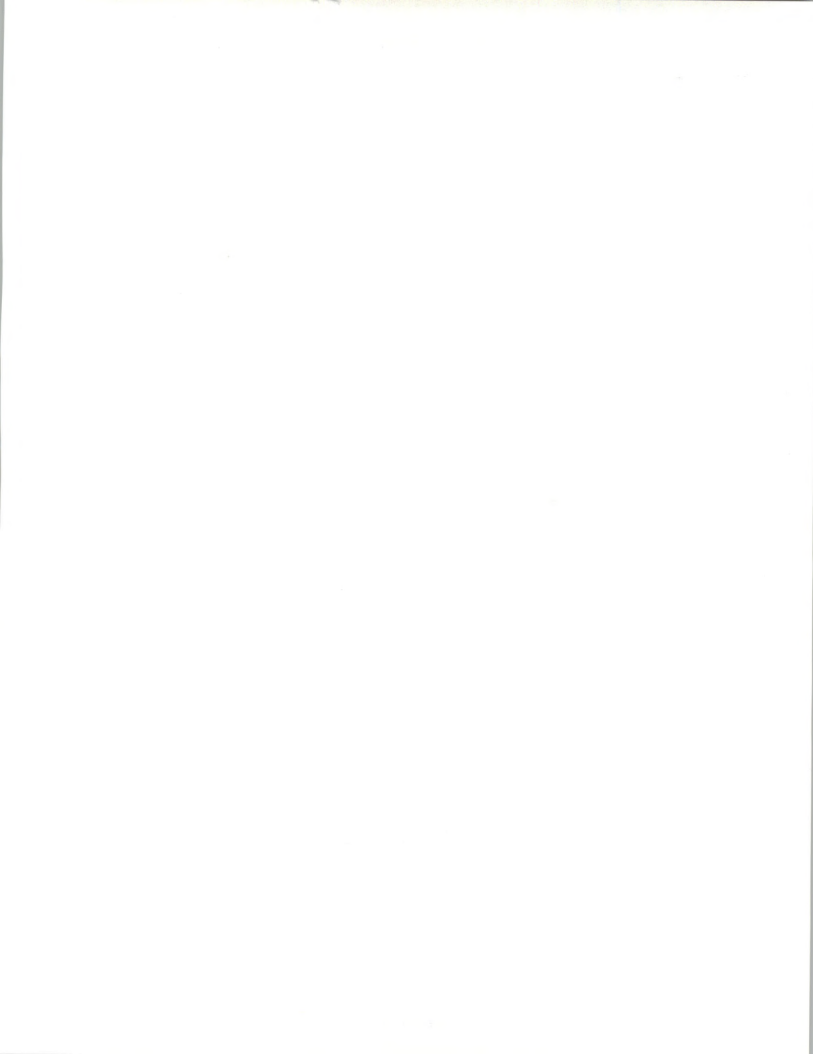
Setting standards involves anticipating and designing the future. These undertakings are often bound to fail to some extent. Capturing installed base, making products to accommodate suboptimal standards, moving from old standards to new ones - all these activities are part of today's competitive electronic commerce environment.

4. Increasing Returns to Scale/Leveraged Recurrence

EDI systems initially cost more (in software, network services and systems integration) than using traditional paper-based systems. Also, an EDI system will probably never entirely replace a paper-based system. Thus, for an EDI system to pay for itself, it must process a large volume of transactions. This is characteristic of all electronic commerce systems. Electronic commerce has an initial high investment and overhead cost that is justified only by the system being used in a great number of recurrent operations.

Like the telephone, specifically, electronic commerce in general requires a certain critical mass of users before it becomes a useful medium. The first telephone subscriber has a useless system on his hands: there is nobody else to call. As the number of subscribers on the network expands, the usefulness of the network expands at an exponential rate.

There is an industry-wide phenomenon associated with electronic commerce. Electronic payment services among a community of banks operate at the level of effectiveness of the least efficient bank. Because commerce takes place between the companies of all banks, all banks must have a common, standardised electronic payment format that they can all send to each other and process. Today, there are various formats for electronic payments. Only a handful of banks have the capacity to originate and process the most efficient formats. But their ability to do so is not exploitable because very few other banks can use this format. The payment system as a whole is diminished because not all banks have equal capacity. The more banks that can process the more-efficient formats (i.e., the greater the scale of optimal-format processing capacity), the greater the overall economic return of the payment system as a whole.

This can be called a "weakest link" or "lowest common denominator" syndrome/effect.
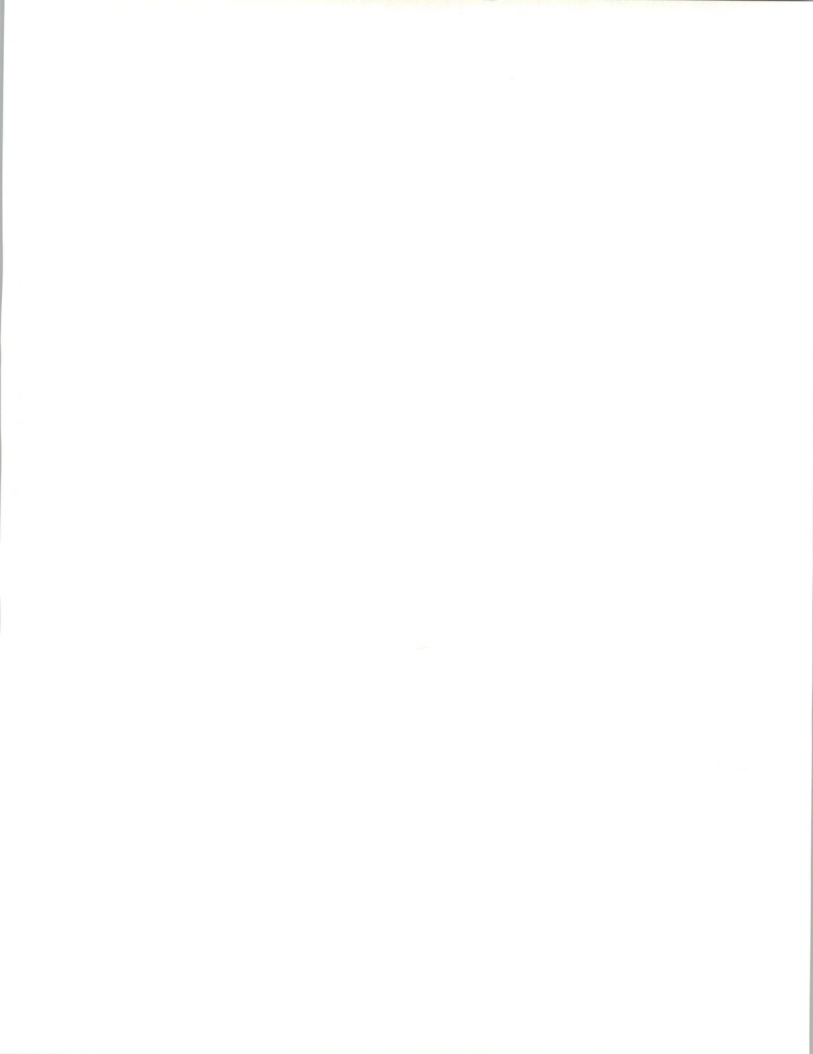
F

Satisfying Existing Customers

Electronic commerce facilitates the making, negotiating and consummating of commercial exchanges. The goal is to make the operation of a given business not a barrier between the customer request (for service or product) and customer satisfaction. Historically, the time and cost for a company to fulfil a customer request has led to dissatisfaction. Appropriately installed, electronic commerce systems overcome these barriers to customer satisfaction.

The just-in-time (JIT) and quick-response (QR) strategies in manufacturing and distribution are well-known. These strategies rely on more than just electronic information technologies. However, computers and telecommunication lines are critical components of the strategies. The objectives of JIT and QR strategies are to improve response time between supplier and customer and to continually reduce price. Examples of these strategies are many and further mention is not necessary.

1. Monetary Redefinition: Electronic Bartering

An interesting phenomenon that might be included in the category of customer satisfaction is how money and finance can be changed by information technology. Money and information technology are both tools that facilitate commercial exchange and, as such, are not different phenomena but different aspects of the same phenomenon. Money, in the words of the chairman of the Citicorp, is "information on the move". As a "medium of exchange", information technology can be identical to money and can itself play the role of money.

Large companies that buy from each other (e.g., Motorola buys workstations from Digital; Digital buys semiconductors from Motorola) and use EDI to do so are finding that they can revert to "electronic bartering". Computers keep track of the transactions between the two companies. At the end of a period, the net owed amount is determined and a single payment is made. This reduces the costs of raising payments for each individual transaction. Netting systems for banks are another form of electronic bartering.

Widespread use of electronic bartering would reduce the payment-services business that banks provide.

The use of smart cards and debit cards could also potentially erode banks' control of the payment franchise. A Japanese department store, vending machine operators, public transit companies and telephone companies are issuing cards to consumers for prepaid amounts (the consumer pays a specified amount up front; the card is credited with this amount; every time the card is used it is debited). The money that these cards represent is outside of the traditional banking system of a country (there is no central bank control).

Merrill Lynch's cash management account is another example of information technology allowing the creation of a new kind of financial instrument. To savers, the cash account is a high-yield savings account with complete liquidity. But the money is actually invested in a broad variety of financial instruments.

The use of information systems to supplant money creates challenges to government bodies. In addition to encroachments on central bank control, information technologies could potentially make more difficult the collection of taxes by tax authorities if electronic bartering arrangements are established among companies.

Funds represent promises to produce action in the future. In this sense, money is no different than the majority of other communications that constitute electronic commerce. Electronic commerce is people making promises to each other (to deliver goods, services, or cash) over electronic networks. Viewing money as a particular kind of promise is useful in determining how a company should take advantage of electronic commerce possibilities.

Exhibit III-5 shows the spread of EDI services across Europe, sector by sector and country by country. It provides visual confirmation of the widespread use of EDI in the distribution sector.
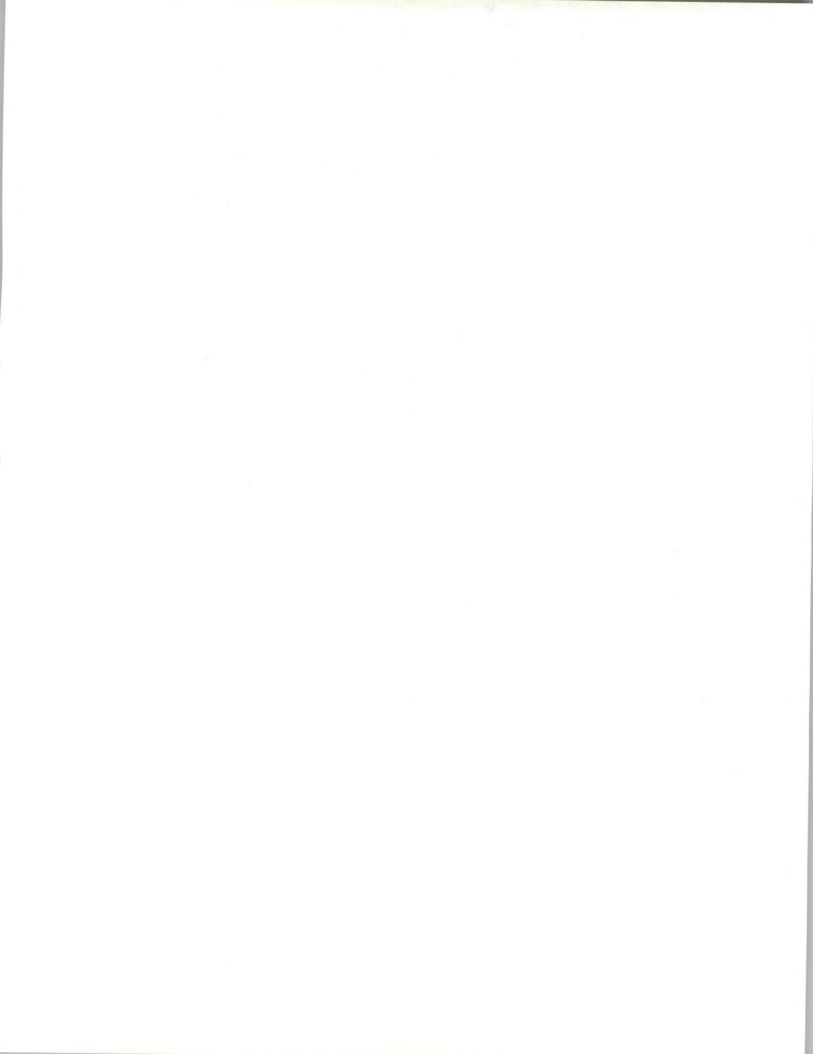
EXHIBIT III-5

