EUROPEAN SOFTWARE AND SERVICES MARKET

1990 - 1995

BANKING AND FINANCE

INPUT

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

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1990-1995

BANKING AND FINANCE SECTOR

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European Software and Services Market, 1990-1995—Banking and Finance Sector

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Abstract

This report analyses the computer software and services market in the banking and finance sector for Western Europe and its growth potential over the period 1990-1995.

INPUT defines the banking and finance sector as covering the banking market and the securities market. The banking market encompasses retail and wholesale banking. The securities market comprises equities, bonds and other forms of securities exchanges.

This report covers all of the six delivery modes of software and services, as defined by INPUT. It reviews all categories of third-party vendors selling to the banking and finance sector, including software and services organisations owned by groups of financial institutions, such as co-operative processing centres for savings and co-operative banks.

The following key issues are discussed: the rapid development of electronic stock exchanges throughout Europe and the beginnings of interlinking between them, the demand for banks to redesign their prime databases to customer name structures and to launch new competitive financial services to corporate and private customers. The report considers the planned deregulation of the EEC financial markets by 1 January 1993, the consequent major restructuring of European banking and finance markets during the 1990s, and the likely repercussions in the European software and services market.

The report identifies leading vendors in the overall West European banking and finance market, in the two subsectors of banking and securities and by major West European country. Profiles of three banking and finance vendors are used to illustrate different vendor strategies.

Challenges are identified for vendors for the 1990s in the banking and finance sector. In addition, recommendations are made to vendors active in this market.

The report contains 150 pages, including 79 exhibits.

AUTHOR

EUROPEAN SOFTWARE & SERVICES

TITLE

MARKET 1990-1995 BANK & FINANCE

DATE LOANED	BORROWER'S NAME

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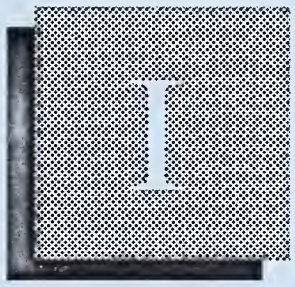
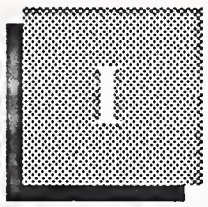


Introduction



Introduction

A Objectives

This report is produced as part of INPUT's Market Analysis Programme—Europe.

INPUT analyses the West European software and services market by three main parameters:

- Delivery mode
- Country
- Industry sector

In previous years, INPUT has produced in-depth reports on the West European market for specific major issues by delivery mode and by country, but not by industry sector. In 1990, a number of key vertical industry sectors are being specifically researched by INPUT. This report is part of this in-depth vertical market research programme.

The objectives of this report are to:

- Create a clear picture of the current structure of the West European banking and finance market and the related software and services
- Understand the major forces that are affecting this sector, in particular the Single European Act legislation of the European Commission and its likely repercussions
- Identify the major actions being taken by vendors as a result of these forces and the resulting changes to the competitive environment over the next few years

- Estimate the size and structure of the software and services market for the West European banking and finance sector and its growth potential to 1995
- Research the current attitudes of vendors and end users in the banking and finance sector towards software and services
- Identify the major differences in national banking and finance markets within Europe and how these might change during the 1990s
- Assess possible major new opportunity areas for software and services vendors arising out of this changing structure of the user market
- Recommend possible strategies for vendors in the banking and finance sector for the 1990s

B

Industry Structure

In the 1980s, the banking and finance market was made up of a number of discrete services supplied by specialist financial institutions. In general, retail banking was separate from house loan financing, which was separate from merchant banking and international banking. Only the larger retail banks might have been involved in a limited number of these different financial services.

In nearly all European countries, the securities market was completely separate from the banking sector. Specialist securities houses offer broking and investment services in equities, bonds and other forms of securities. The main exception was West Germany, where private banks have been the only financial institutions allowed to handle securities trading.

By 1990, the pictures have started to change radically. European Commission deregulation is causing the boundaries between these traditionally separate financial activities to blur. Retail banks are moving into insurance, equity investment services and home loans. House-financing institutions are moving into retail banking, as are insurance institutions and even retail shopping chains.

Today it is not practical to try to analyse the West European banking and finance market by different types of financial institution, only by their activities and the type of software and services these activities demand. Because the activities of securities trading and their associated software and services are so different from banking activity, this report breaks the West European banking and finance market into just two subsectors:

- Banking market
- Securities market

It is acknowledged that there are many different types of financial services within the banking market subsector, but often the functional requirements for software and services are similar and hence can be grouped together. The functional requirements for software and services to the securities market are significantly different from those of banking and hence can be reasonably dealt with separately, even though the ownership of the banks and securities houses has already become blurred in some national markets.

C

Scope

This report reviews the software and services market for the banking and securities sector of Western Europe, for the period 1990 to 1995.

It discusses the growing blurring of boundaries between the banking and finance sector and between the related sectors of insurance and retail shopping. It covers any software and services demand generated by these two sectors in the area of banking and securities services. However, it does not deal with the software and services demand for insurance services or retail shopping, which are being covered by INPUT in separate vertical market reports in the 1990 Market Analysis Programme—Europe. This report does cover EFTPoS links between retail outlets and banks because such links are seen as part of banking, not retail.

The report covers independent software vendors and equipment vendors selling software and services to the banking and finance sector. A number of key independent vendors are totally or partially owned by financial institutions. In forecasting the size of the West European banking and finance market, INPUT includes only end-user revenues gained by third-party vendors and excludes revenues gained from parent organisations that can be defined as captive revenues.

INPUT defines captive revenue as that gained by a vendor from a parent organisation that owns more than 50% of the vendor. In the area of banking and finance, the definition of what is and what is not captive revenue is not clear cut.

Many French banks in the late 1960s and early 1970s set up their internal IT departments as separate companies. These are now many of France's leading independent vendors. Some banks still retain majority shareholding in these vendors. This trend of banks' setting up their in-house IT departments as separate companies is growing in Europe.

There is also a tendency for the parent bank to go for open tender and not to award contacts to its daughter software and services company automatically. This pattern is making a clear definition of what is and what is not captive revenue difficult. This grey area between captive and non-captive revenue in the banking and finance market is likely to become greyer in the 1990s.

In West Germany and Scandinavia, there are many joint or co-operatively owned processing centres for savings, co-operative and retail banks. These centres supply not only central processing services, but also IS consultancy, software products, custom software development and network services. Some supply these services only to their shareholders; others sell also to third-party financial institutions. Similarly in other European countries, there are credit and debit card processing centres owned by groups of retail banks, as well as jointly owned interbank clearing centres.

Since no individual bank owns a majority of the shares in these processing centres, INPUT does not define centre revenues as captive and does not include these revenues in the market forecasts.

Exhibit I-1 details the structure of the information services as defined by INPUT. It also illustrates the six delivery modes covered by this report for the banking and finance sector.

Geographically, this report divides Western Europe into the following main countries and regions:

- France
- U.K.
- West Germany
- Italy
- Benelux
- Scandinavia
- Rest of Europe

D Methodology

The European banking and finance market is large and complex. Many vendors have specialised in specific niche areas and country markets.

To obtain an in-depth appreciation of the structure, issues and opportunities, INPUT carried out the following research programme:

- 20 in-depth, formal interviews using the vendor questionnaire in Appendix C
- An additional 40 informal vendor interviews that concentrate on specific niche products, services and issues
- 10 interviews with key users

This tiered approach with vendors has allowed INPUT to interview an acceptable cross-section of vendors with a wide range of products and services in the banking and finance sector and vendors specialising in specific market niches.

EXHIBIT I-1

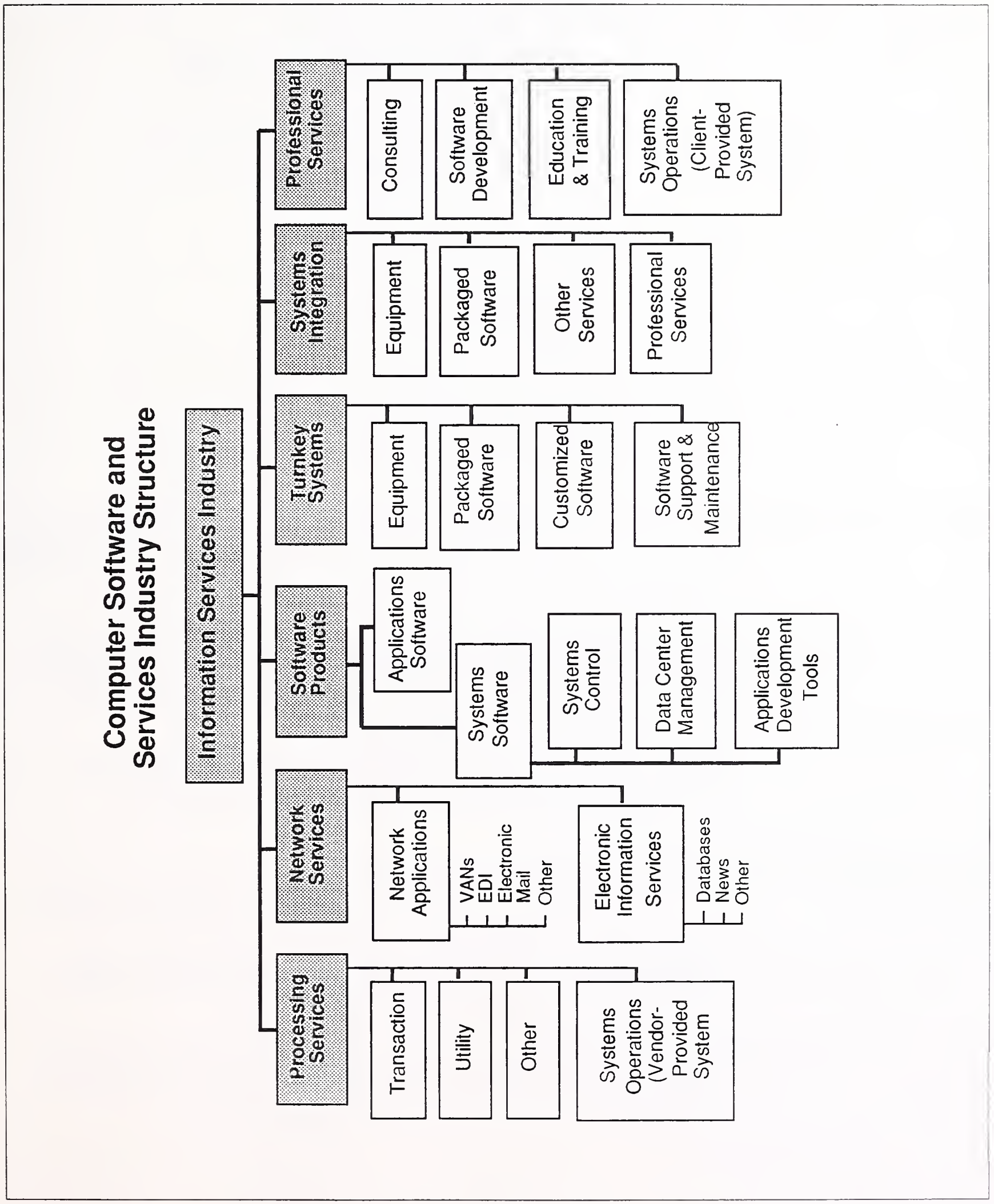


Exhibit I-2 shows the country breakdown of these 60 vendor interviews.

EXHIBIT I-2

Analysis of Vendor Interviews

Country or Area	Number of Interviews
Benelux	3
France	15
Italy	1
Scandinavia	3
Spain	5
U.K.	18
West Germany	15
Total	60

As stated in the previous section, market forecasts are based on noncaptive end-user expenditures. These are defined by INPUT as expenditures made externally by any organisation with a third-party vendor, rather than made within the organisation itself.

Inflation effects are included in historical and future growth rates of market size estimates. Estimates of inflation rates are given in Appendix B.

E

Report Contents

The report is organised into five chapters and four appendixes as follows:

- Chapter II is an Executive Overview of the complete report. It is designed for the individual who wants to quickly identify the salient points of the report without reading it in its entirety.

- Chapter III reviews the dynamics of the banking and finance end-user market, of the overall West European software and services market for this sector and of the banking and securities subsectors.

- Chapter IV forecasts the size of the overall West European banking and finance software and services sector for the period 1990 to 1995 and analyses the sector by delivery mode and major geographic region. Chapter IV reviews leading vendors and gives three vendor profiles to illustrate vendor strategies in the banking and finance sector.

- Chapter V summarises what INPUT sees as the prime challenges for vendors in the banking and finance sector for the 1990s and gives INPUT's recommendation for vendors.

- Appendix A gives INPUT's definition of terms.

- Appendix B lists the exchange rates used in compiling this report and provides inflation assumptions.

- Appendix C details the vendor questionnaire used in this research.

- Appendix D gives the detailed forecast database of market sizes in local currencies.

F

Related INPUT Reports

Readers may find it useful to refer to the following 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, 1989-1994* (December 1989)

  - *The Challenge of the Single European Market - 1992 and Beyond* (December 1989)

- Industry sector reviews:

  - *The Western European Computer Software and Services Market, Insurance Sector, 1990-1995* (April 1990)

- Network services reviews:

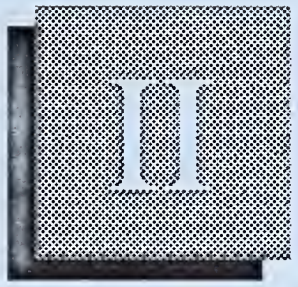
  - *Network Services, Western European Market Opportunities, 1988-1993* (December 1988)

  - *EDI Intertrends Western Europe, 1989-1994* (July 1989)

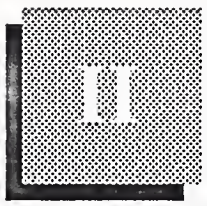
- *Western European Electronic Information Services, 1989-1994* (December 1989)

- U.S. banking and finance reviews:

  - *Industry Sector Markets, 1988-1993, Banking and Finance Sector* (September 1989)



Executive Overview



Executive Overview

A Overview

The plan by the European Commission to deregulate financial markets by the 1st of January 1993 is sending shock waves through all the financial markets of Western Europe, not just those of the 12 member states of the EEC. As a result, banking and finance institutions are being forced to restructure, and at the same time develop new competitive products and services. They are looking increasingly to software and services vendors to assist them in developing the complex international systems needed for the 1990s. INPUT forecasts that the banking and finance sector of the European software and services market will exceed $11 billion by 1990, and will achieve a growth of 18% per annum on average over the next five years.