EDI Users by Country and Sector

Cells contain: • Significant EDI projects • Estimated numbers of user/subscriber companies

INDUSTRIES →

COUNTRIES (Europe)	Discrete Manufacturing	Process Manufacturing	Distribution	Transportation	Utilities	Communications	Banking	Insurance	Government	Agriculture	Construction	Education	Health Care	Services
(standards)	Odette Edifice	CEFIC	EAN/ EANCOM	EDIS AIRIMP		ICA	SWIFT EDIC	RINET	EDIS		EDIBUILD		EMEDI AIM	EDIFICAS
U.K.	SMMT 400	Pharmnet	Tradanet 3,000	1,600		EDIPost	(BACS)	LIMNET Brokernet 1,100	CHIEF HMART PURSUIT		EDICON	LEAGS 120	TT2 NHSPLUS ETHOS	AMEDIS
France	Gala 200	EDI PHARM	GENCOD 300	ESCALE PROTIS 100	EDIGED EDUTES		(ETEBAC)	ASSURNET	EDI DOKANEDI CALS		EDICON-STRUCT			EDIFICAS EDIJUST
Germany	VDA 750	VCI	CGS/SEDAS 2,000	DAKOSY 170		ELFE		GDV			EDI-BAU			
Italy	Odette 700	PUSHED	INDISCOD	COST 306										
Netherlands	Odette 150		SUAC	INTIS ERITIS 200			(GOO)	ADN 1,000	SAGITTA GBA				IMDF	
Belgium	60		ICODIF 60	SEAGHA				ASSURINET					Hospinet	
Spain	300		AECOM											
Sweden	Odette 170		DAKOM	SWECOM					TDS		DK-BYGG			
Denmark			DIVA-OSK	TEDISF						LEC 1,000	EDIBYG EITI			
Finland			100						Customs					
Norway		JIB	NVF	NODI 200			1,500		TVINN				EDINED LABKOM	
Austria	Odette/VDA	EDIPAP	ECODEX 200											
Switzerland			NEANDER	CSS-CH					ZOLL 90					
Rest: - Greece - Portugal - Ireland		ANAI		POLAS ICARNS										
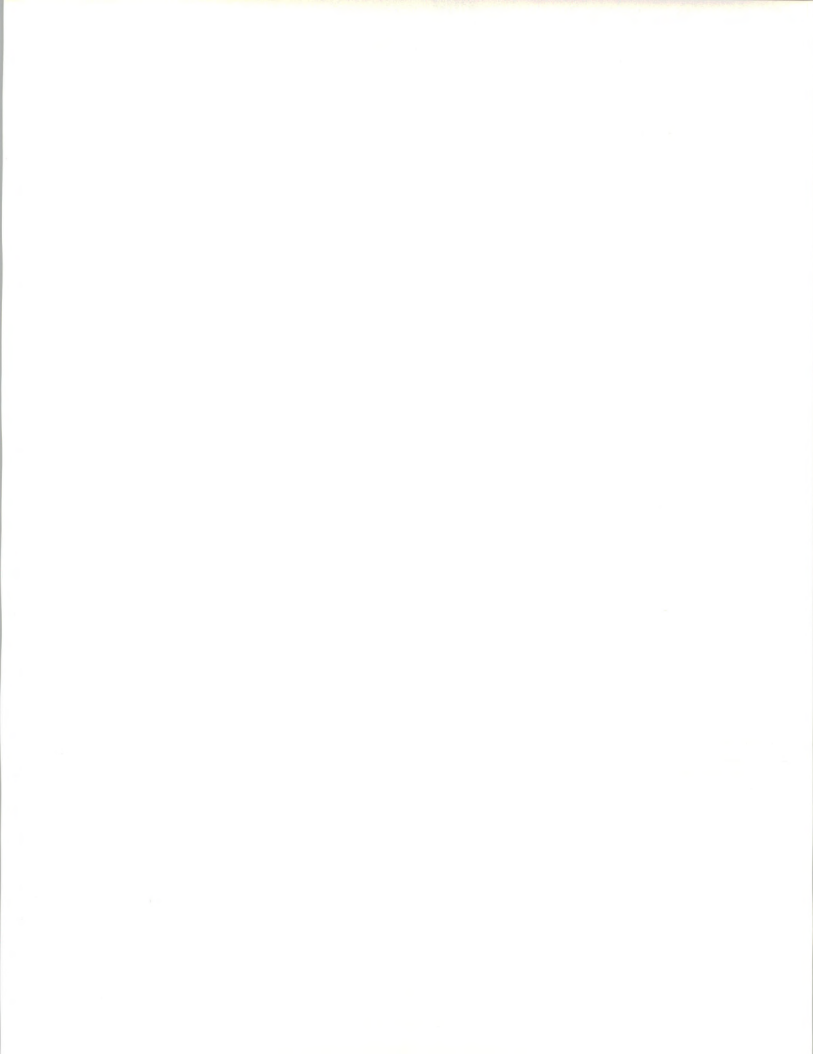
IV
Distribution Market Analysis

A
Market Structure and Overview

1. Market Forecast

The market for industry-specific software and services in the distribution sector (the subject of this report) represented 5.7% of the total European market for software and services in 1991. If generic and cross-industry software and services are included, the total represents 8.5% of the full European figure. The industry-specific market is estimated to be worth $5.0 billion in 1992, and is forecast to grow to $8.3 billion in 1997.

The compound annual growth rate for the sector between 1992 and 1997 is forecast to be 11%. This forecast growth is equivalent to the average forecast growth of the whole European market, but varies considerably between retail and wholesale sectors and between different countries. Although the distribution market is expected to be extremely active over this period, user expenditure will be moderated by two factors.

· Users will continue to exercise tight financial management when purchasing software and services. As traders, they are used to driving hard bargains with suppliers.

· Fierce competition among vendors looking to gain market share, accompanied by a general move towards open systems, will keep prices down.

Mergers, acquisitions and alliances will continue among European retailers and wholesalers, stimulated by the search for more profit as both opportunities and competitive threats increase through 1993. As such retail concentration continues, many wholesale businesses will fall prey to the expansion plans of retail chains, transport companies, or manufacturers all looking for better returns from and control of their own supply chain. For this reason user expenditure in the wholesale sector is expected to grow more slowly than in the retail.

Of the seven delivery modes shown in Exhibit IV-1, professional services and turnkey systems will dominate with 66% of the market in 1992. By 1997, this share will have dropped to 60%, as the faster growing network services, applications software products and systems integration contracts build up.

Traditional processing services are no longer a growth market. The vendors are re-emerging with more relevant positioning in network services and facilities management. Distribution companies have been slow to contract out systems operations - seeing them as fundamental to their fast moving businesses.

Network services are the cornerstone of the concept of supply chain systems. The physical movement of goods over a distribution network – from manufacturer through to consumer – will be matched by an equivalent information network offering EDI (electronic data interchange) and other services. The objective is to be able to track every item if necessary, and to be able to pass documents along the chain quickly and cheaply, independent of the goods themselves. The leading vendors, INS (a joint venture between ICL and GEIS), Digital, IBM and AT&T Istel may be impeding faster acceptance of EDI by their enthusiasm to promote their own versions. For example, a recent initiative by IBM, AT&T and BT will link their networks, eliminating the need for customers to buy separate interfaces for each service.

The commercial user interest required to force the market pace will only come from some single-minded manufacturers or retailers imposing timescales on their suppliers – as GM and Ford did in the motor industry. Distributors are waiting to be told to use EDI by their customers. Those in the import/export business may adopt EDI first as a cost-effective means of meeting the 1993 EC custom and VAT reporting requirements.
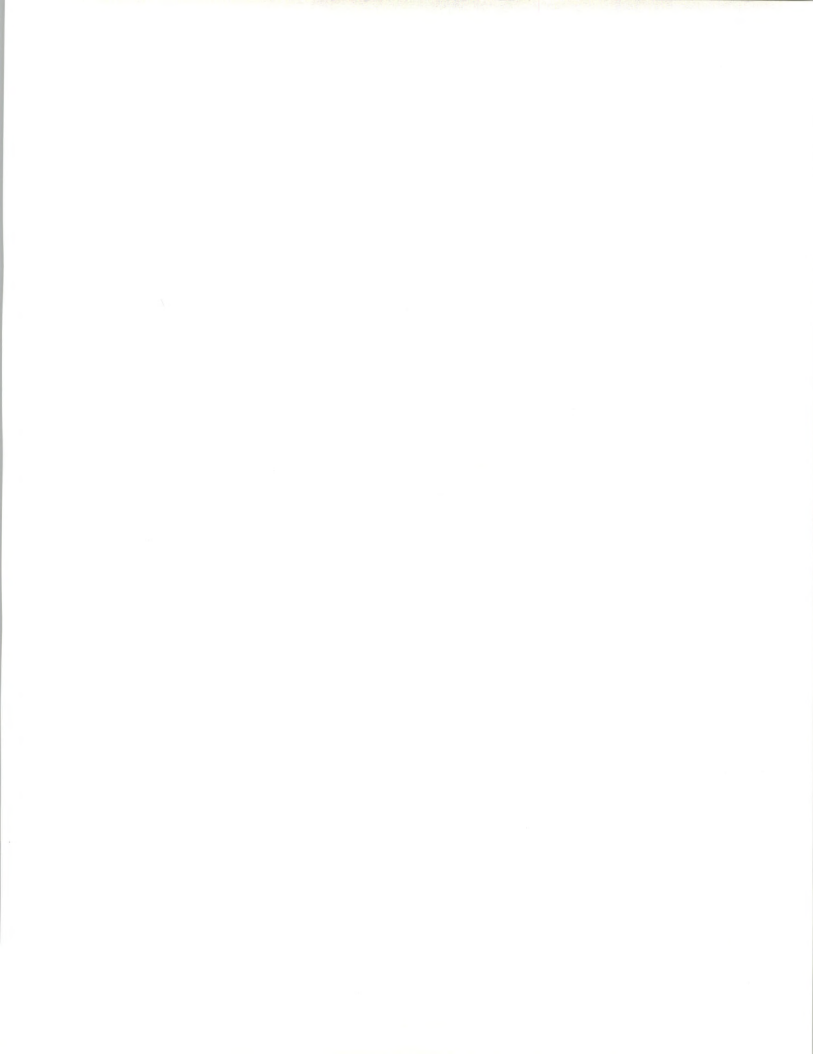
EXHIBIT IV-1

Distribution Sector, Europe
Software and Services Market, 1992-1997

Subsector	$ Millions				
	1991	'91-'92 AGR (%)	1992	'92-'97 CAGR (%)	1997
Transaction Processing	310	0	310	3	360
Turnkey Systems	1,260	10	1,390	10	2,250
Applications Software Products	490	16	570	14	1,080
Professional Services	1,740	7	1,860	8	2,730
Network Services	270	19	320	19	770
Systems Operations	80	25	100	21	255
Systems Integration	335	18	395	16	830
Industry Sector Total (Rounded)	4,500	10	4,950	11	8,300

While network service vendors require heavy up-front investment and long-term business development plans, the exact opposite can be true for originators of applications software products. The diversity of retail and wholesale businesses in the distribution sector has led to a huge proliferation of vendors and products. INPUT forecasts that this situation will persist well into the 1990s, with applications software products for PCs and workstations contributing the most to market growth. This delivery mode clearly offers the software product developers with detailed market knowledge the most opportunity. In-depth knowledge of a retail or wholesale subsector and modern portable software platforms and tools can be a winning combination. This is the area in which the equipment vendors make most use of innovative third parties. For example, IBM has minority equity stakes
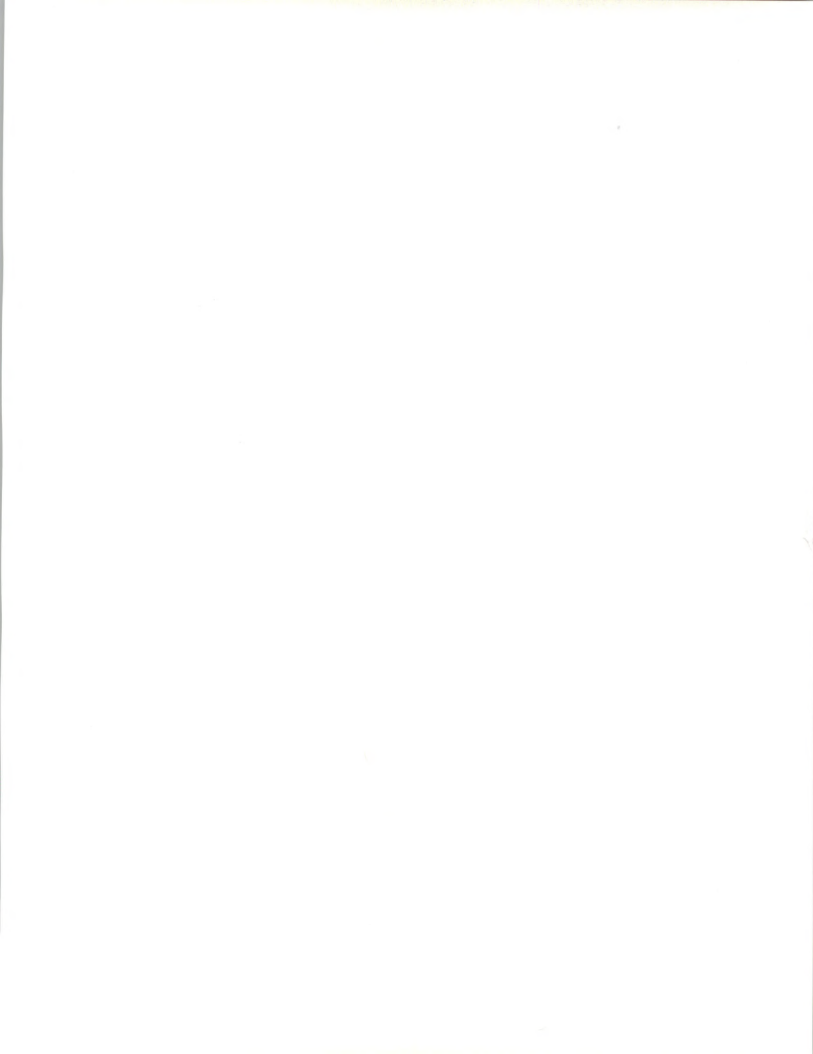
in at least two distribution sector software specialists - Worldwide Chain Store Systems and PR Johnson.

Exhibit IV-2 shows the relative sizes of retail and wholesale subsectors.

EXHIBIT IV-2

Industry-Specific Software and Services
Distribution Sector, Europe

Subsector	$ Millions				
	1991	'91-'92 AGR (%)	1992	'92-'97 CAGR (%)	1997
Retail	2,050	12	2,250	10	3,700
Wholesale	2,450	8	2,710	11	4,600
Total Europe (Rounded)	4,500	10	4,950	11	8,300

2. Leading Vendors

Exhibits IV-3 and IV-4 list the leading vendors of software and services in the retail and wholesale distribution sectors across Europe. Revenue estimates have been significantly revised in some cases since last year's report to reconcile revenues with those reported in other industry sectors.

IBM has been particularly successful in the European distribution sector, identifying it as a key area for growth and probably IBM's largest sector in Europe. INPUT estimates that IBM hardware platforms account for over half the value of equipment delivered in this sector. IBM's future direction is being masterminded from its newly established European Distribution Development Group at Eastleigh in the U.K. The strategy is to position IBM to deliver the exact solutions that each customer wants. There are five major components to its drive for growth, which will ensure that IBM remains a formidable competitor:

· A very strong portfolio of IBM and third-party applications packages and specialised equipment such as POS terminals. These are being carefully selected to meet requirements in markets segmented by country, by subsector, by business function and by size of business.

· An umbrella architecture including Retail/SAA and a midrange operating system strategy inclusive of OS/400, AIX and PS/2 is used to encourage applications developers and reassure customers.

· Strong retailing and wholesaling expertise within its European network services team - a separate business unit running services on IBM's worldwide network INS.

· An aggressive systems integration business strategy for winning major national and international bids.

· A partnership strategy allowing IBM to combine the best of the systems and application skills that it has built up in-house, with those of its partners among the leading specialist independent vendors in the distribution software and services.

IBM is determined to generate over 50% of its customer revenues from software and services. Having entered the systems integration business just five years ago in Europe, IBM is now getting more than 5% of its business by this route.

3. Retail Sector

The retail industry subsector for software and services vendors is led by the specialist POS suppliers. However, very few companies cover the whole industry. The top 20 vendors of industry-specific software and services in the distribution sector account for about 50% of the total retail market in Europe.

Systems and professional services vendors are all looking to broaden their portfolio of applications and to establish or maintain market leadership within the many niche markets in this sector. Market segmentation is apparent on two dimensions:

· The style of organisation, e.g., supermarket, multiple, department store and cash-and-carry

· The type of products, e.g., food, oils, textiles and shoes

AT&T (NCR) and ICL are the two equipment vendors that are clearly focussed on the retail sector rather than on wholesale, and on in-store point of sale rather than on headquarters mainframe or distribution centre processing. Both are well aware of the blurring boundaries between the sectors and can be expected to diversify to encompass more of the supply chain in future.

EXHIBIT IV-3

Leading Software and Services Vendors
Retail Sector, Europe, 1991

Rank	Vendor	Country of Origin	Estimated Sector Revenues ($ Millions)	Market Share (Percent)
1	IBM	U.S.	200	9.8
2	ICL	U.K.	135	6.6
3	Siemens-Nixdorf	Germany	120	5.9
4	AT&T	U.S.	90	4.4
5	Olivetti	Italy	85	4.1
6	CAP Gemini Sogeti	France	65	3.2
7	GSI	France	65	3.2
8	Andersen Consulting	U.S.	55	2.7
9	Microsoft	U.S.	50	2.4
10	Computer Associates	U.S.	30	1.5
	Total Listed*		895	43.7
	Total Market		2,050	100.0

* May not add due to rounding.

Note: Cross-industry and generic software and services revenues are omitted from these industry-specific distribution sector estimates.

4. Wholesale Sector

The wholesale industry subsector is even more fragmented than the retail subsector. The top 20 in this case represent only 45% of the total market for industry-specific software and services. At issue is the management of the physical distribution of products, components and raw materials. Competition is keen, with strong margin pressure from retailers, manufacturers and transport contractors. In addition, as retailers and shipping companies grow stronger, the wholesale function is being absorbed into their business functions. This is forcing wholesalers to add greater value and use more sophisticated business techniques to differentiate themselves and grow.

Large wholesalers and retailers have significant investments in mainframe systems, but at the store, warehouse and headquarters

levels there is a strong trend towards physically distributed minicomputer and PC or workstation systems.

EXHIBIT IV-4

Leading Software and Services Vendors
Wholesale Sector, Europe, 1991

Rank	Vendor	Country of Origin	Estimated Sector Revenues ($ Millions)	Market Share (Percent)
1	IBM	U.S.	240	9.9
2	GSI	France	180	7.4
3	CAP Gemini Sogeti	France	85	3.5
4	Andersen Consulting	U.S.	75	3.1
5	Tietotehdas	Finland	70	2.9
6	Digital	U.S.	60	2.5
7	Bull	France	60	2.5
8	Olivetti	Italy	50	2.1
9	Siemens-Nixdorf	Germany	35	1.4
10	Groupe Concept	France	35	1.4
	Total Listed*		890	36.6
	Total Market		2,450	100.0

* May not add due to rounding.

B

Delivery Modes

1. Processing Services

In real terms this delivery mode is a declining market. It has never had as strong a role in the distribution sector as is typical in other industries, and rapidly went out of style as companies invested in in-house inventory management and accounting systems.

User expenditure on industry-specific processing services in the European distribution sector is estimated to be $310 million in 1992, with inflation lifting it to $360 million in 1997 − zero real growth. One of the few growth areas is the use of specialist processing for the production of mail-order reference books, catalogues and price lists.

2. Network Services

INPUT estimates that user expenditures on network services in the distribution sector of Europe in 1992 will be $320 million, rising to $770 million in 1997. This represents a CAGR of 19% over the five-year period. These figures have been revised down since last year by removing network management spending into the systems operations delivery mode.

The major vendors of network services in Europe have each concluded that their provision of international added-value networks is an essential element in their strategy to build:

· Customer loyalty

· Industry-sector knowledge

· Add-on business

· Pan-European reputation

· Sector market share

· Multivendor systems capability

With such high interest in mapping physical distribution onto equivalent information networks, it is not surprising to find that all the vendors specifically target the distribution sector. In fact, ICL and Digital both have versions of their network services positioned and marketed exclusively to the distribution market. For example:

· ICL's RSM - Retail Systems (network) Manager

· Digital's DIN - Distribution Information Network

In addition, all the major equipment vendors in this market offer a (unique) standard systems architecture. This architecture includes the standards necessary for building networks of their own computers and applications, plus the ability to integrate systems built on other manufacturers' platforms.

Some brief comments on EFTPOS (electronic funds transfer at the point of sale) are included in the text for each country market in the report. The differences among countries are so significant that it is inappropriate to offer a general European comment here. It is a subject dealt with in more detail in the banking and finance sector analyses (see Related INPUT Reports - Chapter I section E).

Chapter III describes the influence of electronic commerce across the whole supply chain, including EDI usage.

3. Applications Software Products

This delivery mode covers industry-specific applications software products sold unbundled from any equipment or professional services such as planning or implementation. Bundled turnkey applications packages are included in the turnkey systems category. INPUT estimates that user expenditures on applications software products in 1992 will be $570 million, rising to $1,080 million in 1997. This represents a CAGR of 14% over the five-year period. The applications software products included in turnkey systems nearly doubles this forecast, making a total market of about $0.9 billion in 1992, rising to $1.6 billion in 1997.

As shown in Exhibit IV-5 the most obvious trend among all vendors is the migration from mainframe to minicomputer, and minicomputer to PC or workstation. This downsizing of software products has been underway for some time, but shows no sign of changing. Announcements by IBM of distribution products for their latest System 390 or ES/9000 mainframe range may slow the trend for a while, but not for long. In fact, these announcements will undoubtedly stimulate demand for more packages, joining the RS/6000 AIX systems as yet another alternative to IBM's midrange AS/400 systems.

Mainframe users have done a lot of in-house development in the past, in spite of the success of vendors like German software company SAP, and of IBM, with their own Inforem inventory management package (now in its third generation form - rewritten for CICS). However, this is changing as users find they just cannot afford to develop and maintain their own software, especially since these types of very high function and flexible packages have appeared. There are about 10 software vendors in Europe that specialise in IBM mainframes and the distribution sector, including SAP, WCSS and Dallas. Users find these companies offer proven products, a user community and the opportunity to add their own functions for unique working practices or competitive edge.

EXHIBIT IV-5

Applications Software Products
Distribution Sector, Europe, 1992-1997

Applications Software Products Subsector	$ Millions				
	1991	'91-'92 AGR (%)	1992	'92-'97 CAGR (%)	1997
Mainframe	50	0	50	-2	45
Minicomputer	160	12	180	7	250
Worksation/PC	280	22	340	18	785
Total (Rounded)	490	16	570	14	1,080

Minicomputers (including IBM's AS/400 and its predecessors) have long been the applications platform for most medium-sized companies. This encompasses most of the larger wholesalers, few of which exceed $200 million turnover. Traditionally, these minicomputers have supported an integrated business system, managing accounts, inventory, order processing, etc. Most of the growth in this market is now in departmental systems, rather than whole company systems, as distributed applications become a more cost-effective solution. For example, separate minicomputers or PC networks are being used for in-store, warehouse, marketing, materials and accounting systems. Digital's strength in networked solutions has been a major force in getting such solutions accepted in the larger companies. Several hundred application packages are available on minicomputers in this sector.