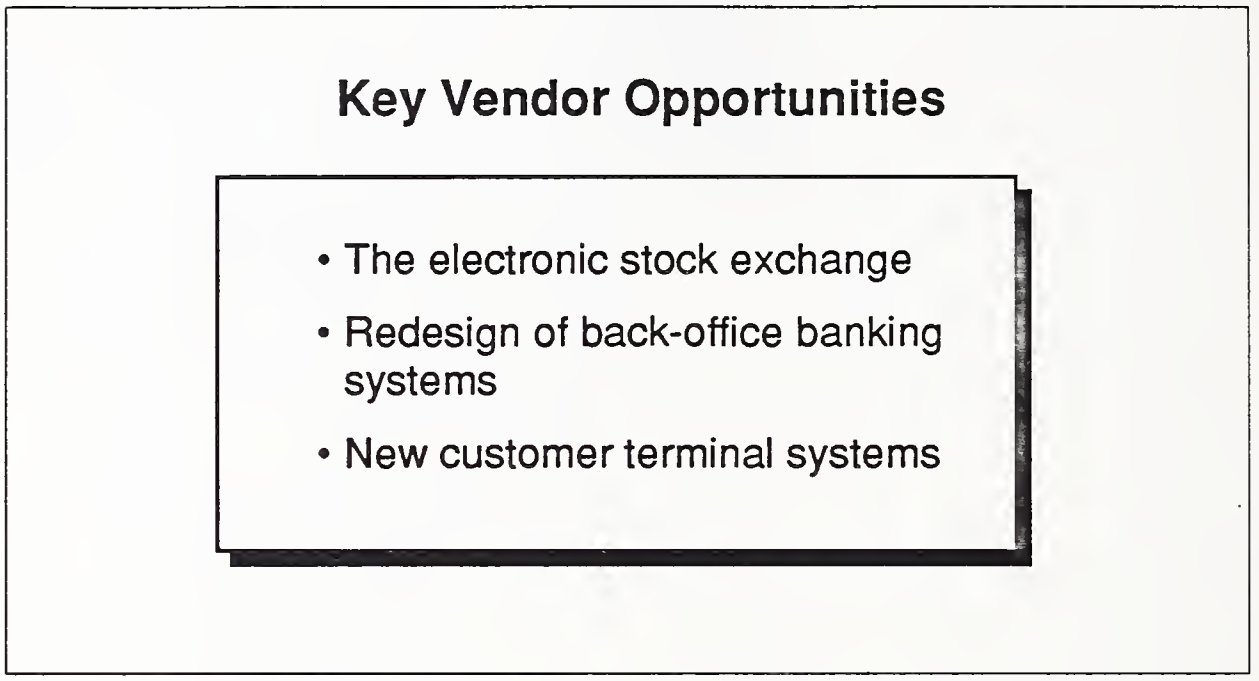
The banking and finance sector represents some 20% of the total European software and services market, second in importance only to the manufacturing sector. It is dominated by a small number of key vendors; some 80 vendors control around 70% of the total end-user revenues.

Many of these vendors today are traditional European-owned independents focused on a specific European country market. As banks, savings and other financial institutions expand out of their traditionally protected national market niches in the 1990s, major new opportunities are evolving. Not only are these being driven by the demand for new national customer service systems, but also increasingly for pan-European systems. As a result, the European banking and finance market is being targetted by the major international independent and equipment vendors.

As Exhibit II-1 illustrates, three key opportunity areas for software and services vendors have been identified:

- the development of and growing competition between electronic stock exchanges around Europe

EXHIBIT II-1



- the redesign of the prime databases of banks to meet the increasingly competitive environment after 1992

- the demand by banks to be able to deliver new products and services to their customers through new terminal systems to gain competitive advantage

A massive restructuring of the European banking and finance markets is evident today with major national and international mergers and acquisitions being regularly reported between banks and other financial institutions. As a result, the number of financial institutions within Europe is declining, their size is increasing, and they are becoming more pan-European.

For software and services vendors, this changing market-place means new opportunities to assist financial institutions to restructure and adjust. INPUT sees that there will be strong demand for professional services in the banking and finance market, such as IT consultancy (advising clients on CASE tools, 4GLs, fault-tolerant processing, security, and networking), project management services (assisting IT managers in ensuring that key projects are delivered on time), or custom software development services (new customer service systems).

In other areas of the market there are opportunities for software products, notably in the securities markets and in small-to-medium-sized banks, and in certain specialised areas of banking, such as foreign exchange, EFTPoS, and EDI.

The 1990s offer software and services vendors many challenges and opportunities. In INPUT's opinion, to be successful it is essential for vendors to target specific market niches and position themselves quickly in these areas. Vendors that are successful in defining their strategy will find this market sector very lucrative over the next few years. However, once the major realignment of the European banking and finance markets has been completed (by the mid-1990s), there is a real danger of an oversupply in software and services that could seriously affect vendors who have not managed to clearly establish themselves in key niches.

B

The Winds of Change

In INPUT's opinion, one of the most exciting market sectors for software and services vendors in Western Europe will be banking and finance.

INPUT has interviewed vendors and users around Europe to identify the key trends and issues in the banking and finance market. Many niche opportunities can be recognized, but three stand out as offering software and services vendors major opportunities in the first half of the 1990s.

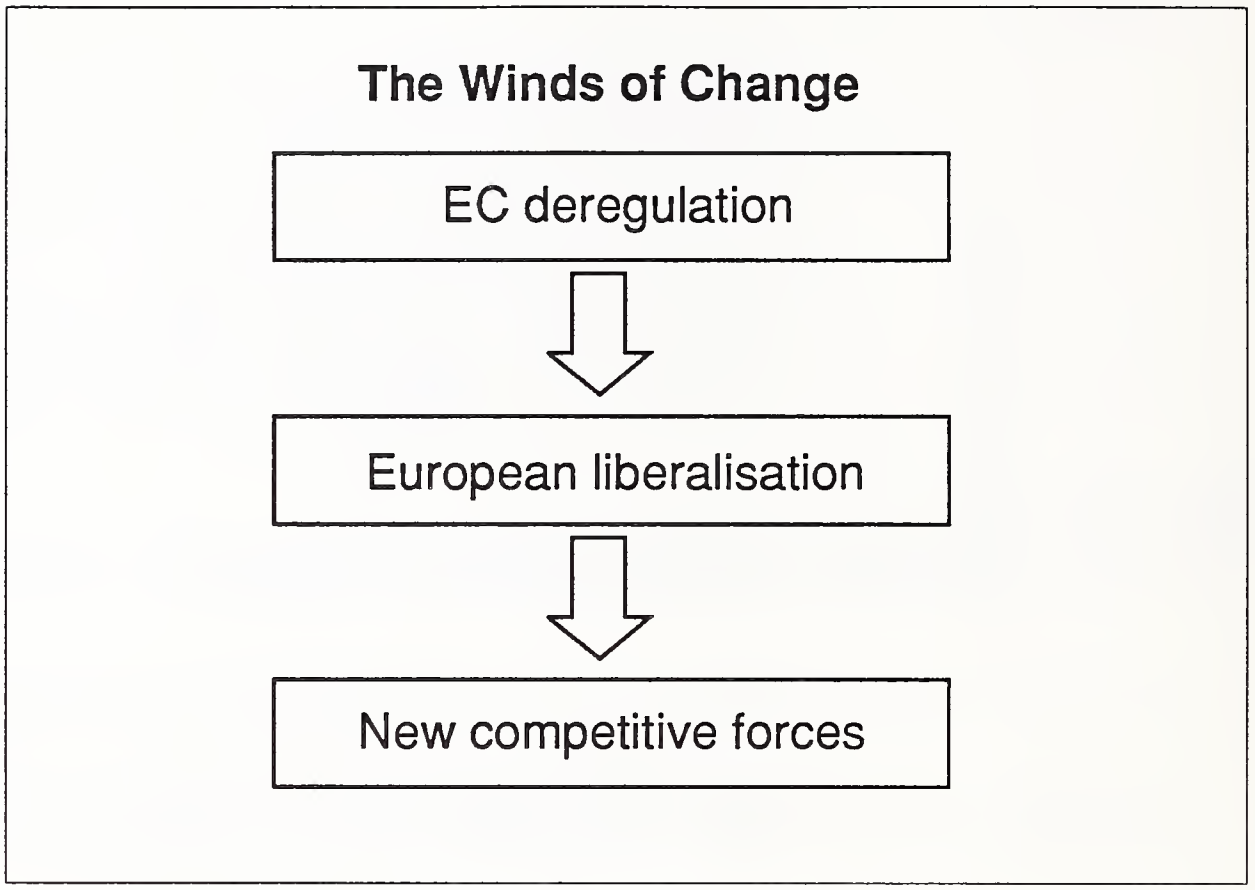
Throughout Europe, all the major securities markets are introducing or upgrading electronic systems so as to offer full "electronic stock exchanges" to security houses. Through these developments, individual stock exchanges are identifying specific areas of the European securities market to target, and are attempting to offer the most competitive electronic infrastructure in these areas. INPUT sees that these developments will offer major opportunities to software and services vendors.

In the area of banking, the prime databases of nearly all banks throughout Europe are based on account number records, rather than customer name records. There are growing competitive demands on banks to offer more sophisticated and targetted services to customers. To do this, banks have to identify more with individual customers; this they can do only by redesigning their prime databases. Redesign is by no means a trivial task as these developments must be undertaken at the same time that new services are also being offered to the banks' customers.

The redesign of back-office banking systems to accommodate these new customer-orientated databases and the development of customer terminal systems through which banks can deliver new, competitive services will offer vendors many additional opportunities in the 1990s.

The key driving force behind this restructuring of the financial markets of Europe is the Single European Act legislation of the European Commission, as illustrated in Exhibit II-2. It is planned that all EEC financial markets will deregulated by 1st January, 1993. As a result, any EEC financial institution will be free to offer its services in any other member state and to be able to extend its range of services beyond those defined by traditional national legislation.

EXHIBIT II-2



The effect of this liberalisation is not just affecting the EEC, but also financial institutions through Western Europe. As a result, new competitive forces are reshaping the entire Western European banking and finance market.

Many financial institutions have already merged nationally as a direct result of these forces. INPUT sees that this process will continue into the 1990s, accompanied by a growing number of acquisitions between institutions of different European origin.

Denmark is an example. Already in early 1990, the six largest banks have merged into two new larger groups, sending shock waves throughout the Danish market. In addition, the Danish government has invested in a new electronic stock exchange in Copenhagen with the intention of becoming the focal point for Nordic securities trading and the gateway for other Nordic countries into EEC financial markets.

Similarly, in the Netherlands major changes have occurred this year. In March, the ABN and the Amro bank announced that they will merge to become Europe's sixth largest bank.

As a result of these changes, the number of financial institutions in Western Europe will decline and the size and importance of individual institutions will grow. Mergers and acquisitions will mean that incompatible systems will have to be rationalised—at the same time that IS managers are trying to redesign them to meet the new demands of the 1990s.

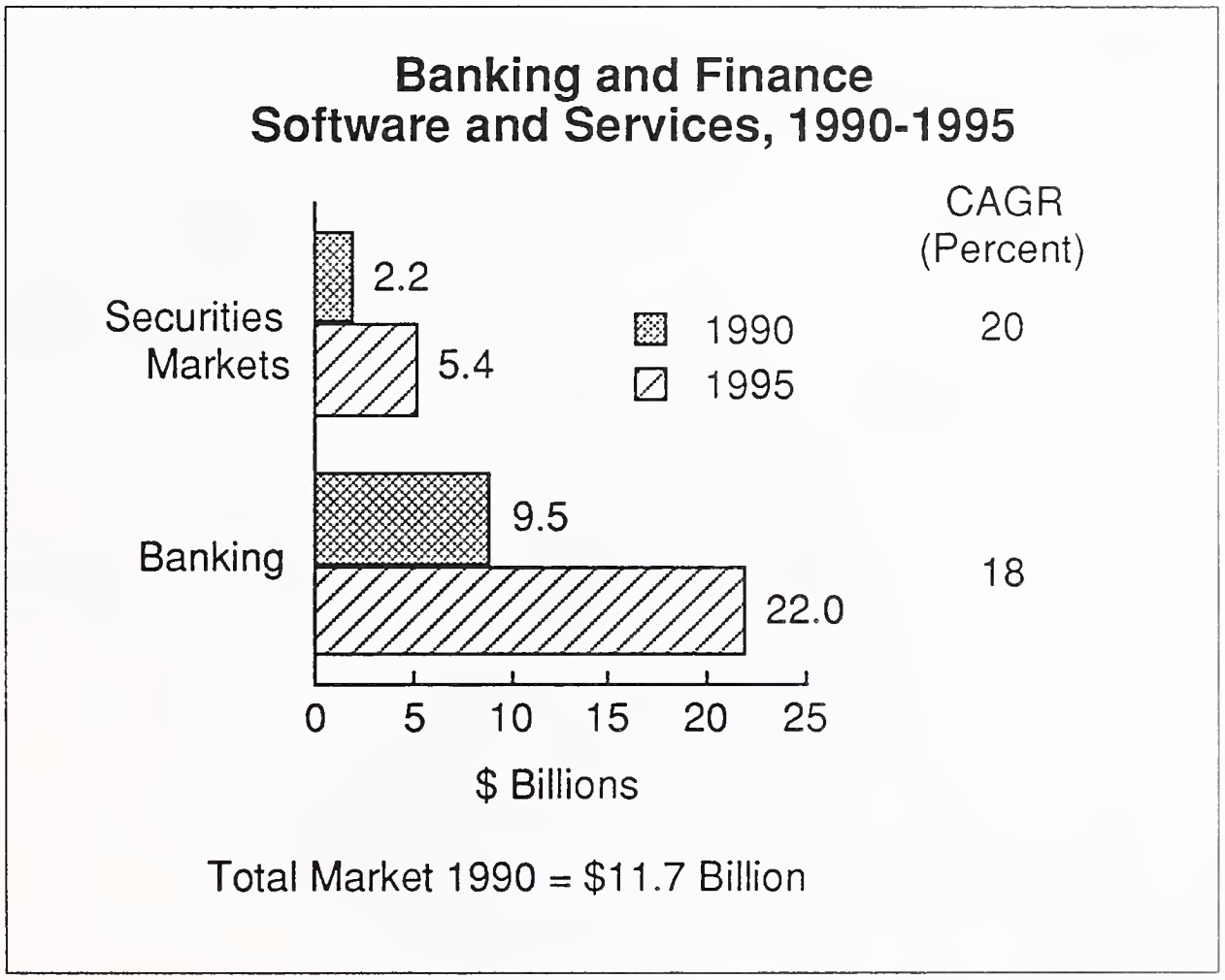
These trends will be extremely important to the software and services industry. The types of services and products traditionally delivered to the banking and finance community may well have to be changed—perhaps radically—in the 1990s. Vendors who foresee these changes will be best positioned to benefit from potential opportunities in the 1990s.