The most common forms of PCs or workstations in this sector are the ECR (electronic cash register) and the EPOS (electronic point of sale) terminal. Nearly all current POS products use MS-DOS, with some also running UNIX. In addition, very large numbers of conventional PCs are being used in a similar way to the departmental minicomputers, but in smaller departments, sites or businesses. Applications software, rather than the hardware specification, has become the primary basis for choosing a system. There are well over ten thousand PC applications products in the European distribution sector.

One of the largest untapped opportunities in the distribution sector lies in offering small shopkeepers and supply chain middle-men easy-to-use software – for the price of a cash register or two – for managing their businesses. Some of the leading equipment vendors believe that such products are now less than a year away from widespread availability.

The vendors interviewed all believe that applications software products are critical to their market success in distribution. Areas expected to receive the most attention in future include:

· Human resource management

· Customer care applications

· Property and space management

· DRP - distribution resource planning

· Logistics decision support

· Local store/depot decision support

· Pan-European support

New technology is driving other applications:

· Item tracking

· Home shopping

· Active in-store price display

· Warehouse automation

· Route planning/vehicle scheduling

· Demand forecasting (expert) systems

· Merchandising support

Although there are huge numbers of existing products, all the major vendors are still seeking wider portfolios with which to win business. Few products yet meet the general requirements listed below:

· Specialist use by business subsector or department

· Conforms to equipment vendor's chosen architecture(s)

· Portable and scaleable across different platforms

· Can coexist in a distributed environment

· Suitable for supporting local languages and working practices

· Modular and rich in function

· Easily tailored without writing programmes

· Packaged training and retraining for users

· Adequate performance for time-critical core business functions

· Demonstrably reliable with a community of users

4. Professional Services

Exhibit IV-6 shows user expenditures on industry-specific professional services in the European distribution sector, which have been reviewed by INPUT and are estimated to be $1,860 million in 1992, rising to $2,730 million in 1997, at a CAGR of 8%. Additional professional services are included in two other categories – systems integration and turnkey systems.

The trend to contract out more services will continue, but with a changing emphasis. As applications products become more capable of meeting requirements for function and adaptability, so the demand for custom software will slow. However, this decreased demand will be compensated by growth in consultant, education and training.
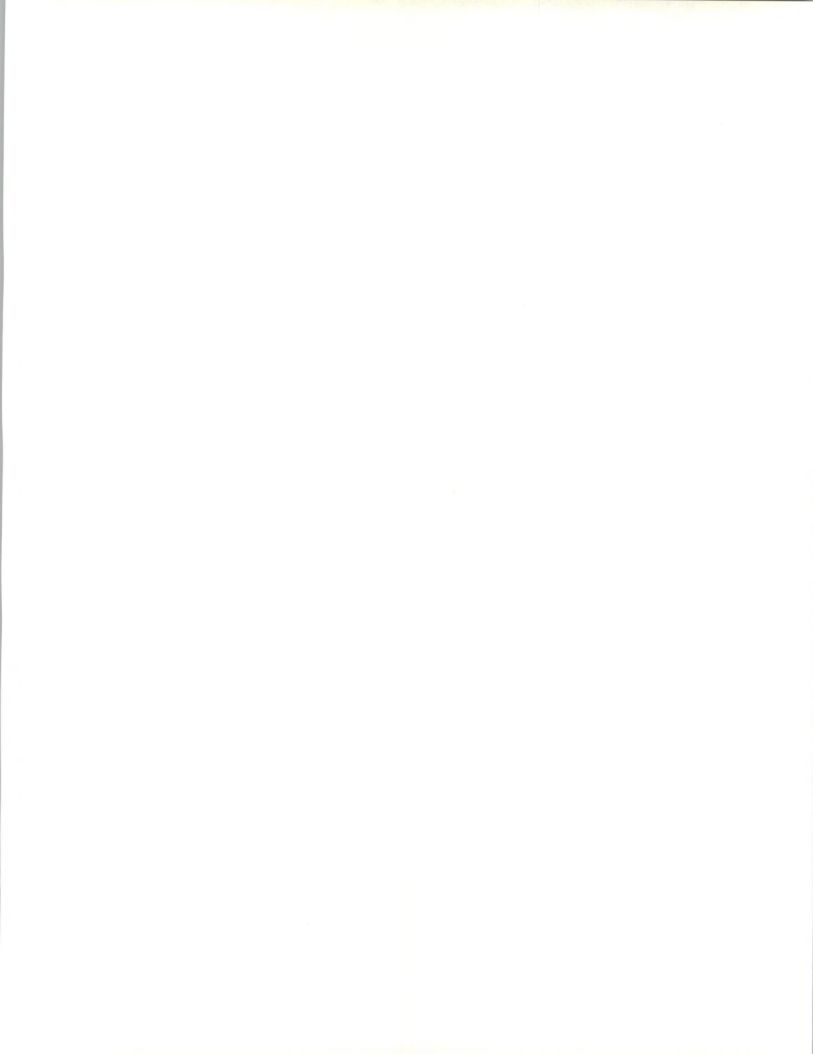
Consultant suffered significant price competition in 1991, which has continued into 1992, as customers delayed decisions about the longer term future in favor of short-term cost-cutting measures. Users are now seeking more than the technical consultant they have used in the past. They seek business consultants that can help them adapt their businesses to new information-rich working practices. This could be the most significant brake on market growth, because a large percentage of vendors are already experiencing a shortage of such talent.

The largest equipment vendors are making maximum use of their own experts - staff from their own internal European distribution functions - who have been using the latest systems and software to cut costs and improve customer deliveries of both products and spares. Digital, for example, established a single European, fully automated distribution centre for the delivery of all its products, and halved the cost of its operations.

EXHIBIT IV-6

Professional Services Market
Distribution Sector, Europe, 1992-1997

Professional Services Subsector	$ Millions				
	1991	'91-'92 AGR (%)	1992	'92-'97 CAGR (%)	1997
IS Consultant	185	5	195	11	330
Custom Software	1,395	8	1,510	8	2,210
Education & Training	160	-2	155	4	190
Total (Rounded)	1,740	7	1,860	8	2,730

Education and training are seen as critical areas by vendor and user alike, particularly in view of the high turnover of staff in the distribution business; many shops use a high proportion of low-cost, part-time workers, and the labor pool for warehouse operations also has a high content of temporary staff. The introduction of new technology often results in new working practices, which require still more training. The down side is that this area is always the first to get cut or forgotten in the heat of day-to-day running of a business. It is inevitably true that tomorrow's retail and wholesale market leaders will be those that have given the education and training of their staff the priority it needs.

However, revenues in this area are not likely to grow because of the lower cost of new technologies and the effects of recession in reducing spending to the minimum. Among the vendors, the winners will be those that can build-in user training as part of their packages (using computer-aided learning techniques as well as classroom learning), and can then deliver in volume and with good quality. It is worth noting that consumers' loudest criticism of retailers is the lack of knowledgeable and helpful sales staff.

Equipment vendors are giving a lot of new-found attention to the development of their professional services capability. In the past, many of their services - such as technical consultant, feasibility studies and performance audits - have been bundled into the price of a system and treated as cost-of-sale items. There is pressure from vendor management to unbundle these activities and price them properly. Some major users are also asking for services to be priced properly. Their logic is that they currently have to fight hard to get this type of resource from equipment vendors, due to the shortage of experienced vendor staff. If it was run more as a business in its own right, then the vendors could better plan and manage the availability of resources to match the customers' willingness to pay for them. Both parties would be better off - the customer receiving the services he or she needs and the vendor generating directly related revenues and margin.

For the independent software vendors, the potential threat of competition from the equipment vendors is minimal. Few equipment vendors, with the exception of Nixdorf, have the expertise or staff to address detailed design and implementation of application systems in any volume. They still depend heavily on the independent third parties and the customers' IS departments to provide these skills.

All vendors see the shortage of trained professional services staff as a potential limit to their own growth prospects, even though the same factor is the primary driving force for the user community to contract out. One or two vendors already have plans to counter the looming shortfall of young trainees as the numbers of school and college leavers fall over the next few years.

5. Systems Integration

INPUT estimates that user expenditures on systems integration in the European distribution sector in 1992 will be $395 million, rising to $830 million in 1997. This represents a CAGR of 16% over the five-year period, three points lower than in 1991's forecast.

Although INPUT's definition is simple, in the minds of vendors, systems integration can have many meanings. The term is used by vendor staff to define a wide range of subjects, from networking and user-interface architectures, to any major custom contract. Many users still have no clear idea of what systems integration means to them. INPUT's definition separates systems integration from all the other delivery modes by assuming high levels of complexity in each systems integration project. This complexity will be apparent in three areas:

· The technical complexity of a solution being sourced from multiple suppliers and valued at the multimillion-dollar level

· The client insistence on one vendor being the prime contractor for the complete solution

· The implementation of the project having a significant impact on the users and their business environment

IBM promotes systems integration as the solution for its largest customers. The combination of IBM computers, software, networks and services with third-party software, hardware and services, all under IBM project management, is the way to provide a total solution to the customer - the benefits being one price, one partner and clear responsibility.
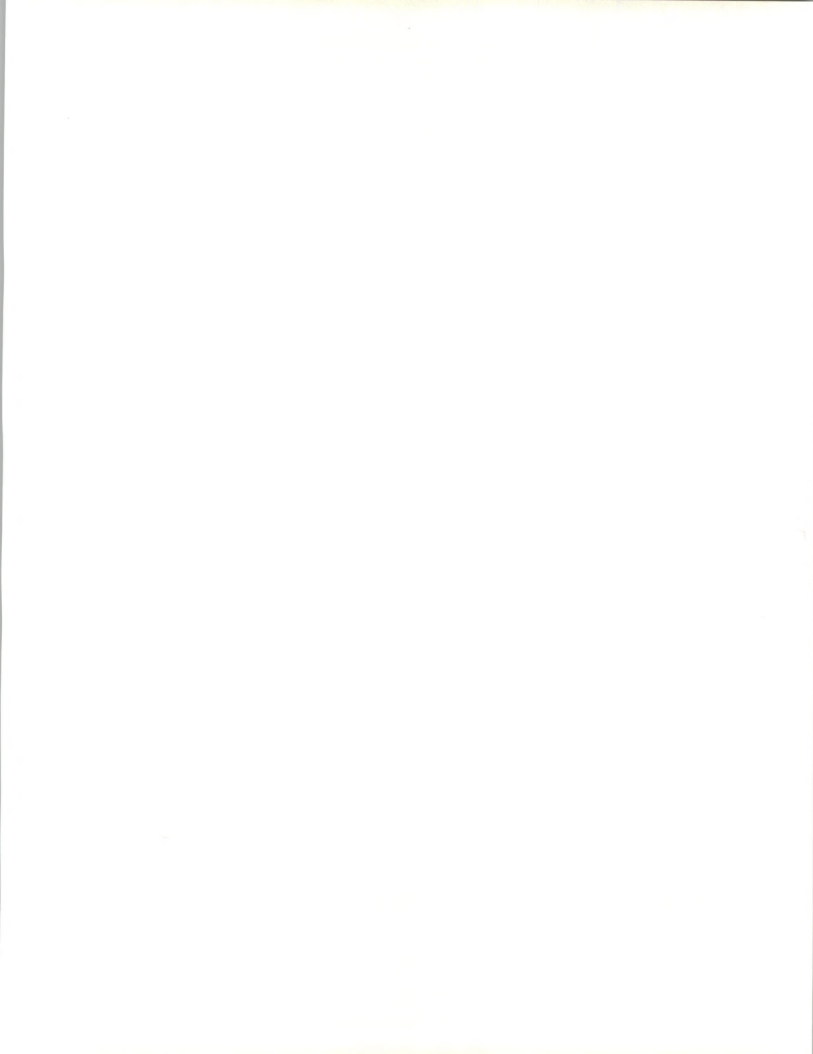
The equipment vendors are clearly seeing systems integration as a route to improving account control in the face of plug-compatible or open systems and falling hardware margins. The role of "preferred supplier" offers vendors many advantages in terms of forward planning and minimising costs. As users switch their allegiances from hardware to software, all the major vendors have adopted a systems integration strategy to keep close to their major customers.

Many systems integration vendor's aspirations are unlikely to be matched by the market demand. There is still a huge task of educating both vendor staff and customers to understand the implications of their vendor being a systems integrator. Equipment vendors in particular seem to have convinced themselves that they will be more highly valued and profitable if they position themselves as systems integrators (service companies) rather than as manufacturers (product companies.) The cultural changes implied may prove too much for some vendors.

The pan-European alliances occurring in distribution are already generating a growing demand for more complex national and cross-border operational systems. Clients for systems integration express their needs in terms of business information problems, and the exploitation of existing systems and applications in a wider business environment - most often in terms of supply chain and logistics problems.

The scale and complexity of such schemes are often seen as beyond the technical skills of the in-house staff. Major projects in the past have had a habit of severely overrunning on cost and time. To find that major system vendors are now willing to supply such complex total solutions and take on the technical and commercial risks is highly attractive.

The effect of these new choices for users is to encourage far more co-operation among vendors than ever before. Companies that are competitors now also partner each other when it seems a more likely way to win the business. Even IBM recognises that it cannot go it alone.

· Equipment vendors are bidding directly through their own sales forces.

· Equipment vendors are bidding through a VAR or other third party.

· Large/medium professional services vendors are bidding directly and usually are choosing equipment with guidance from the customer.

Smaller vendors would not normally win projects that fall within INPUT's definition of systems integration. The larger independents are wary of the equipment vendor's taking the lead role, but are willing to let the customer decide on which vendor it prefers as prime contractor.

6. Turnkey Systems

User expenditures on industry-specific turnkey systems in the European distribution sector are estimated to be $1.4 billion in 1992, rising to $2.3 billion in 1997, a CAGR of 10%. This delivery mode covers the application solutions, which come packaged complete with hardware, software and implementation support.

As discussed under *Applications Software*, the demand for packaged solutions is growing well in this market, as users switch from in-house development to more off-the-shelf solutions. The custom software element of these systems is expected to steadily decline over the next five years. This is in response to several factors:

· Customers are continually looking for cost savings in their acquisition of business solutions.

· Well-designed applications software products with much richer functionality are now far easier to tailor for a particular client.

· Clients now accept that organisational changes and new working practices should accompany the installation of many new applications.

In the past there has been a tendency for the application to be adapted to the organisation, rather than the other way about. Since many new applications - -like DRP (distribution resource planning) - reflect more up-to-date business practices, users can see the sense in changing the "way things are done here" to get full benefit from their IS investment.

The two leading turnkey vendors (SNI and GSI) have both invested heavily in re-engineering applications for greater portability and flexibility and to make downsizing onto smaller hardware platforms easier.

C

Country Markets

The U.K. leads Europe in terms of IS spending per dollar of retail revenue, with a ratio of about 0.40%. In other words, for every hundred dollars spent by U.K. consumers in 1991, the distribution companies spent forty cents on software and services. In France this figure was 0.30% and in Germany 0.25%

1. France

The big success story in the French distribution sector has been hypermarkets. There are now over 800 such outlets in France, and the leading companies are expanding elsewhere, particularly in Italy, Portugal and Spain. Family businesses are still strong in France, accounting for some of the leading retailers, and home shopping has become established practice through the widespread use of Minitel terminals in seven million homes. The wholesale sector contains 80,000 businesses and is growing fast, encouraged by France's pivotal position in Europe with many key national trading borders and a very positive attitude towards the 1993 EC initiatives.

Distribution sector user expenditures on industry-specific software and services are estimated to reach FF 5.7 billion in 1992, growing to FF 10.0 billion by 1997, a CAGR of 12%. Exhibit IV-7 gives the breakdown by delivery mode.
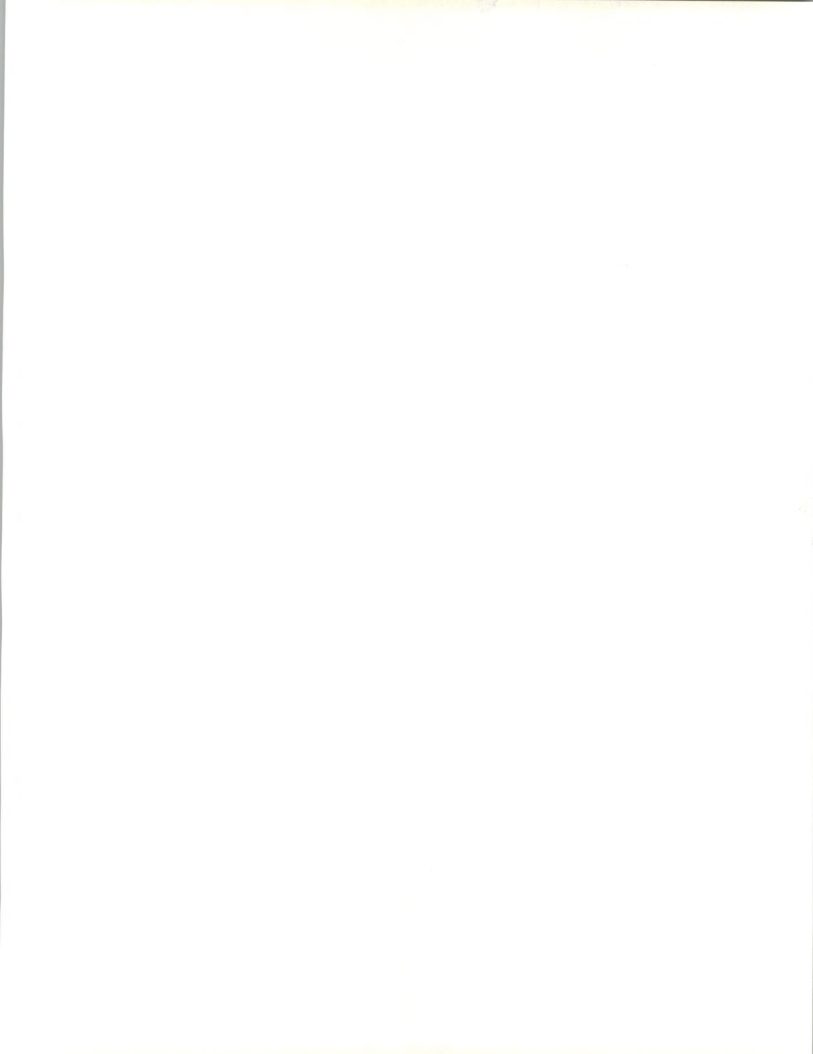
EXHIBIT IV-7

Software and Services Market
Distribution Sector, France, 1992-1997

Subsector	FF Millions				
	1991	'91-'92 AGR (%)	1992	'92-'97 CAGR (%)	1997
Transaction Processing	310	6	330	6	450
Turnkey Systems	870	11	970	11	1,650
Applications Software Products	630	14	720	13	1,350
Professional Services	2,520	9	2,750	9	4,200
Network Services	410	22	500	24	1,450
Systems Operations	60	25	75	18	170
Systems Integration	300	17	350	16	740
Industry Sector Total (Rounded)	5,100	12	5,695	12	10,010

EXHIBIT IV-8

Leading Software and Services Vendors
Retail Sector, France, 1991

Rank	Vendor	Country of Origin	Estimated Sector Revenues (FF Millions)	Market Share (Percent)
1	GSI	France	235	10.0
2	IBM	U.S.	185	7.9
3	Groupe Concept	France	155	6.6
4	CAP Gemini Sogeti	France	135	5.7
5	Axime	France	85	3.6
6	Sligos	France	80	3.4
7	AT&T (NCR)	U.S.	75	3.2
8	Microsoft	U.S.	65	2.8
9	Cegid	France	50	2.1
10	Andersen Consulting	U.S.	50	2.1
	Total Listed		1,115	47.4
	Total Market		2,350	100.0

EXHIBIT IV-9

Leading Software and Services Vendors
Wholesale Sector, France, 1991

Rank	Vendor	Country of Origin	Estimated Sector Revenues (FF Millions)	Market Share (Percent)
1	GSI	France	630	22.9
2	IBM	U.S.	220	8.0
3	CAP Gemini Sogeti	France	185	6.7
4	Groupe Concept	France	180	6.5
5	Bull	France	160	5.8
6	Sligos	France	80	2.9
7	Cegid	France	70	2.5
8	Andersen Consulting	U.S.	65	2.4
9	Axime	France	65	2.4
10	SG2	France	50	1.8
	Total Listed (Rounded)		1,705	62.0
	Total Market		2,750	100.0

Exhibits IV-8 and IV-9 list the leading vendors in France. GSI is among the strongest independents in the distribution sector. Over half of its revenue now comes from supply chain (logistics) businesses. It has a marketing agreement with Digital (both a turnkey systems equipment supplier and a major customer for its Tolas distribution software) to distribute GSI's Tolas internationally through Digital's sales channels.

EFT in France is centred on the use of intelligent (chip) cards, pioneered by Bull and adopted by all the major French banks. By the end of 1992 all EFT systems should accept chip cards, and by 1993 all the stripe cards will also include a chip. Retailers will be encouraged to introduce EFTPOS (electronic funds transfer at the point of sale) with the banks, keeping handling charges down to a low 0.8% of turnover.

Most data interchange in France is still accomplished by direct custom links to manufacturers and retailers. This is expensive to implement and difficult to maintain as business practices change. In effect, the distributors have to tap into their customers' information systems, each of which is totally different from the next. Distributors feel they cannot set the pace for standards, but they have to wait for their customers to lay down the law.

2. Germany

Germany has the largest retail sales per person in Europe. It also has the largest retailers in Europe. Eight of the top 20 European distribution companies are German. However, strict monopoly controls mean it is less dominated by large companies than either France or the U.K. Major demographic changes in the form of an aging population and severe reductions in 18- to 25-year-olds are already affecting both consumer demand and the availability of work force labour in the distribution sector.

Germany is seen as the market offering the most potential by all the leading vendors of software and services in Europe. To a large extent, this is based on the opportunities perceived in Eastern Europe by their clients in the distribution sector. The merger with East Germany is viewed very positively, but the lack of existing infrastructure, especially in telecommunications and financial services, is seen as an obstacle to rapid growth.

The industry-specific software and services market in the German distribution sector is estimated to reach DM 1.6 billion by 1992. It is forecast to grow to DM 3.02 billion by 1997, a CAGR of 13%. This places it as the third-largest country market in Europe (25% share), just slightly behind France and the U.K. The high growth rate is going to give it a strong lead, making it 31% of the European total by 1996. Exhibit IV-10 gives the breakdown by delivery mode. Application solutions in the form of application products and turnkey systems are a particular strength of German vendors.

EXHIBIT IV-10

Software and Services Market
Distribution Sector, Germany, 1992-1997

Subsector	DM Millions				
	1991	'91-'92 AGR (%)	1992	'92-'97 CAGR (%)	1997
Transaction Processing	135	0	135	3	160
Turnkey Systems	610	13	690	13	1,250
Applications Software Products	130	23	160	17	350
Professional Services	380	8	410	10	650
Network Services	55	18	65	25	200
Systems Operations	15	33	20	25	60
Systems Integration	115	22	140	20	350
Industry Sector Total	1,440	13	1,620	13	3,020

Exhibits IV-11 and IV-12 list the leading vendors in Germany.