C

Big Player Market

The banking and finance sector represents about 20% of the total Western European software and services market. INPUT estimates that in 1990, the total value of this market will be some $11 billion, as illustrated in Exhibit II-3.

EXHIBIT II-3



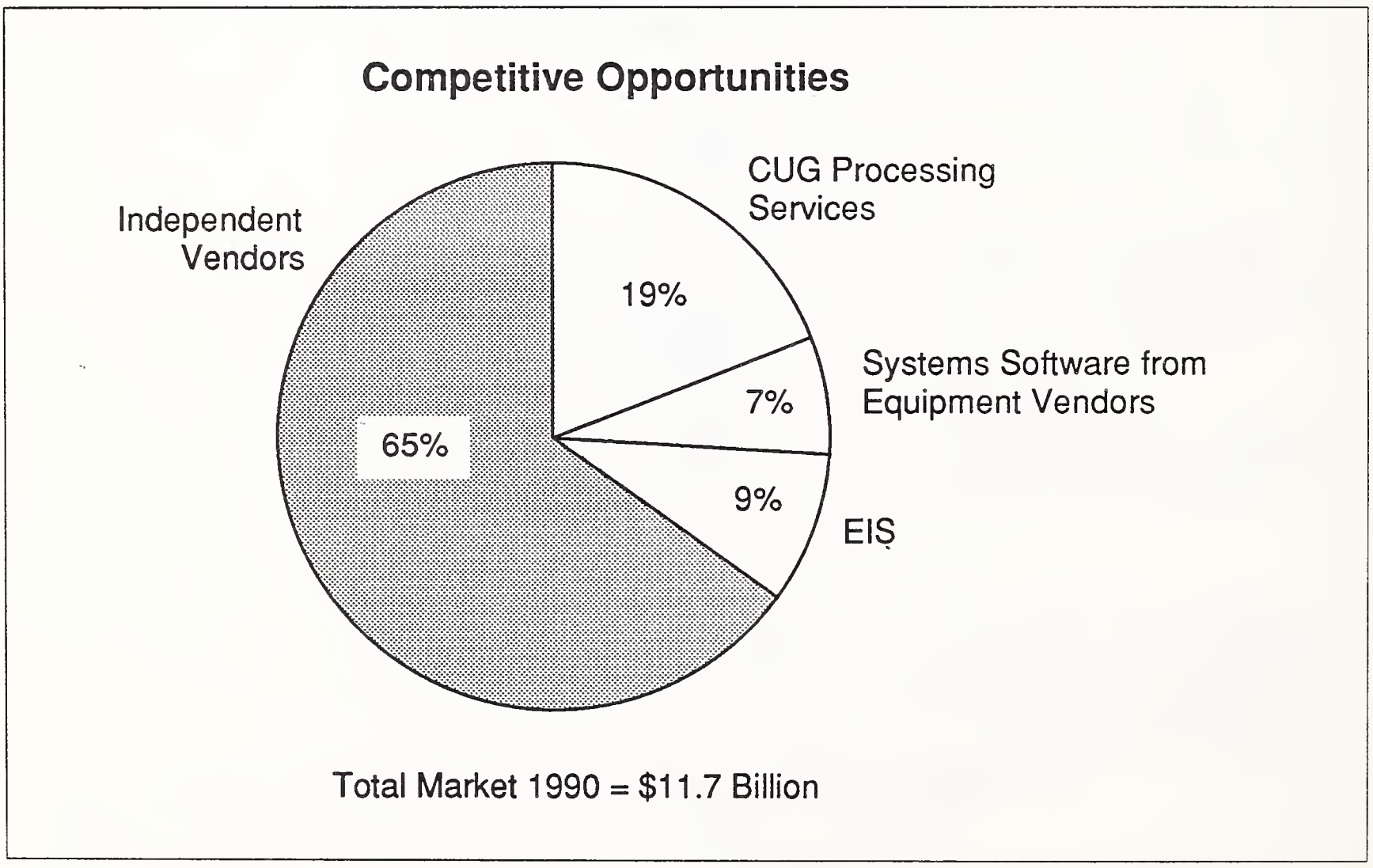
INPUT estimates that the banking and finance market is second only to the manufacturing sector in size and importance. However, unlike the manufacturing sector, the banking and finance market is dominated by a small number of very large vendors. INPUT estimates that only some 2,500 vendors are involved in this market and that some 3%, or around 80, control over 70% of total end-user revenues.

One of the prime reasons for this structure is the nature of the banking and finance market itself. Banks make their information services decisions centrally, thus creating an ideal market for large vendors to serve

them. In addition, there are a limited number of large market sectors, covered by a very few major vendors, in what can be described as semiclosed markets.

Exhibit II-4 indicates the relative size of these semiclosed market sectors. Around 20% of the total banking and finance market is accounted for by closed user group (CUG) processing services. These are vendors owned by groups of banks. They are all minority shareholders and are generally savings or cooperative banks. These vendors supply the total information services needs of these banks, mostly through centralised processing services. Germany has some 19 of these vendors, Italy five, Scandinavia three and Switzerland one.

EXHIBIT II-4



In addition, about 7% of the total market consists of system software supplied by equipment vendors, notably IBM. INPUT estimates that between 60% and 65% of West European banking back-office equipment is IBM's, and that IBM also has a very strong presence in front-office systems. As a result, IBM is the largest vendor in the European banking and finance market, controlling some 11% of total revenues.

The third sector controlled by a small number of large vendors is that of electronic information services to the securities market. Vendors such as Reuters, Telerate, Quotron and Telekurs act as electronic publishers, delivering their information as digital feeds to the electronic trading desks of market makers in the new electronic stock exchanges and to traditional exchange floors.

As a result of these three semi-closed sectors, around a third of the total banking and finance market is controlled by less than 40 vendors. This leaves the remaining two-thirds of the market open for independent vendors.

D

Evolving Pan-European Electronic Securities Market

Exhibit II-5 shows some of the major developments in electronic stock exchanges around Europe. Different exchanges are at very different phases of development. London introduced electronic dealing in 1986 with "Big Bang," but has yet to launch its electronic share registry system TAURUS, which is not planned until 1992. Frankfurt has had electronic settlement since 1970, but only plans to introduce electronic dealing in early 1991. Paris plans to introduce its full electronic settlement system, RELIT, beginning in March 1990.

EXHIBIT II-5

Phased Developments of Electronic Stock Exchanges

• London	- Dealing 1986 (SEAQ) - Settlement 1992 (TAURUS)
• Paris	- Dealing in major shares 1987 - Settlement for major shares 1987 - Full development 1991
• Frankfurt	- Dealing 1991 - Settlement for major shares 1970
• Copenhagen	- Dealing/settlement 1988
• Madrid	- Dealing/settlement for major shares 1989
• Brussels	- Dealing/settlement for major shares 1989

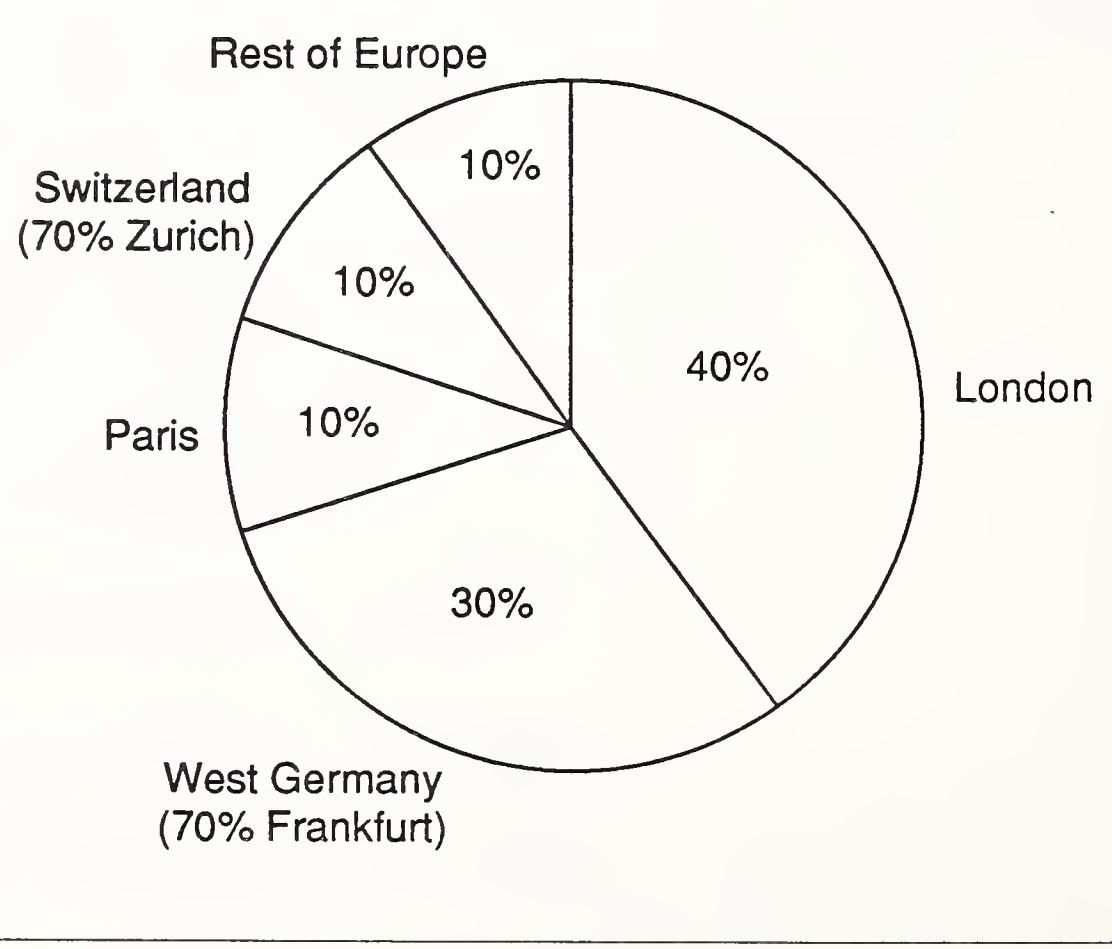
The opportunities for software and services vendors in Europe vary significantly from exchange to exchange, and will continue to do so for many years. Deregulation is forcing individual exchanges to specialise in specific financial instruments—London international equities, Frankfurt bonds, Copenhagen Nordic trading, and so on. This local specialisation will create further opportunities for software and service vendors as securities houses will not be able to rely on just their local exchange for the best service, but will be forced to link in to a range of European exchanges.

Specialisation of European exchanges means that the software and services industry must be prepared to provide integration and networking skills to European securities houses in the 1990s, and often pan-European skills.

Exhibit II-6 shows the breakdown of the trading volume in securities throughout the different West European markets in 1989.

EXHIBIT II-6

Western European Equities and Bonds—Trading Volumes, 1989



Currently, London is by far the largest market, accounting for some 40% of total trading, and dominates international trading. The next largest market is Frankfurt, accounting for some 70% of the total West German trading volume and 20% of the overall West European market. Paris accounts for some 10% of the total West European market.

Exchanges like Paris and Copenhagen are growing rapidly, and seek to capture volume from other markets through the most advanced electronic systems.

As these different stock exchanges introduce and improve their electronic systems, they are in turn forcing their competitors to re-evaluate and improve their existing electronic systems. In addition, there are now moves to link these traditionally separate exchanges by a pan-European electronic information system—such as PIPE—for international equity information and a potential dealing system.

As each of these local or international electronic developments are phased in, securities houses are forced to update their internal electronic trading and settlement systems. Generally, they look to external vendors to manage, install and support these systems, offering considerable opportunities to software and services vendors.

However, overriding these development trends is the overall health of the global securities market. Securities are by their very nature risky, and directly reflect the state of the global business cycle. For the past 2 to 3 years, the business cycle has been on a downturn, reflected by minimal growth in the value and volume of securities trading. In London, the first market to introduce electronic market making, volumes were slashed by one-third in October 1987, on "Black Monday."

After static growth for the past 2 to 3 years, there are now signs of a resurgence of investment in London systems. Added to the developments in other European exchanges, the prospects of a healthy software and services market for European securities houses looks very promising for the first half of the 1990s.

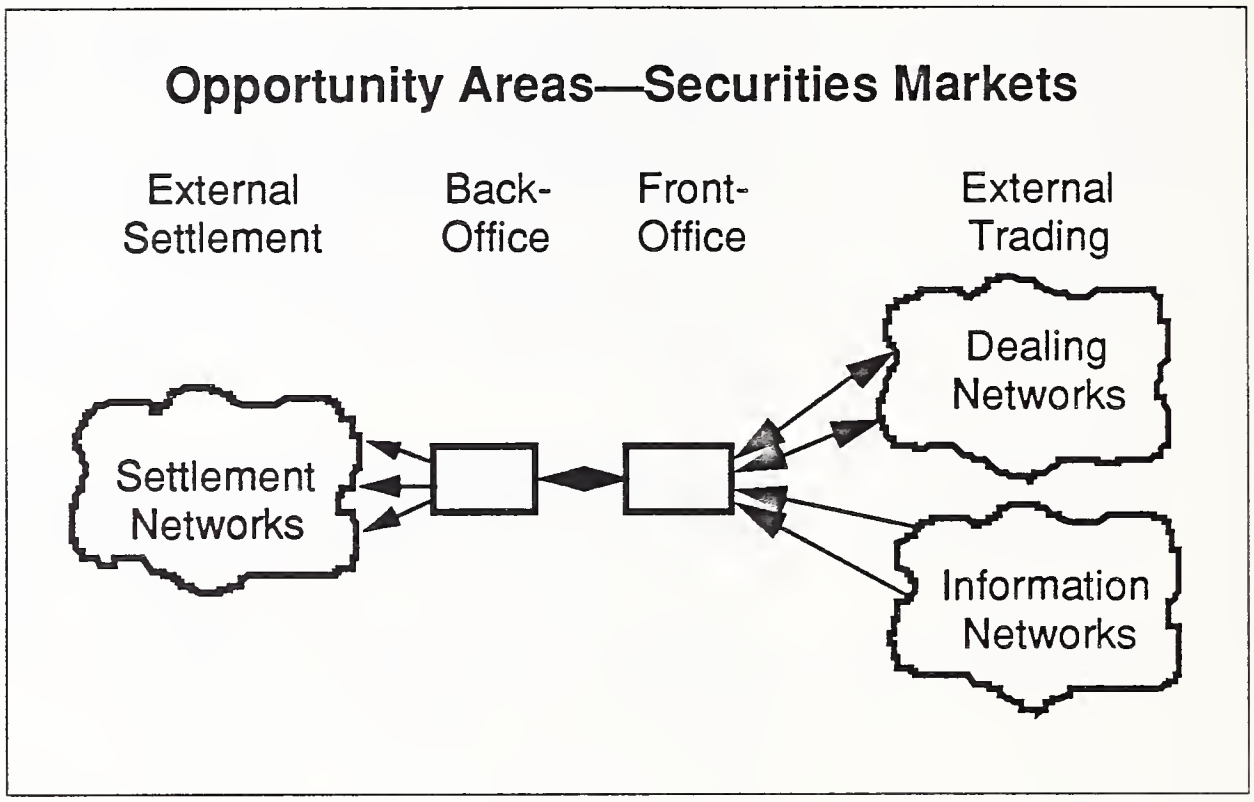
E

Securities Market Opportunities

Exhibit II-7 illustrates the different opportunity areas in securities markets.

- In the back office there are software product opportunities for packaged solutions (BIS, McDonnell Douglas, Tibet—recently acquired by Sema)

EXHIBIT II-7



- To minimise cost, securities houses are looking for single integrated front-office solutions:
  - software products (Telerate, Reuters)
  - bespoke solutions (Cap Gemini Sogeti, SD-Scicon, Data Logic)
- AI opportunity software products:
  - charting
  - market analysers
  - risk assessment
  - forecasting
  - deal ticket making (Concept, Gecosys, GEIS, Software Sciences)
- Network and integration opportunities for the front and back office (NMW, Admiral Computing, Cap Gemini Sogeti, SD-Scicon, Logica)

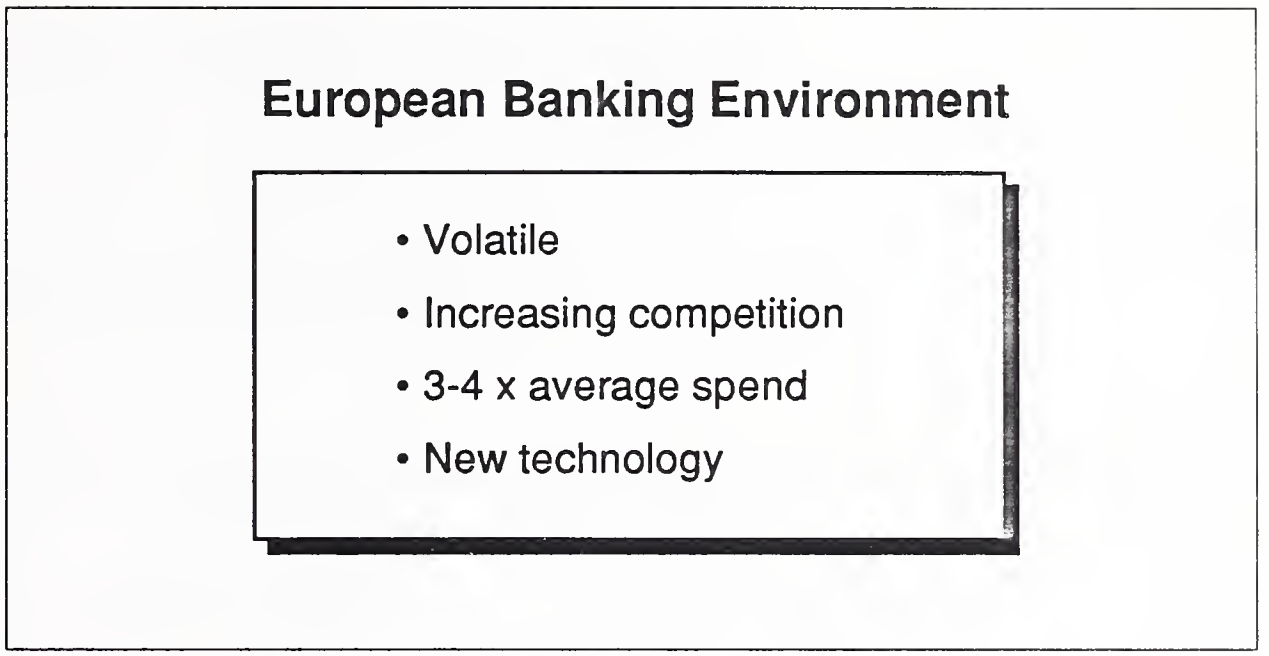
F

Banking—Highly Active Market

Exhibit II-8 lists the key characteristics of the European banking market.

Just as the securities market is volatile, so in its own way is banking. Banks can be seriously affected by downturns in economic activity, and in recent years most major banks and their IT budgets have been affected by the demands on them to write off very large third world debts. Savings banks have tended to be less vulnerable to these external effects than other commercial banks.

EXHIBIT II-8



Against this backdrop, European banks are facing a new decade when their traditional protective barriers will be torn down by the European Commission. Retail banks are seeking to increase their geographic coverage and product range and to move into new areas, such as house financing, insurance and stockbrokerage. Savings, mortgage and insurance institutions are also trying to move into commercial banking.

Banks managers today are more concerned over developing the right competitive strategy than maintaining profits. They are therefore prepared to increase their spending on information services to ensure that they maintain their bank's competitive position.

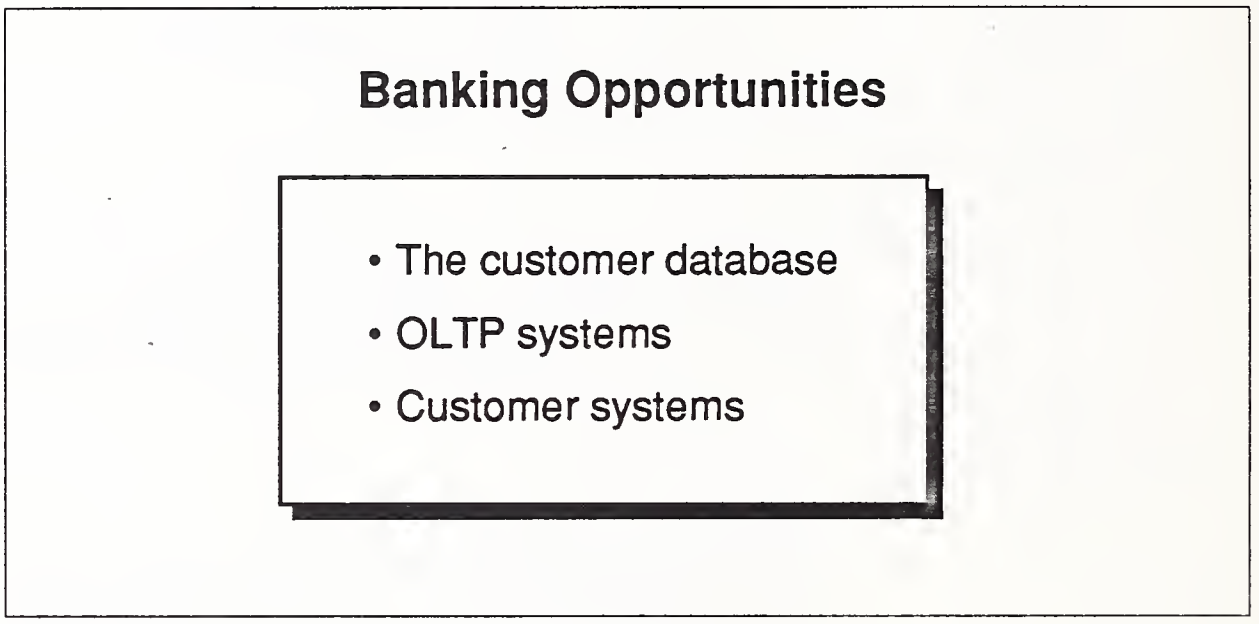
Traditionally, banks have spent a higher proportion of their revenues on information services than any other sector of the market. In the past, banks have reported allocating some 10% of their expenditures to information. INPUT's research indicates that this figure has in many instances risen to 15% or 20%, and could even increase over the next few years.

The 15% to 20% level of expenditure by banks on information services is at least three to four times that of other sectors. As a result, information managers in banking are very concerned over establishing the right priorities and maintaining development schedules within budget.

As part of the pressure on information managers to ensure that their financial institutions maintain their competitive edge, banks are always prepared to look at the latest technology. However, they have learnt from bitter experience that any new ideas must be fully tested via field trials before any serious investment is made. As a result, many new technological ideas are being tested by banks around Europe at any given time. However, vendors should be wary of believing many press comments about such systems being "commercial" when in reality they may be on trials extending over a number of years.

Within this highly active and competitive market, a number of key opportunities can be seen for software and services vendors, as illustrated in Exhibit II-9.

EXHIBIT II-9



Old account number databases throughout Europe must be redesigned to customer name designs to ensure that banks can offer the most competitive customer-orientated services in the 1990s. The problems of doing this are exacerbated by mergers and acquisitions. Information services managers will often find that the newly acquired or merged bank will have totally different back-office systems, making the job of creating a single, flexible customer name record system even more difficult.

To meet the demands of the bank of the 1990s, these new back-office systems have to be flexible and capable of quick, cheap modification to allow new banking products and services to be launched whenever the market demands. Banks are therefore very keen to exploit 4GLs and CASE tools.

One of the major new demands being forced on banks is to offer more on-line products and services. This requires OLTP fault-tolerant systems and systems that can be expanded to meet the increasing needs of individual banks, as their customer bases grow not only through natural expansion, but also through acquisitions and mergers. The development of such systems is far from trivial.

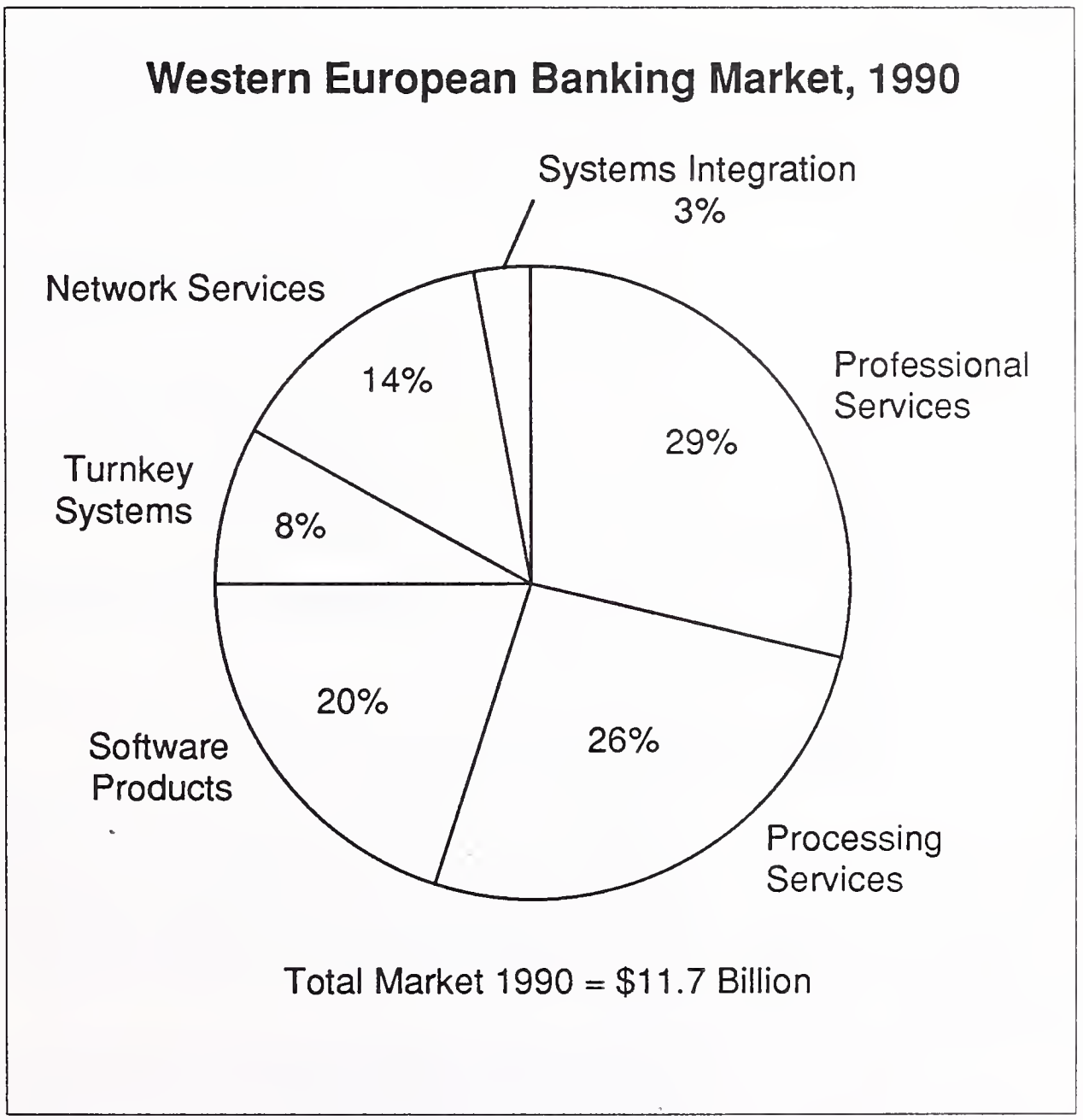
The third area of major opportunity for vendors is in developing new customer systems so that banks can deliver sophisticated new products and services to their customers. These new products and services may not necessarily demand new equipment, but will undoubtedly require new systems to run them, which in some cases can be delivered entirely by third-party vendors.