EXHIBIT IV-11

Leading Software and Services Vendors
Retail Sector, Germany, 1991

Rank	Vendor	Country of Origin	Estimated Sector Revenues (DM Millions)	Market Share (Percent)
1	Siemens-Nixdorf	Germany	120	20.0
2	IBM	U.S.	70	11.7
3	ESG-FEG	Germany	25	4.2
4	AT&T (NCR)	U.S.	20	3.3
5	Taylorix	Germany	20	3.3
6	SAP	Germany	15	2.5
7	Microsoft	U.S.	15	2.5
8	Computer Associates	U.S.	10	1.7
9	Garmhausen	Germany	10	1.7
10	GSI	France	10	1.7
	Total Listed (Rounded)		315	52.5
	Total Market		600	100.0
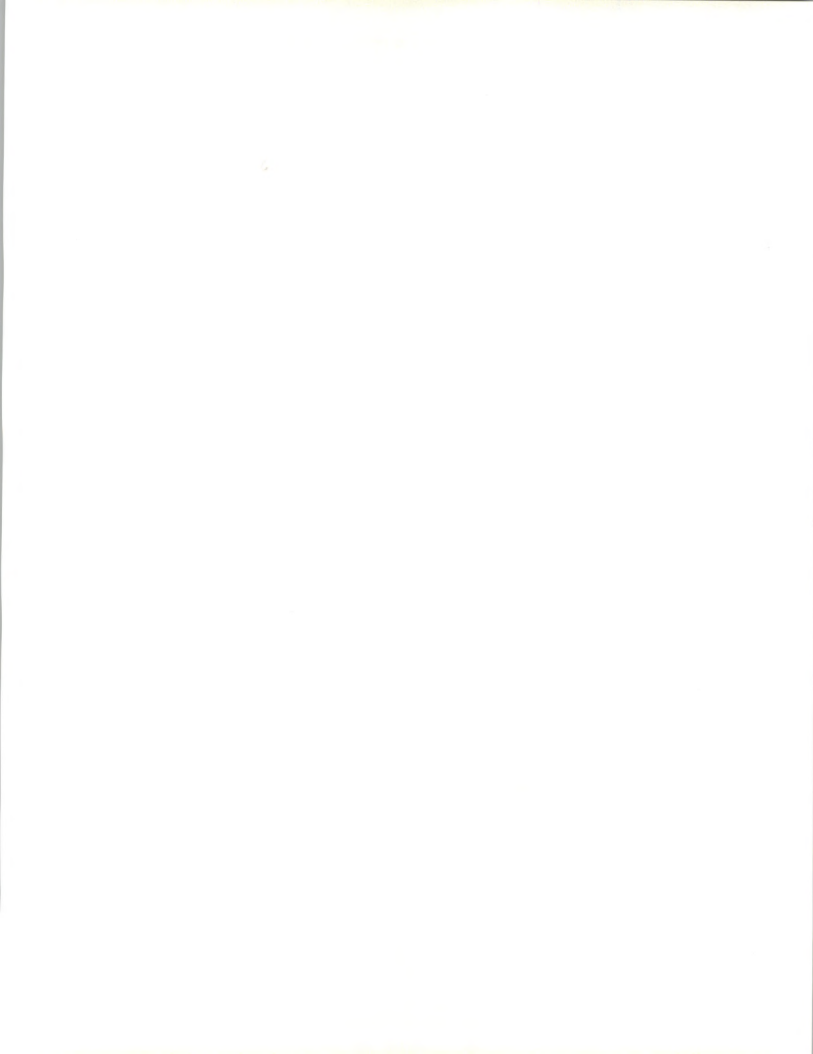
EXHIBIT IV-12

Leading Software and Services Vendors
Wholesale Sector, Germany, 1991

Rank	Vendor	Country of Origin	Estimated Sector Revenues (DM Millions)	Market Share (Percent)
1	IBM	U.S.	85	10.0
2	Siemens-Nixdorf	Germany	35	4.1
3	GSI	France	30	3.5
4	ESG-FEG	Germany	20	2.4
5	Taylorix	Germany	20	2.4
6	Digital	U.S.	20	2.4
7	SAP	Germany	15	1.8
8	DAT-Gruppe	Germany	15	1.8
9	Datev	Germany	10	1.2
10	TDS	Germany	10	1.2
	Total Listed*		260	30.6
	Total Market		850	100.0

* May not add due to rounding.

The merger of Siemens and Nixdorf into SNI has resulted in the only European vendor able to compete on near-equal terms in its home territory, head-to-head with IBM across both retail and wholesale sectors of the distribution market. Nixdorf's long-term strategy of offering turnkey systems solutions as its main line of business has given it a significant advantage over its other European rivals in terms of software and services revenues. Its adoption of open systems platforms and the gradual transfer of both its applications software products and its customers to UNIX and MS-DOS make it a good fit with Siemens. SNI offers a broad range of open hardware platforms and better established sales channels through and with third parties. Nixdorf has a large share of the POS market in Germany and is in the top three in most European countries. Nixdorf has a strong pedigree in distribution applications.

SAP is a software product company that is experiencing rapid international growth, has a large market share in its home country of Germany, and has a modular, IBM mainframe, SAA-conformant product line. Its main market sector is manufacturing, but it has some major retailers in its customer base. SAP introduced further products for in-store (POS) and headquarters applications in 1991. One of the few European companies to have a clear strategy for the single European market, SAP's products support seven languages - not just in local variants of the product, but in concurrent use on the same system if necessary. SAP sees this as an attraction for companies already employing multinational staff, each of whom can use the system in the language of choice. EDI interfaces were developed in response to its manufacturing customers and are well integrated in their product line.

In common with other software vendors, SAP decided to widen its available market by converting its products to UNIX. This is also in response to its large customers' implementing applications on smaller platforms - either IBM midrange (AS/400) or UNIX. The re-engineered, table-driven products will maintain SAP's SQL standards - to allow porting to different database platforms - and offer the same functionality as its mainframe products.

EFTPOS (electronic funds transfer at the point of sale) in Germany is a long way behind other developed countries, largely due to the banks' being slow to offer terms attractive to retailers. IBM and the German PTT have established a joint venture to offer electronic cash (EC) network services. The oil companies are now moving quickly to install card payment systems at the pumps in forecourts throughout Germany.

3. United Kingdom

The retail concentration that has taken place over the last two decades in the U.K. has resulted in the retail sector's exceeding the wholesale sector by some 50%. The number of shops per head of population is the lowest in Europe, and the food sector is dominated by five large supermarket chains with over 50% market share between them. In non-food, the large multiples also dominate, and the consolidation continues. Two retailers, Sainsburys and Marks and Spencer, are seen as European market leaders in their exploitation of IS. Both retailers are noted for the quality of customer service and the size of their business profits. The U.K. generally is envied for the profits made in the distribution sector. Few wholesalers have turnovers above £100 million, but those that have grown significantly seem to have made maximum use of information systems.

The industry-specific software and services market in the United Kingdom distribution sector is estimated to reach £490 million by 1992. It is forecast to grow to £615 million by 1997, a CAGR of only 5%. Exhibit IV-13 gives the breakdown by delivery mode.

The U.K. leads in the use of EDI, though this has been stimulated almost entirely by far-sighted manufacturers, rather than by demanding retailers. Component and raw material wholesalers are seeing the benefits well before the retail sector. INPUT estimates that the U.K. represented 40% of the European EDI network applications market in 1990.

EXHIBIT IV-13

Software and Services Market
Distribution Sector, United Kingdom, 1992-1997

Subsector	£ Millions				
	1991	'91-'92 AGR (%)	1992	'92-'97 CAGR (%)	1997
Transaction Processing	17	-6	16	-3	14
Turnkey Systems	145	5	152	4	185
Applications Software Products	32	13	36	7	50
Professional Services	185	-3	180	-1	175
Network Services	31	10	34	10	55
Systems Operations	19	21	23	21	60
Systems Integration	44	11	49	9	77
Industry Sector Total (Rounded)	475	3	490	5	615

Exhibits IV-14 and IV-15 list the leading vendors in the U.K.

EXHIBIT IV-14

Leading Software and Services Vendors
Retail Sector, United Kingdom, 1991

Rank	Vendor	Country of Origin	Estimated Sector Revenues (£ Millions)	Market Share (Percent)
1	ICL (Fujitsu)	U.K. (Japan)	52	18.6
2	IBM	U.S.	16	5.7
3	Data Sciences	U.K.	12	4.3
4	Hoskyns (CGS)	U.K. (F)	10	3.6
5	Andersen Consulting	U.S.	8	2.9
6	AT&T (NCR)	U.S.	8	2.9
7	AT&T Istel	U.S.	7	2.5
8	Admiral	U.K.	6	2.1
9	EDS-Scicon	U.S.	5	1.8
10	Microsoft	U.S.	4	1.4
	Total Listed*		128	45.7
	Total Market		280	100.0

* May not add due to rounding.

EXHIBIT IV-15

Leading Software and Services Vendors
Wholesale Sector, United Kingdom, 1991

Rank	Vendor	Country of Origin	Estimated Sector Revenues (£ Millions)	Market Share (Percent)
1	IBM	U.S.	19	9.7
2	Hoskyns (CGS)	U.K. (F)	12	6.2
3	Andersen Consulting	U.S.	11	5.6
4	Digital	U.S.	6	3.1
5	McDonnell Douglas	U.S.	5	2.6
6	Data Sciences	U.K.	5	2.6
7	GSI	France	5	2.6
8	Bull	France	3	1.5
9	Unisys	U.S.	3	1.5
10	Misys	U.K.	3	1.5
	Total Listed		72	36.9
	Total Market		195	100.0

EFTPOS has had a hesitant start in the U.K. While it has been up to the banks, they have never offered very attractive terms to retailers. The failed initiative by U.K. banks resulted from the need for check-out clerks to rekey totals from the POS terminal to the EFTPOS terminal. In the past year, a new service, initially taken up by Sainsburys, allows direct integration of an EFTPOS service into the in-store POS systems. This results in savings in cheque and cash handling for both retailers and banks. There is a transaction charge of 1.7% of turnover.

ICL has taken the initiative in the U.K.'s retail sector for in-store and point-of-sale products and systems. Now representing over an eighth of ICL's business revenues worldwide, this business is still expanding rapidly across Europe. Working in close partnership with some of the U.K.'s leading retailers to address the key business issues with the latest technology, ICL has become the market leader in scanning (electronic point-of-sale) systems. Many of its EPOS software and service offerings have been developed in-house, contributing in higher-than-usual proportions to its total revenues.

ICL is well positioned to extend its offerings out to the back of the store and along the supply chain. EPOS-led information systems are becoming the next natural step for retailers, and ICL already has a strong community of interest among distributors through its EDI (Tradernet) activities. It is already actively seeking partners for such diversification.

4. Italy

The Italian market is dominated by small traditional companies. There are more retail shops per person than in any other European country. However, the French hypermarket chains are being highly successful in building business in Italy, where development is said to be three years behind that in France. Several joint ventures are in place with foreign distribution companies, including some Japanese companies.

Government regulations impose severe restrictions on the design of POS systems. These restrictions are based on requirements for a seven-year audit trail of sales totals, number of tickets and tax totals. Approval procedures can delay new products for long periods. The predominance of small businesses means that most attention is given to small POS systems. This is the area where Olivetti shines, though it faces strong competition from Casio and TEC.

The industry-specific software and services market in the Italian distribution sector is estimated to reach Lira 525 billion by 1992. It is forecast to grow to Lira 930 billion by 1992, a CAGR of 12%. Exhibit IV-16 gives the breakdown by delivery mode.

It is only in the larger companies that such topics as systems integration, EDI and industry standards are a priority. La Rinascente, the second-largest Italian retail group (after the Italian Co-op), controls seven totally different retail chains. Their corporate IS strategy is to allow each chain to make its own IS decisions, but remain compatible across the group for networking and information consolidation purposes. For example, the company has adopted UNIX as a standard; this allows each subsidiary a broader choice from which to select its own suppliers.

One-to-one connections are generally used for communication between trading companies, with networks used only for internal data transmission. The advent of EDI standards will be a major step forward in reducing communication difficulties and improving information flow. EDIFACT has emerged as the standard of choice for EDI in Italy and will be one of the key areas for user investment over the next few years. INPUT estimates that Italy represented 12% of the European EDI network applications market in 1991.

EXHIBIT IV-16

Software and Services Market
Distribution Sector, Italy, 1992-1997

	Lira Billions				
Subsector	1991	'91-'92 AGR (%)	1992	'92-'97 CAGR (%)	1997
Transaction Processing	34	6	36	3	42
Turnkey Systems	60	17	70	8	105
Applications Software Products	90	11	100	14	190
Professional Services	205	7	220	10	360
Network Services	45	22	55	19	130
Systems Operations	8	13	9	24	26
Systems Integration	29	21	35	17	77
Industry Sector Total (Rounded)	470	12	525	12	930

Exhibits IV-17 and IV-18 list the leading vendors in Italy.

EXHIBIT IV-17

Leading Software and Services Vendors
Retail Sector, Italy, 1991

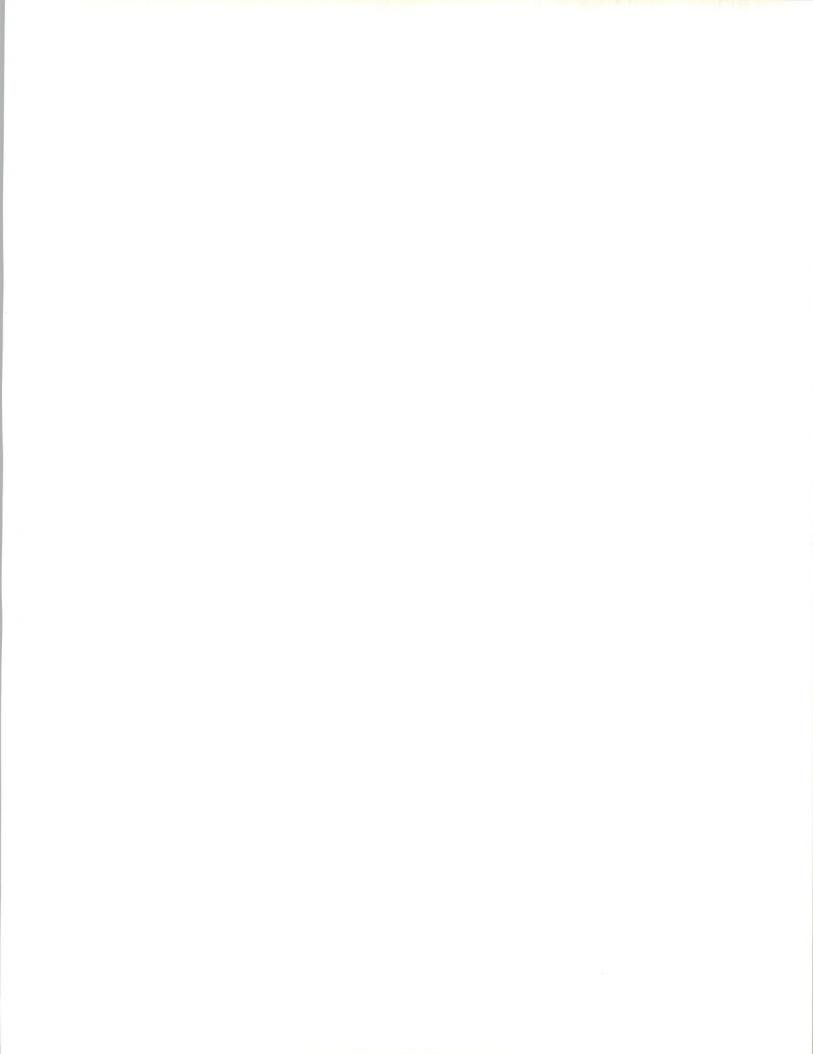| Rank	Vendor	Country of Origin	Estimated Sector Revenues (Lira Billions)	Market Share (Percent)
1	Olivetti	Italy	60	30.0
2	IBM	U.S.	35	17.5
3	Editrice	Italy	25	12.5
4	Siemens-Nixdorf	Germany	10	5.0
5	Andersen Consulting	U.S.	10	5.0
6	Microsoft	U.S.	10	5.0
7	AT&T (NCR)	U.S.	5	2.5
8	Computer Associates	U.S.	5	2.5
9	INTESA	Italy	5	2.5
10	CAP Gemini Sogeti	France	5	2.5
	Total Listed		170	85.0
	Total Market		200	100.0

EXHIBIT IV-18

Leading Software and Services Vendors
Wholesale Sector, Italy, 1991

Rank	Vendor	Country of Origin	Estimated Sector Revenues (Lira Billions)	Market Share (Percent)
1	IBM	U.S.	45	16.7
2	Olivetti	Italy	35	13.0
3	Andersen Consulting	U.S.	10	3.7
4	Bull	France	10	3.7
5	Digital	U.S.	5	1.9
6	GSI	France	5	1.9
7	CAP Gemini Sogeti	France	5	1.9
8	Microsoft	U.S.	5	1.9
9	Engineering	Italy	5	1.9
10	INTESA	Italy	5	1.9
	Total Listed*		130	48.1
	Total Market		270	100.0

* May not add due to rounding.

5. Rest of Europe

Spain is seen by all major vendors as the most promising country market in the European distribution sector in terms of growth potential. Distribution sector user expenditure on industry-specific software and services is estimated to reach Ptas 13 billion in 1992, growing to Ptas 25 billion by 1997, a CAGR of 14%.

The geography of Spain presents a very fragmented market for distribution companies. There are three areas with a solid infrastructure supporting strong growth for the distribution business in Madrid, Barcelona and Alicanti. There are only a small number of substantial retail and wholesale companies (around 100) providing a potential market for large integrated systems. The main activity will continue to be centred on PCs and POS cash registers, installed to speed customers through check-outs and to maintain records of sales and receipts. In the rural areas, small shops fed by cash-and-carry warehouses will remain the norm. In developed areas, hypermarkets and department stores are investing in information systems and

services. Expo '92 is expected to put a firm distribution infrastructure in place in southern Spain.

The attractive growth prospects in Spain have resulted in investment - for example, Arthur Andersen and Price Waterhouse investing in software companies Coritel and Tectel. Equipment vendors are also seeking software partners to develop their local software and service capability, though the market leaders already have well-established channels and software product partners.

The industry-specific software and services market in the Rest of Europe, including Spain, in the distribution sector is estimated to reach $1.4 billion by 1992. It is forecast to grow to $2.4 billion by 1997, a CAGR of 12%.

Of the countries outside the European community, Sweden is seen as the most active in positioning itself to benefit from the trading growth expected when the barriers finally fall. To this end, Sweden is investing heavily in member countries to ensure that it doesn't become excluded from the Single European Market, even if it is not an official member itself. Whatever the result of that initiative, it is generally presumed that member countries will benefit more from increased trade than will nonmember countries - hence, a growth rate for software and services that seems to contradict the fact that both Scandinavia and Switzerland are near the European forefront in using advanced information systems for their distribution businesses.

A
Forecast Database, Distribution Sector - Industry-Specific
Software and Services, Europe, 1992-1997

EXHIBIT A-1

Software and Services Market
Distribution, Europe

Country	Currency	1991	'91-'92 AGR (%)	1992	'92-'97 CAGR (%)	1997	U.S. $ Exchange Rate
France	FFM	5,100	12	5,695	12	10,010	5.18
Germany	DMM	1,440	13	1,620	13	3,020	1.52
U.K.	PSM	475	3	490	5	615	0.532
Italy	ILB	470	12	525	12	930	1.15
Rest of Europe	$M	1,235	12	1,380	12	2,380	1.00
Total Europe	$M	4,500	10	4,950	11	8,300	1.00

Note: Only products and services specific to the European distribution industry
sector are included in these forecasts. Cross-industry delivery modes are not
included.

EXHIBIT A-2

Software and Services Market
Distribution, Europe

	U.S. Dollars (Millions)				
	1991	'91-'92 AGR (%)	1992	'92-'97 CAGR (%)	1997
Transaction Processing	310	0	310	3	360
Turnkey Systems	1,260	10	1,390	10	2,250
Applications Software Products	490	16	570	14	1,080
Professional Services	1,740	7	1,860	8	2,730
Network Services	270	19	320	19	770
Systems Operations	80	25	100	21	255
Systems Integration	335	18	395	16	830
Industry Sector Total (Rounded)	4,500	10	4,950	11	8,300

B
Forecast Reconciliation, 1991-1996

EXHIBIT B-1

Distribution Sector, Software and Services
## Reconciliation of Market Forecast, Europe

	1991 Market			1996 Market			1991-1996		
	1991 Report ($M)	1992 Report ($M)	Variance (%)	1991 Report ($M)	1992 Report ($M)	Variance (%)	1991 CAGR (%)	1992 CAGR (%)	Variance (%)
Total for Sector	4,120	4,485	+9	6,990	6300	-10	17	11	-6
Processing Services	310	310	0	300	360	+20	-1	3	+4
Turnkey Systems	1,230	1,260	+2	1,960	2,045	+4	10	10	0
Application S/W	500	490	-2	1,070	950	-11	16	14	-2
Professional Services	1,340	1,740	+29	2,110	2,530	+20	10	8	-2
Network Services	400	270	-32	890	650	-27	17	19	+2
Systems Operations	70	80	+14	130	+210	+62	16	21	+5
Systems Integration	270	335	+24	650	830	+28	19	16	-3

The change in the size of the market in the base year of 1991 was effected by changes in the dollar exchange rates in Europe. All currencies rose significantly against the dollar. This accounts for 6% of the increase.

The growth rate predictions have fallen as a result of a general fall in inflation rates and the overall negative effect of economic recession. In addition, the acceleration of the trend to downsize is hitting the mainframe market to the benefit of the countertop (desktop) and small servers.

It is considered very unlikely that the sector will see a return to the high growth rates of the last few years. However, as recession eases it is predicted that user spending levels will begin to rise faster than they are today.
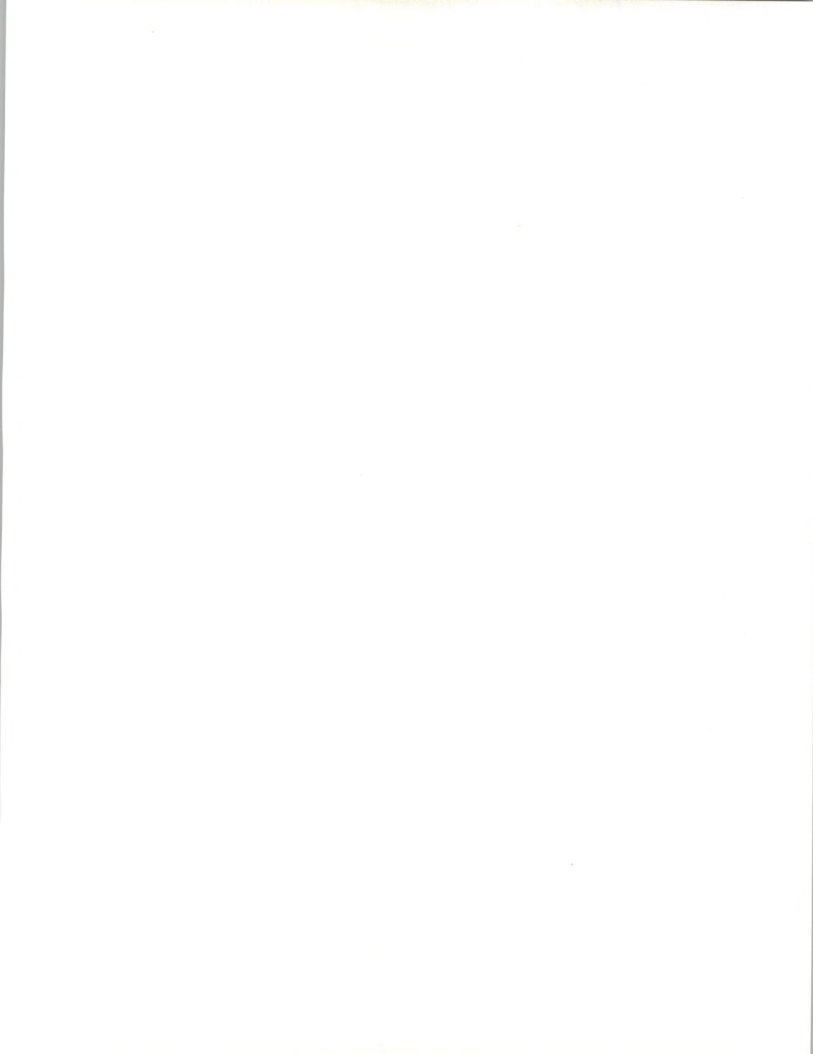
C
Glossary of EDI Terms