G

Strong on Custom Solutions

Exhibit II-10 illustrates the breakdown of the banking software and services market by delivery mode. With some 70% of processing services delivered within CUG services, and one-third of software products being systems software delivered by equipment vendors such as IBM, the major opportunities in banking have been in the area of custom software, delivered as professional services.

EXHIBIT II-10



With development costs always a major consideration, the banking market needs access to standard software product solutions, or at least kernel products that can be readily customized. For the smaller savings and wholesale banks, such standard packaged solutions are available. However, the larger the bank, the greater the limitations of these standard solutions and the greater the economic sense of implementing custom solutions.

Although many vendors seek to develop and modify their standard solutions for larger banks, at the same time banks are increasing their size through mergers and acquisitions. As a result, INPUT sees that custom solutions will remain very important to the European banking community.

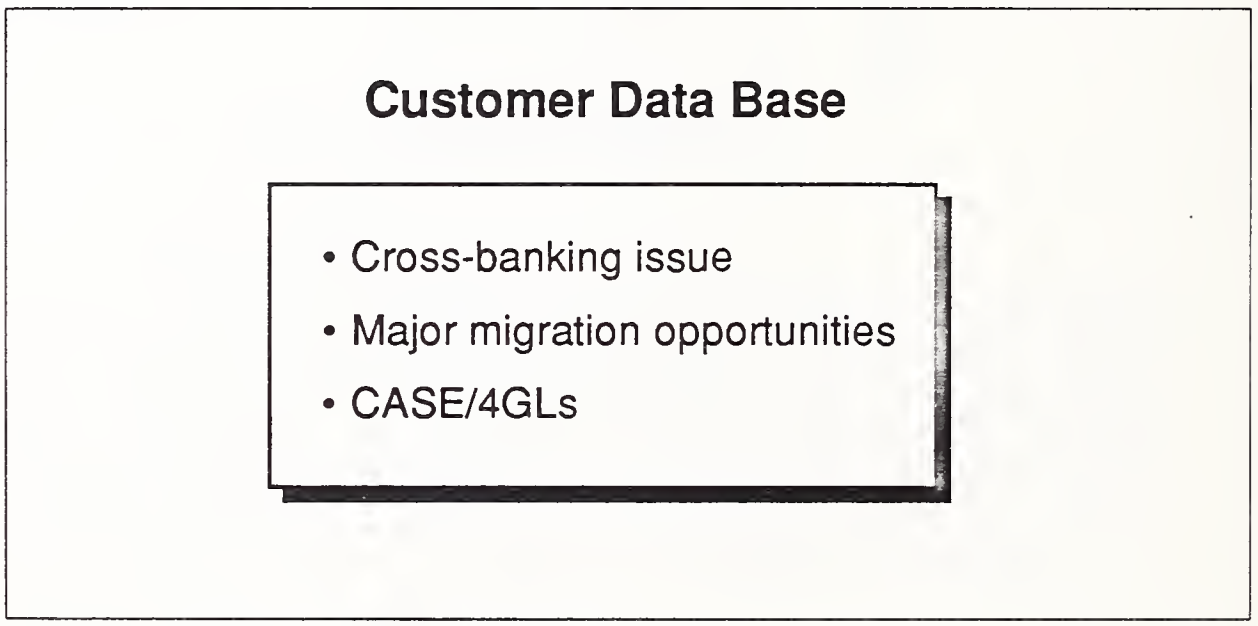
H

Banking Market Opportunities

1. Customer Databases

One of the fundamental issues to be addressed by all European banks is how to convert their prime customer databases from the old account record formats to customer name records, as indicated in Exhibit II-11.

EXHIBIT II-11



Because of the dominance of IBM in banking back-office systems, in many instances these old databases are based on IBM's IMS database. Many of them have been modified over the years. Many financial institutions have gone or will go through mergers and acquisitions and inherit new customer databases that are incompatible with their existing structures.

The problems of redesigning and migrating old databases to new customer name record databases would be hard enough if the banking market did not also have to contend with major competitive pressures to offer new financial products and services—let alone the looming problem of ensuring that all systems will be able to handle information to the year 2000 successfully.

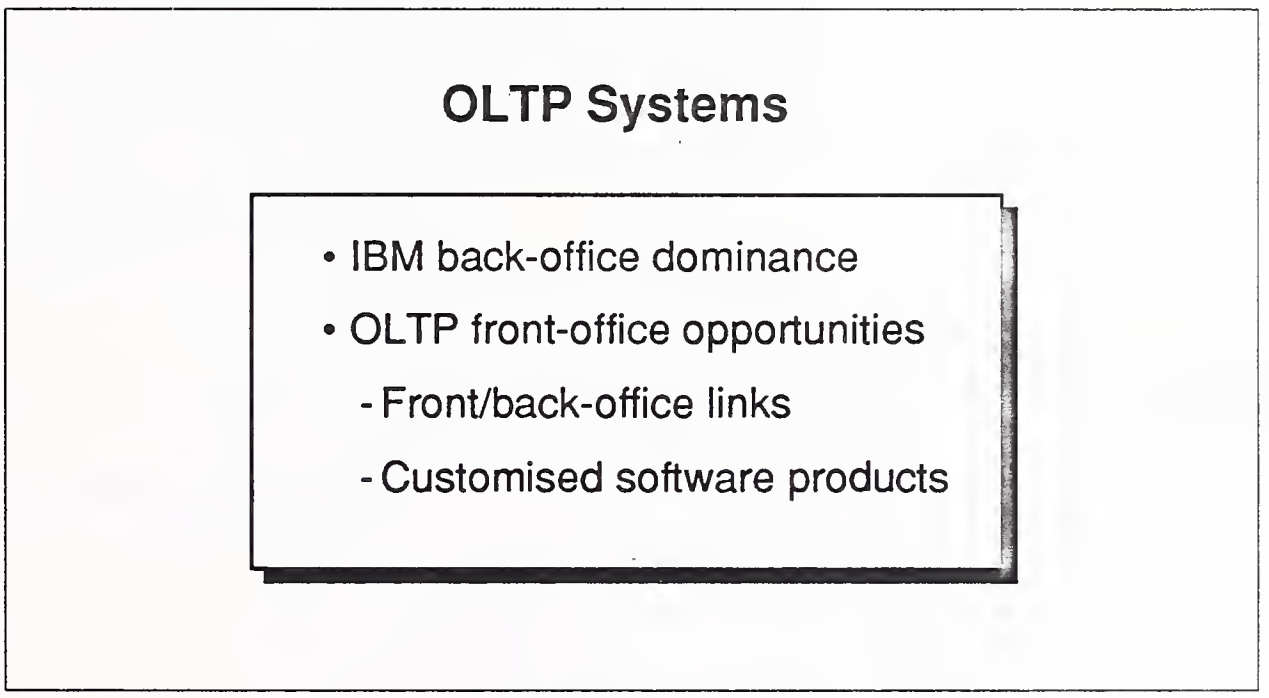
INPUT sees that there are major opportunities for software and service vendors to assist banks in this migration. These opportunities will certainly be in the form of IS consultancy, as well as custom software development services.

For the larger banks, CASE tools are already considered essential to assist them in keeping to development schedules, and they expect to increase their use of CASE substantially. Smaller banks are looking to software products solutions. Flexible solutions based on 4GLs can give these banks the ability to quickly react to changing market conditions and redesign their systems to allow them to launch new products and services cheaply.

2. OLTP Systems

The 1990s will undoubtedly force banks to provide on-line services to customers. This means installing OLTP capacity in the front-office and probably fault-tolerant OLTP capacity. Exhibit II-12 lists the key elements in installing OLTP capacity.

EXHIBIT II-12



IBM itself does not have any fault-tolerant OLTP equipment. It relabels Stratus equipment and sells it under the name System/88. A number of vendors consider that the power of the Stratus is suitable for most securities houses, but often cannot handle the large volumes demanded by many banking systems. Only Tandem with its Cyclone, and the new Digital VAXft 3000 are considered capable of meeting the current and likely future demands of these systems for banks, although Stratus has just launched its mainframe version of the XAZoro series.

IBM seems to have currently found itself in a position where it cannot supply the growing demands of one of its major client groups—banks—for new fault-tolerant front-office equipment. This equipment is needed to run on-line services such as EFTPoS, ATMs and, potentially, EDI services.

For security reasons, many banks do not like the idea of allowing their customers direct access to their prime database. Hence many banks are considering having two OLTP machines: one the external customer front-office processor, the other a fault-tolerant back-office processor which batch updates the traditional back-office mainframe. Such front/back-office developments are by no means trivial and offer independent vendors major opportunities to provide migration services for banks.

In addition to assistance in developing such fault-tolerant front-office systems, banks will need these systems to be customized, since it is in the front office that they need to gain competitive advantage in the new deregulated market of the 1990s.

UNIX is also considered important for front-office systems in banking—but for branch, not OLTP systems. Many vendors consider that there will be "off-the-peg" UNIX branch office systems for banks available in the near term, which will be cheap and efficient.

3. Corporate Customer Services

Exhibit II-13 lists the types of services that corporate banking customers will be offered in the 1990s.

EXHIBIT II-13

Corporate Customer Services

- Growing availability of separate services
- Direct PC access systems
- EDI

There is a growing availability of financial services from a wide range of sources. Corporate finance managers can plug straight into electronic money markets, foreign exchange, or electronic credit checking services. Independent vendors are offering corporate financial modelling packages. If banks wish to maintain control over their corporate customers, they must provide fully integrated solutions to ensure that these customers channel all of their financial dealings through these single interfaces.

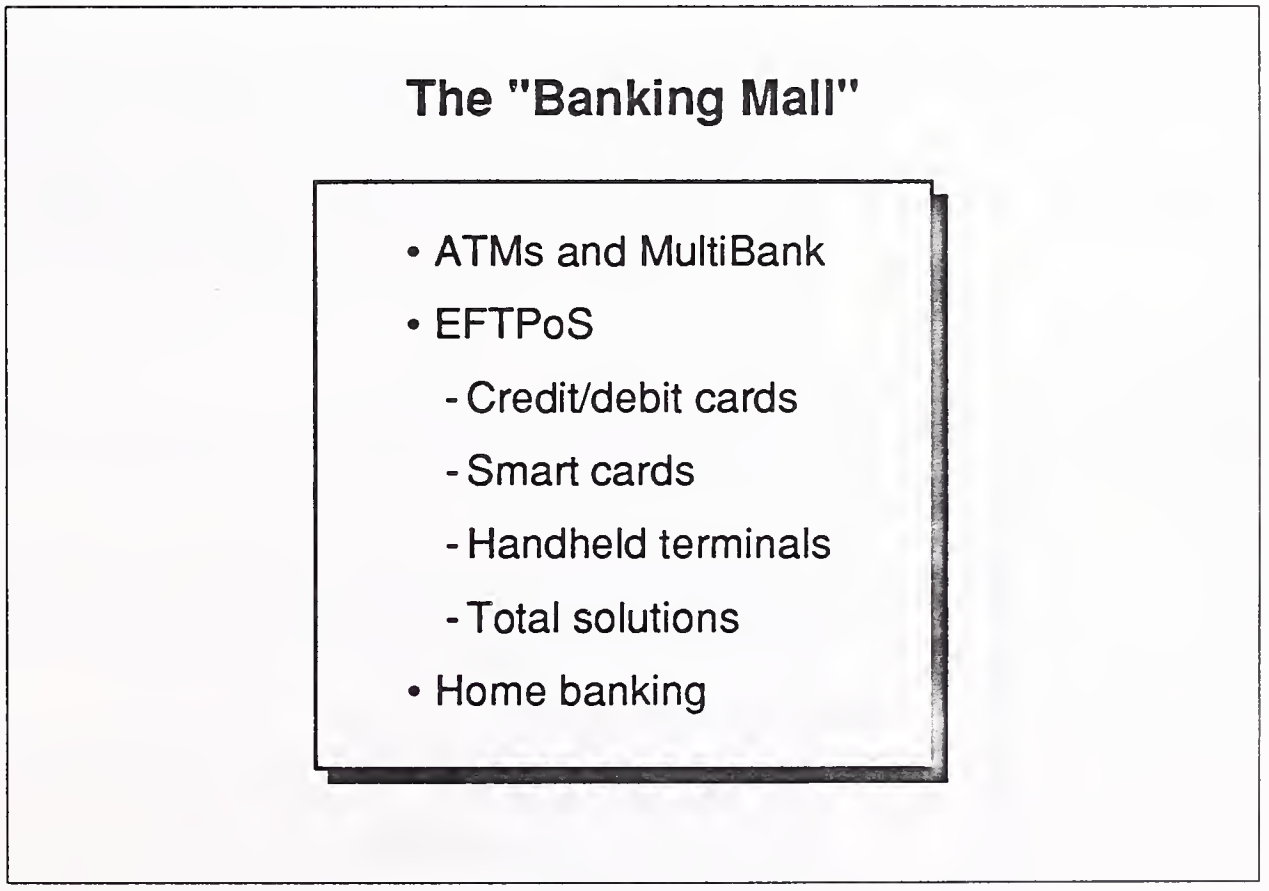
Many banks are therefore developing or considering developing PC access systems to sit on corporate financial managers' desks. In some countries, local videotex systems are used, such as in France and West Germany. However, for many corporate customers, the PC is preferred.