ABI	Automated Broker Interface.
ACH	Automated Clearing-house.
ACP 90	Air Cargo Processing in the Nineties.
AECMA	Association Européene des Constructeurs de Matériel Aerospatiale
AGHA	Antwerp Port Community
ANA	Article Numbering Association
ANSI	American National Standards Institute
APACS	Association of Payment and Clearing Services
ASTI	Association des Services Transports Informatiques
ATM	Automatic Teller Machine
BACS	Bankers Automated Clearing Service
BDI	Batch Data Interchange
BEDIS	Booktrade Electronic Data Interchange Standards
CAD/CAM	Computer-Aided Design/Computer-Aided Manufacturing
CADDIA	Cooperation in the Automation of Data and Documentation for Imports/Exports in Agriculture
CALS	Computer-Aided Acquisition and Logistics System
CASE	Common Application Service Elements
CCITT	Comité Consultatif International Télégraphique et Téléphonique
CCS	Cargo Community System
CEFIC	Conseil Européen des Fédérations de l'Industrie Chimique
CEPT	Committee of European Postal and Telecommunications Administrations
COMPRO	General term for European boards concerned with simplification of commercial procedures
DEUPRO	The German COMPRO
DIN	Deutsches Institut fur Normung
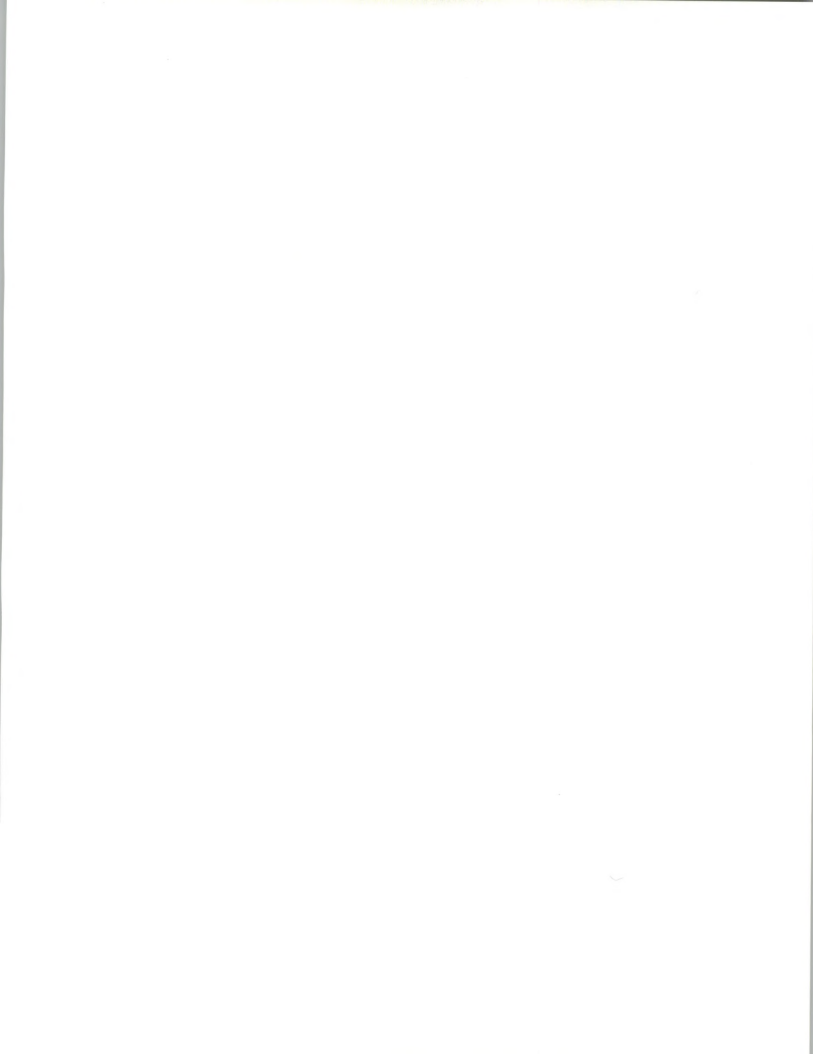
DISH	Data Interchange for Shipping
EAN	International Article Numbering Association
EBDI	Electronic Business Data Interchange
ECU	European Currency Unit
EDI	Electronic Data Interchange
EDIA	Electronic Data Interchange Association
EDICON (U.K.)	Electronic Data Interchange in Construction
EDI Construct (France)	Electronic Data Interchange in Construction
EDIFACT	Electronic Data Interchange for Administration, Commerce and Transport
EDIFICE	Electronic Data Interchange Forum for Companies Interested in Computing and Electronics
EDIMS	Electronic Data Interchange Messaging System
EFT	Electronic Funds Transfer
EFTPOS	Electronic Funds Transfer at Point of Sale
EP	Electronic Publishing
EPOS	Electronic Point of Sale
ERTIS	European Road Transport Information Services
ETDI	Electronic Trade Data Interchange
FTAM	File Transfer Access and Management
IGES	International Graphics Exchange Specification
IATA	International Air Transport Association
ICARUS	Irish Community Aircargo Realtime User System
INTIS	International Transport Information System
JEDI	Joint Electronic Data Interchange
JIT	Just-in-Time
LACES	London Airport Cargo EDP System
LDI	Logistics Data Interchange
MARC	Machine Readable Cataloguing (of books)
MDN	Managed Data Network
MDNS	Managed Data Network Service
MCP	Maritime Cargo Processing
MOTIS	Message-Orientated Text Interchange System
NAPLP	North American Presentation Layer Protocol
ODETTE	Organisation for Data Exchange by Teletransmission in Europe
OFTEL	Office of Telecommunications (UK)
OFTP	Odette File Transfer Protocol
PACE	Ports Automated Cargo Environment
PDN	Public Data Network
PIDX	Petroleum Industry Data Exchange
PSS	Packet Switch Service
PSTN	Public Switched Telephone Network
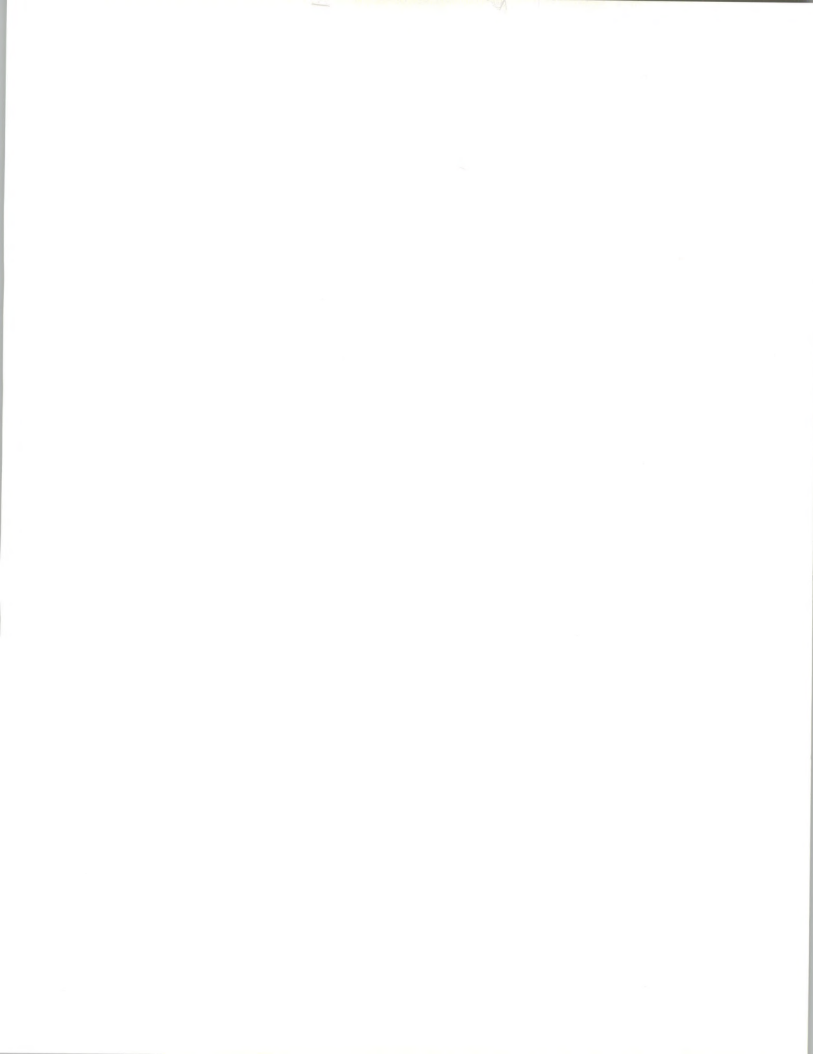
PTO	Public Telecommunications Operator
PTT	Postal, Telegraph and Telephone Administration
PVS	Private Videotex System
RINET	Reinsurance and Insurance Network
SEAGHA	Systems Electronic and Adapted Data Interchange in the Port of Antwerp (see AGHA)
SITA	Society of International Airline Telecommunications
SITPRO	Simplification of International Trade Procedures Board
SITPRONETH	Netherlands body for the Simplification of Trade Procedures (Dutch COMPRO)
SMMT	Society of Motor Manufacturers and Traders
SOFI	Systeme d'Ordinateurs pour le traitement de Fret International
SWIFT	Society for World Interbank Financial, Telecommunications
TDCC	Transportation Data Coordinating Committee
TDI	Trade Data Interchange
TDC	Trade Data Convention
TEDIS	Trade Electronic Data Interchange Systems programme
TISSG	Travel Industry System Standards Group
TRADACOMS	Trading Data Communications Standard
TRADANET	The EDI service of INS
TRANSCOM	EDI project of the Dutch article number association (retail sector)
TRANSNET	GEIS EDI application based on EDIFACT
TS	Transaction Services
TUA	Telecommunications Users Association
UAC	Stichting Uniforme Artikel Codering (Dutch retail trade association)
UNECE	United Nations Economic Commission for Europe
UNGTDI	United Nations Guide-lines for Trade Data Interchange
UNICORN	United Nations Interactive (message) Concept Over Reservation Networks
UNJEDI	United Nations
UNTDED	United Nations Trade Data Elements Directory
UNTDI	United Nations Trade Data Interchange
VADS	Value-Added and Data Services
VANS	Value-Added Network Services
VDA	German Automotive Trade Associations
X12	Generic EDI standards approved by the American Standards Committee
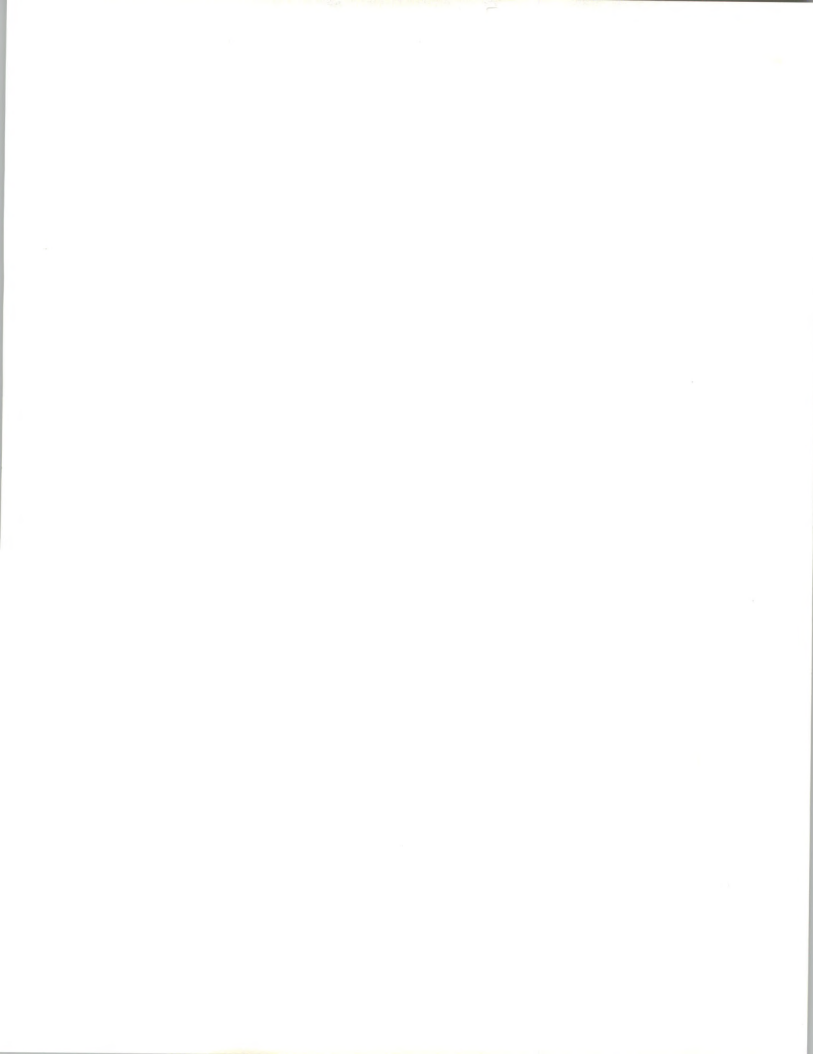
| X.25 | International standard formulated by CCITT for assembling and transmitting data in a packet switched network |
| X.400 | International electronic messaging standard recommended by the CCITT |