In addition to direct access by corporate personnel, the 1990s will see rapid growth in corporate computer access to banks via EDI. The demands of JIT in manufacturing can increase the number of invoices by a factor of 60 and decrease the lead time for processing orders through the whole delivery/payment chain to a matter of hours. In these circumstances, banks will have to front-end their EDI services with fault-tolerant equipment to ensure guaranteed corporate customer service.

4. The "Banking Mall"

For the private customer, banks are seeking to expand their range of products and services from just loans and credit to insurance, house financing, and investments, and even to holiday travel and consumer durables. The bank of the 1990s will become a financial shopping mall, as indicated in Exhibit II-14.

EXHIBIT II-14



Banks are experimenting with sophisticated ATM sites. In Scandinavia, the concept of the "MultiBank" has evolved. In Norway, Fellesdata is testing a unit which gives direct access to the customer's account and other databases through PIN authorisation, E-mail services for ordering

foreign currency, new chequebooks and even small loans, plus a teller printer to update passbooks, print vouchers and write letters. However, problems have been found in the OCR in the teller printer, and this will have to be changed.

Perhaps the most explosive opportunity for private client services is in EFTPoS. There are major moves by both retailers and banks to use debit rather than credit cards. Market research has indicated that over 75% of the public prefers cash to credit cards and will be prepared to substitute the debit card for cash.

Banks, therefore, see that a new boom could happen, with debit cards fuelling an exponential growth in cards and EFTPoS services. One of the most exciting opportunities is for handheld terminals. Belgium is testing on-line radio linking of handheld terminals, and the U.K. is testing replaceable memory modules with the intention that these can be used by any small local trader—whether fishmonger, restaurateur, or milk roundsman.

INPUT believes that there are major opportunities for vendors to offer not only EFTPos software solutions, but complete EFTPoS systems operations services.

At some stage, smart cards will be introduced. These have major attractions for banks as they allow the banks to exploit them using their own creativity. However, INPUT does not see that they will make any impact for at least 5 years. Similarly, home banking—which may have been a success in Finland for special climatic reasons—is unlikely to spread commercially throughout Europe until the mid-to-late 1990s.

I

Vendor Recommendations

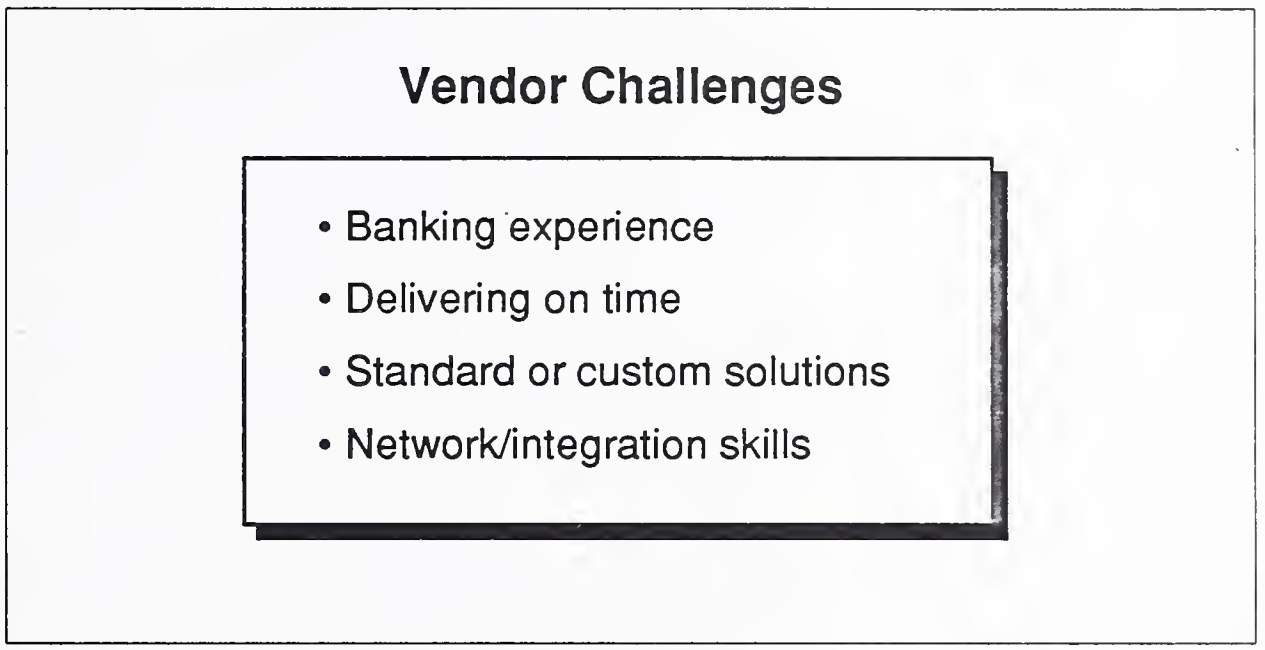
The challenges facing software and services vendors in the banking and finance markets in the 1990s are summarised in Exhibit II-15.

Vendors must have staff with banking and finance experience. Equipment vendors in particular have failed to do this in the past, and some have now realised that this was a mistake.

Banks demand that products and services be delivered on time. With the pressures on IS managers in banking and finance increasing in the 1990s to improve services and to stay in budget, the challenge to deliver on time will remain key to the success of vendors in this market.

Vendors need to decide whether they will target the standard total solution market—for small to medium-sized banks and securities houses—or custom solutions—for the larger banks and security exchanges. In both sectors, there will be niche market opportunities for specific software product sales.

EXHIBIT II-15

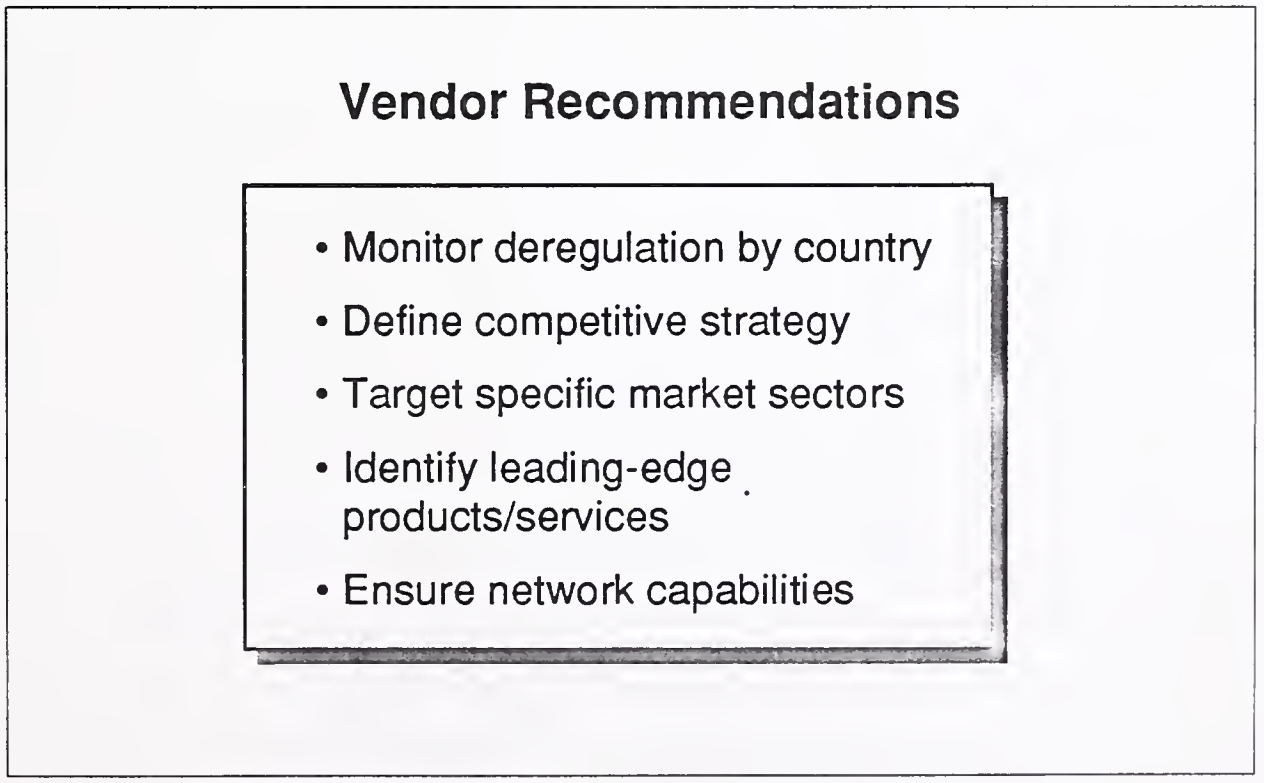


Whatever product or service is targetted, and whether securities or banking, vendors will need to have networking and integration skills in the 1990s. Networking skills will have to cover both LANs for branch offices or trading rooms, and WANs for interenterprise demands.

INPUT's recommendations to vendors are summarised in Exhibit II-16.

It is essential that European Commission legislation on deregulation be monitored closely, preferably via Brussels and DG XV. INPUT also recommends that the effect of this deregulation on each country to be targetted by an individual vendor be closely followed, as the local effects can be very specific to that national financial market.

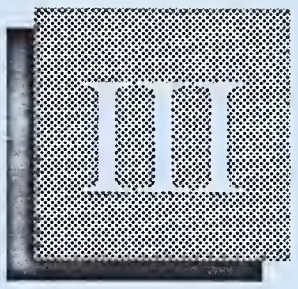
EXHIBIT II-16



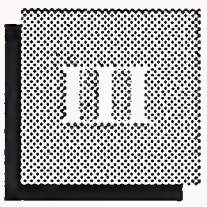
Specific banking and finance markets should be targetted. Many of the opportunities in the area of banking and finance are niche rather than general.

It is interesting that many of today's leading-edge products and services for banking and finance have not been developed in Europe, but in the U.S. and Japan. The banking and finance market is global. Before developing products and services in-house, vendors are recommended to look around outside of their national market—first around the rest of Europe, and then outside of Europe, to ascertain whether a similar concept already exists that could be imported and exploited profitably.

A final recommendation is to ensure network capabilities. The thread running through all banking and finance software and services markets is that of networking. The necessity of this skill—especially as a pan-European skill—will only increase, rather than decline during the 1990s.



Market Dynamics



Market Dynamics

A Overview

As was discussed in Chapter I, traditionally the West European banking and finance market has been made up by a number of discrete services supplied by specialist financial institutions. The structure of each national banking and finance market has been very different. In the Netherlands, retail banks offered not just high street banking facilities, but also holiday travel services. In West Germany, the private banks are the only institutions allowed to trade on the securities market. In France, a number of major banks have outsourced their internal IT departments, which are today some of France's leading software and services vendors.

In general, each national securities market was completely separate from the national banking sector. Most countries had just one major stock exchange, although countries made up of federal states, such as West Germany and Switzerland, had separate exchanges for each major region. Specialist securities houses offered broking and investment services in equities, bonds and other forms of securities. Specialist houses traded on traditional market floors during set trading hours.

By the second half of the 1980s, a number of European governments were beginning to free their national financial markets by introducing national deregulation legislation. The first to enact such national deregulation was the U.K. in the second half of the 1980s. As a result, a major restructuring of the financial markets throughout Europe began.

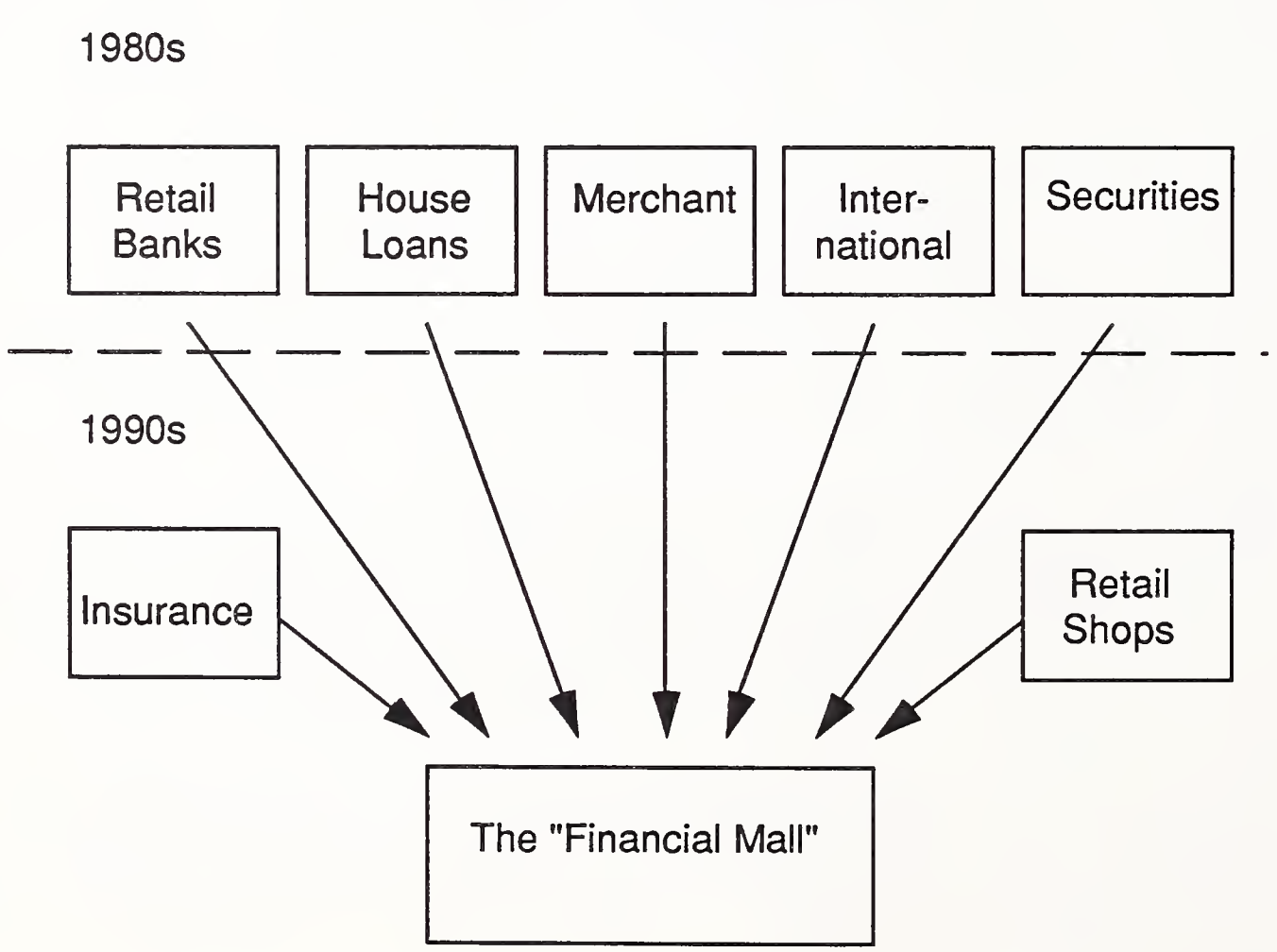
In the late 1980s, this move by a few national governments to deregulate was reinforced by the European Commission's Single European Act legislation. This legislation set the scene for all financial markets throughout the EEC to be deregulated by 1993, from traditional banking and securities through house finance and insurance institutions.

Financial institutions in all of these markets were faced with the prospect in the 1990s of direct competition from other financial institutions traditionally limited to other financial sectors. At the same time, the major retail shopping chains around Europe were improving the capture of customer information through better computer systems and their own credit cards. As a result these chains also started to look at the financial sector as a major new opportunity area. In France, the major food and clothing supermarket chain, Carrefour, has announced that it will develop its own bank.

As Exhibit III-1 illustrates, the structure of the banking and finance markets in the 1990s is going to be radically different from that in the 1980s. Not only are the traditional boundaries between the different types of banking and securities trading going to continue to blur, but also the boundaries between these sectors and the traditionally unrelated sectors of insurance and retail shopping will fade.

EXHIBIT III-1

Banking and Finance Market Structure 1980s and 1990s



In the 1990s, the concept of the single "financial mall" is evolving. All types of financial services are offered by a single organisation—current and loan accounts, home loans, investment, foreign exchange, insurance services and equipment leasing, even holiday travel and consumer goods.

1. The Single European Act

Exhibit III-2 lists the key developments within the EEC in the area of banking and finance. Prior to the Single European Act of 1986, the only progress was in the area of developing the European Monetary System (EMS) and the European Currency Unit (ECU).

EXHIBIT III-2

EEC Chronology for Banking and Finance Sector

March 1957	The Treaty of Rome creates the European Economic Community (EEC)
January 1958	The EEC comes into being
December 1978	Final agreement on a European Monetary System (EMS)
April 1979	The EMS is established, but not joined by the United Kingdom
January 1981	The European Currency Unit (ECU) comes into use
February 1986	Signing of the Single European Act
June 1988	1st Banking Directive agreed to by the Council of Ministers (agreement to free capital movements)
December 1989	2nd Banking Directive agreed to by EEC finance ministers (agreement on minimum supervisory standards and concept of the "single passport")

With the Single European Act, the European Commission moved quickly to develop specific deregulation legislation for the whole financial area—banking, house financing, securities and insurance. The First Banking Directive, agreed in June 1988, sets out the principle of liberalising capital movements throughout the EEC. This directive allows for the liberalisation of current and deposit account transactions, financial loans and investments.

The Second Banking Directive sets out the concept of minimum harmonisation supervisory standards for financial institutions and of the single passport for a financial institution in any member state. Through this directive, each member state will be responsible for home country supervision of financial institutions. Once an institution is established in one member state, then the single passport will allow it to automatically sell its financial products and services in any other member state. This legislation covers:

- Commercial banks
- Investment banks
- Co-operative banks
- Building societies
- Mortgage banks
- Other specialist banks

U.K. building societies, German BausparKassen and Danish mortgage institutions are already active in other member states. Retail banks are prepared to offer home loans for properties abroad, and international banks have expanded from operating in just a few EEC states to ensuring that they are in all member states.

There are national concerns about financial institutions from one member state being freely allowed to establish themselves in other member states. The European Commission is, therefore, setting out regulations and rules on credit worthiness that can apply throughout the EEC.

The Commission is also considering such issues as money laundering in a deregulated EEC. Not only does the European Commission wish to ensure that clear penalties are set by each national government for money laundering, but also the commission wants new systems to monitor the movement of money and identify fraudulent movements, especially related to drugs.

Exhibit III-3 sets out the main principle behind the European Commission's legislation for the banking and finance sector. By freeing the movement of capital between member states and demanding minimum harmonisation of standards, the European Commission will create an environment allowing established financial institutions to consider expanding throughout the EEC. By also invoking the single passport

EXHIBIT III-3

Key Principals behind the EC Banking and Finance Legislation

1. Complete freedom of capital movement between member states
2. Minimum prerequisite for harmonisation of supervisory standards by the European Commission
3. Authorisation for the establishment of a financial institution in one member state becomes the passport for that institution to be set up in any other member state

rule—a financial institution in one member state has the automatic freedom to also establish itself in any other member state—the traditional national barriers stopping financial institutions from moving into neighbouring member states will be torn down.

The planned date when this Single European Act legislation will come into force is 1 January, 1993. This date is less than three years away and is sending major shock waves through not just the financial markets of the EEC, but through the whole of Western Europe.

2. Fewer but Bigger Institutions

The number of financial institutions varies significantly from country to country within Europe. West Germany has some 4,000; the U.K. has only some 1,200, around half of which are branches of foreign banks in the City of London. Italy has some 1,200 domestic banks. In total there are some 10,000 financial institutions in Western Europe, of which some 500 are large European-owned banks. The top ten EEC banks are listed in Exhibit III-4.

Without any doubt this total of 10,000 is too high for a deregulated single European market and will be substantially reduced during the 1990s. The beginning of a major restructuring started in the 1980s. Today the restructuring can be seen with the creation of new regional banking groups and a merging of the larger banks in the smaller European countries.

EXHIBIT III-4

Top European Banks

Bank	Country	1988 Net Income ($ Millions)
National Westminster Bank	U.K.	1,705
Barclays Bank	U.K.	1,615
Lloyds Bank	U.K.	1,115
Banco Bilbao Vizcaya	Spain	785
Midland Bank	U.K.	760
Paribas	France	735
Crédit Agricole	France	680
Deutsche Bank	West Germany	676
Société Générale	France	590
Banque Nationale de Paris	France	535

In January 1990, the six largest Danish banks announced they are re-grouping into two new banks. Together these two will control 60% of the Danish market and will force major changes throughout the rest of the Danish banking market. In March 1990, the two largest Dutch banks, the Amro and ABN, announced they are going to merge. The new bank will be the sixth largest in Europe and will account for some 50% of the Dutch banking market.

In France there are moves for new regional groupings of banks, which have in the past been held back by state intervention. Crédit Lyonnais has acquired the Credito Bergamasco bank in Italy. However, in Italy the recent government reversal of the decision to privatise Italian banks has put a halt to the proposed merger of the Banco di Roma, the West German Commerzbank and one of Spain's leading banks, Banco Hispano Americano.

Recent national mergers have not been confined to the EEC. The prospect of a deregulated EEC is affecting the neighbouring EFTA countries nearly as much as those in the EEC. In Sweden during 1989, the PK

Banken acquired the stated-owned Investment Bank and, in February 1990, two of Norway's largest banks, the Bergen Bank and Den Norske Creditbank, announced they will merge. The new Den Norske Bank will be Scandinavia's seventh-largest bank. However, as a result of the merger, some 15% of the 8,000 employees will be cut.

These national regrouping of banks will over the next few years not only significantly reduce the number of individual banks, but also shrink the number of staff in banking and in-house computer departments. At the same time, regrouping will increase the average size of banks and the opportunities for external software and services vendors to sell services to the new larger banks.

It is highly likely that this merging of national banks is only the first phase in a major restructuring of European financial institutions. Once a restructuring at a national level has been completed, it is likely that the restructuring will move to an international acquisition phase in which the larger national banks expand throughout Europe by buying smaller banks in other European countries.

In addition to this mergers-and-acquisition activity within the banking sector, similar activity can be seen between different financial subsectors. The U.K. government deregulated the U.K. financial market in the late 1980s prior to European Commission initiatives. As a result, there have been major changes in the structure of the London securities market.

On the 27th October 1986, the London stock exchange launched a new electronic dealing system. Big Bang, as it was known, had very similar effects on the U.K. securities market to those now being seen throughout Europe due to the Single European Act. Large financial institutions took over the small old traditional securities houses. In the U.K., many of these purchasers were U.S. banks and were seen by many as a repeat of what happened when Wall Street went electronic. Again, the big retail banks acquired local securities houses.

A repeat of these trends can be expected elsewhere in Europe. Because of the complex interconnections between banks, government and industrial organisations, it has been difficult for foreign companies to take over companies in many European countries. The U.K. financial and industrial institutions have traditionally had a simpler and more open structure and hence mergers-and-acquisitions activity has been far higher in the U.K. than in other European countries to date. The European Commission's Single European Act legislation is expected to make it easier to acquire companies throughout the EEC, although the complex interlinking of companies will continue to be a barrier to hostile acquisitions in certain countries.

The effect of this restructuring of the banking and finance market on the software and services market will be considerable. Exhibit III-5 summarises the key effects, which INPUT sees as:

- Fewer, but bigger clients
- Short-term increase in supply of IS personnel as financial institutions cut back internal staff following mergers and acquisitions
- New opportunities for third-party vendors to assist financial institutions to:
  - Restructure internally following mergers and acquisitions
  - Integrate the multifunctional systems needed for the "financial mall" for banking clients
  - Become more pan-European
- New competition from:
  - Foreign software and services vendors expanding through Europe as their clients become more pan-European in a deregulated market
  - Nontraditional banking and finance vendors entering the banking and finance sector:
    - By themselves
    - Through their traditional clients moving into banking and finance
    - Traditional banking and finance vendors owned by groups of banks looking to sell their services to the open market rather than just to their shareholders
  - Financial institutions:
    - Setting up joint ventures with independent vendors to exploit in-house products and services
    - Spinning-off in-house IT departments as separate independent vendors
- Mergers and acquisitions within the software and services banking and finance sector, with a small number of large vendors maintaining or increasing their share of total revenues

EXHIBIT III-5

Repercussions of EEC Restructuring on the Information Services Industry

- Fewer, but bigger clients
- Short-term increase in supply of IS personnel
- New opportunities for existing vendors
- New competition from nontraditional vendors
- Mergers and acquisitions between vendors

The new bigger financial institutions of the 1990s will have a broader base of financial services and will no longer be confined to a single country. It will often be impractical for financial institutions to develop all the necessary in-house expertise to develop and manage the bigger and more complex systems needed for these new international products and services. There will, therefore, be many major new opportunities for third-party vendors to assist financial institutions—not only after major restructuring, but as an ongoing service in the 1990s.

Just as the banking and finance markets will undergo a major restructuring during the 1990s due to the Single European Act, so will the associated computer software and services industry. Foreign software and services vendors specialising in banking and finance will enter new national markets as the financial institutions that are their clients expand through a deregulated Europe. New software and services vendors will enter the banking and finance sector from other industrial sectors or will be brought in as their traditional nonbanking clients move into banking and finance.

Mergers and acquisitions in the banking market may well force vendors owned by groups of banks to look more to the open market, rather than just to their shareholders. This opening could be a natural development for such vendors in the more-open market-place of the 1990s, or could be forced on vendors if the financial institutions that are the vendors' shareholders are directly involved in mergers and acquisitions. The recent merger of the six largest Danish banks has already forced PBS, the central processing centre for Danish savings banks, to review its strategy and selection of clients in the 1990s. PBS is, therefore, having to consider whether it should be offering more open-market services.

Financial institutions may try spinning off their IT departments as separate companies in the 1990s to benefit from the new opportunities that deregulation will bring, or at least setting up joint ventures with independent vendors to exploit the financial expertise that these institutions have built up over the years. Many of the U.K. major retail banks are considering exploiting their internal networks. The Midland Bank already has set up FASTRAK as a third-party VAN. A number of financial institutions are already trying to exploit their in-house developments by licensing third-party vendors to market these developments, sometimes via joint ventures.

A number of financial institutions have developed systems written in the Unisys fourth-generation language LINC and are looking to market these solutions on the open market—either themselves or through a third-party vendor. The Skipton Building Society is planning to market its recently developed mortgage administration package developed on LINC. Similarly, NMW has developed EQUITY, a packaged solution for securities houses, in conjunction with IBM and Winterflood Securities, which NMW will market worldwide.

In addition to new vendors entering the banking and finance sector, there will be many mergers and acquisitions within the existing software and services industry serving this sector over the next few years. The banking and finance sector is characterised by a small number of large vendors that control a very significant proportion of total revenues. INPUT sees that the strength of particular key vendors will continue, if not increase—especially key equipment vendors.

B

Securities Market

The securities market by its very nature is a risk business. It is highly volatile; expenditures are often directly linked to the current state of the local stock market.

The world stock market has been going through a periodic downturn since 1987. The start was Black Monday, 19th October 1987. The fortunes of the stock market tend to follow the world business cycle, which traditionally has a periodicity of some 4 to 5 years. After two years of slowdown, there are signs that 1991 should see an upturn in the world business cycle and hence stock markets.

It is all too easy for software and services vendors to ignore these cyclical effects and be caught by what appears to be sudden downturns in their fortunes. In reality, these downturns are reasonably predictable traditional cyclical movements in customer businesses.

1. The Electronic Stock Exchange

Exhibit III-6 illustrates the different development phases of the major West European stock exchanges as they move from the old traditional floor-based trading and manual settlement and clearing systems to new electronic systems.

EXHIBIT III-6

Development of Leading European Electronic Stock Exchanges

• London	- Dealing 1986 (SEAQ) - Settlement 1992 (TAURUS)
• Paris	- Dealing/Settlement in major shares 1986 - Full development 1991 (RELIT)
• Frankfurt	- Dealing for major shares 1990 - Settlement for major shares 1970
• Copenhagen	- Dealing/Settlement 1988
• Amsterdam	- N/A
• Brussels	- Dealing/Settlement for major shares 1989
• Madrid	- Dealing/Settlement for major shares 1989
• Milan	- Dealing/Settlement for shares 1991
• Zurich	- Options and future 1987 - Dealing for banks 1991/92

It can be seen that the first steps by different bourses in developing into the complete electronic stock exchange have been made only over the past few years. The London and Paris markets were the first to install electronic systems in 1986. However, Frankfurt has had an electronic settlement system since 1970.

In retrospect, many exchanges have seen that London's single-step move into electronic dealing with Big Bang was too risky and have opted for a step-by-step development path, such as in Amsterdam and Paris. The first step has often been to introduce electronic systems for just the major

securities, or just the major equities. In most cases, the plan to introduce the full electronic stock exchange will not be completed until 1991 to 1992 at the earliest. In France, the monopoly of brokers is only being gradually phased out by 1992 to allow banks to buy into brokerage houses.

Not only is one seeing this fundamental switch from traditional to electronic systems for both dealing and settlement, but already individual exchanges are being forced to review their plans to consider upgrading their central electronic systems. The prospect of a deregulated EEC after 1992 is creating growing competition between separate stock exchanges and these exchanges are having to consider how they will be able to offer the most advanced technology for specific financial instruments—equities, bonds, futures, etc.—to attract traders.

The International Stock Exchange in London sees itself as the leading exchange in Europe for equities. Germany has been traditionally strong in bonds. Denmark is looking to become the gateway into the EEC for Nordic securities trading; the Danish government has funded the development of an electronic stock exchange in Copenhagen with that prime intent and to develop invisible export earnings.

Exhibit III-7 illustrates the breakdown of the total securities trading volume for Western Europe in 1989 by major geographic region. London is by far the most important exchange and accounts for some 40% of the total. Frankfurt accounts for some 70% of the total German market and some 20% of the total West European volume, followed by Paris at 10%. Although this exhibit does not attempt to show the breakdown of current electronic trading, it does indicate where the potential lies.

For individual securities houses, each step down the road to the full electronic stock exchange by the central exchange and each upgrade of the central dealing or the settlement system forces the house to install or upgrade its internal electronic system. The growing competition between bourses in the 1990s will therefore significantly stimulate the software and services market.

2. Local Development Strategies

a. London

On 27th October 1986, Big Bang was launched in the London International Stock Exchange (ISE) with the introduction of the electronic trading system for domestic equities (SEAQ) and for international equities (SEAQ INTERNATIONAL). Both systems moved trading from the old exchange floor to screen-based systems.

EXHIBIT III-7

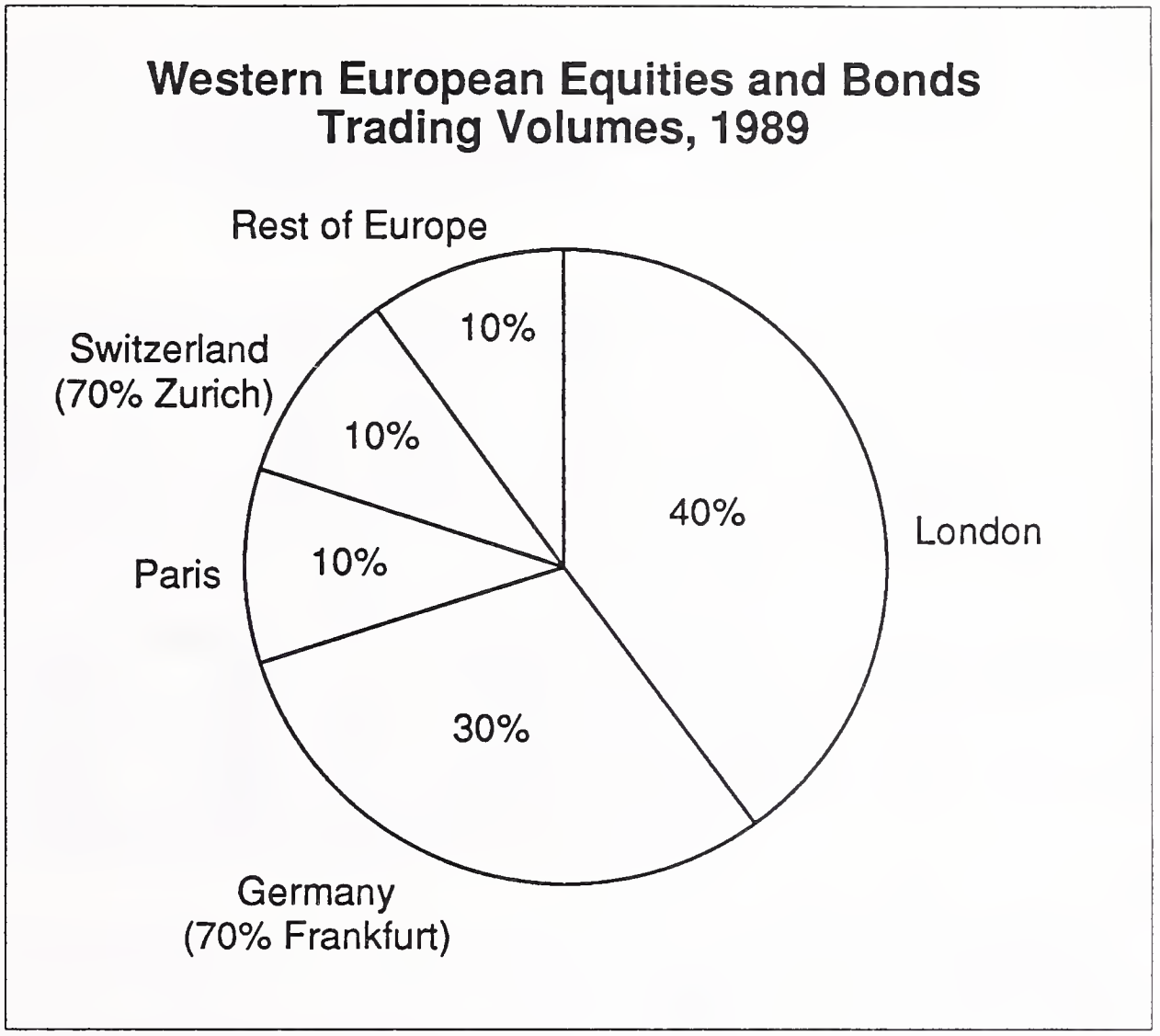


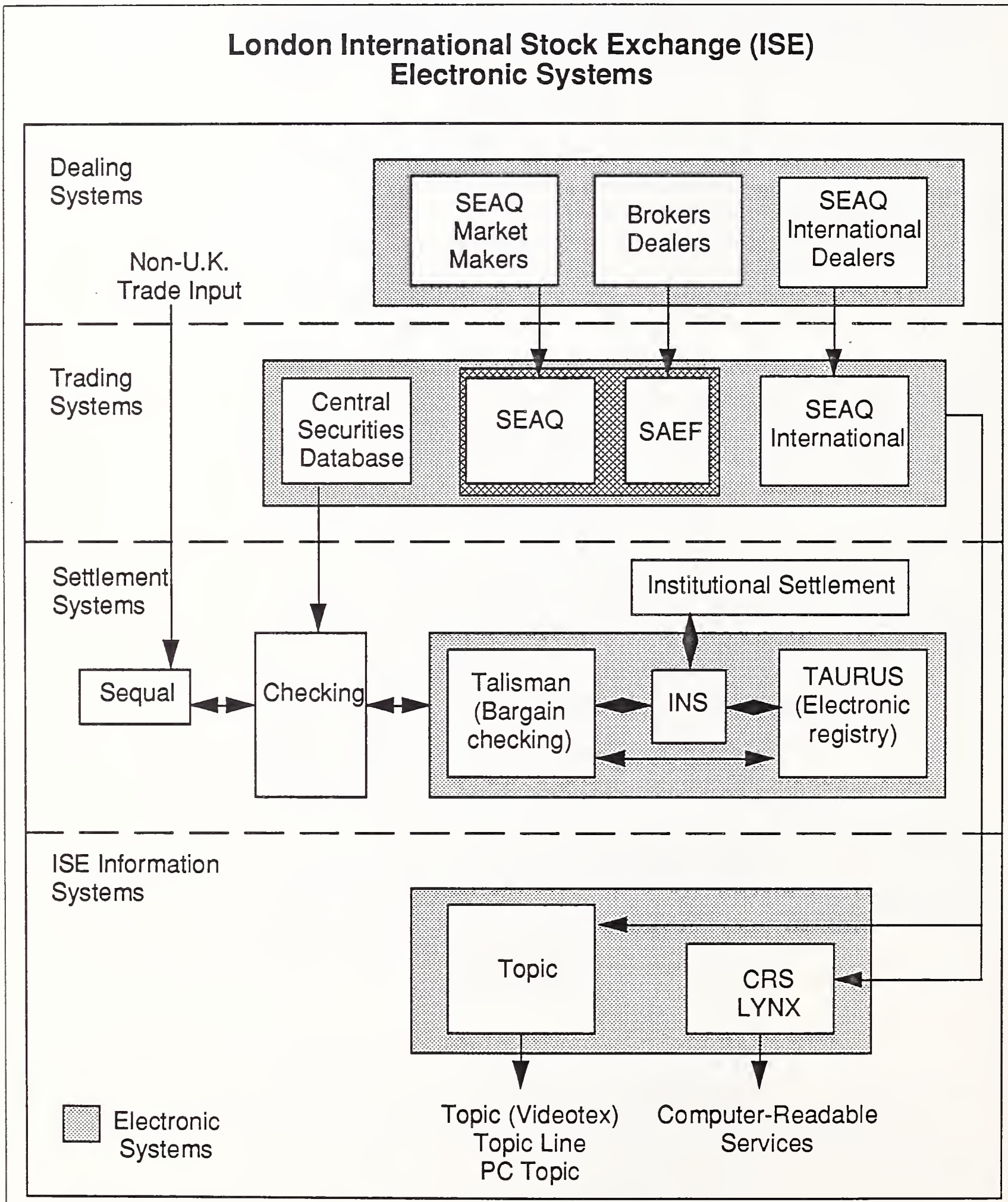
Exhibit III-8 illustrates the main systems in the ISE. SEAQ covers over 2,500 stocks and SEAQ INTERNATIONAL some 700 non-UK securities. Within SEAQ, small orders can be completed electronically at the best price through SAEF (SEAQ Automatic Execution Facility). Market makers and dealers link directly into these three trading systems.

These trading systems are backed by the exchange's price and news information system (TOPIC), which was developed about 1980. Today TOPIC has some 15,000 users and includes not just current prices, but also information bulletins from different securities houses, overseas price information (e.g., NASDAQ and Telekurs), LIFFE financial futures information and foreign exchange rates.

TOPIC is delivered to end users directly via videotex or PC format. TOPIC can also be supplied as a direct data stream. SEAQ and SEAQ INTERNATIONAL information is fed directly into TOPIC via CRS LYNX, which acts as a distributor of trading information to a variety of end users. TOPIC is currently being upgraded from its original Modcomp hardware to Stratus to eliminate the 5- to 10-minute downtime after any failure, reduce the 50-second delay in updating prices and increase capacity.

EXHIBIT III-8

London International Stock Exchange (ISE) Electronic Systems



The ISE's electronic settlement system TALISMAN, launched in August 1988, is to be enhanced with the electronic share registry system, TAURUS. The infrastructure of TAURUS is planned to be completed by mid-1991, and shares will be completely dematerialized by the end of 1993. The total development cost of TAURUS is estimated to be £45 to £50 million.

In January 1989, the Association of International Bond Dealers (AIBD) launched TRAX (Transaction Exchange System) for Eurobonds. TRAX was based on software developed by Admiral Software and modified by the AIBD. The system runs on Tandem equipment. TRAX is primarily an electronic reporting system and deals are fed into the settlement system ACE, which was jointly developed by the two Eurobond clearing-and-settlement organisations, Cedel and Euroclear.

There are proposals to merge TRAX and ACE into a joint service, TRACE. Network links would have to be established between the two currently separate systems. GEIS, the network services supplier for ACE, is working on a proposal. Non-U.K. Eurobond dealers can already link into TRAX in the U.K. An X.25 link has been established in Amsterdam for Dutch dealers.

The immediate effect of the Big Bang was to substantially increase trading volumes in the London market. This growth lasted a year. On Monday, 19 October 1987, world stock markets crashed. Black Monday, or Big Crash, saw volumes slashed by some one-third in London which still have not yet fully recovered.

The effect of these two events on key software and services vendors has been considerable. Prior to Big Bang, vendors saw the ownership of their traditional clients change from independent partnerships to international banks. With the strength of IBM in the banking world, the computer strategies of many of these firms began to favour IBM equipment. In the period following Black Monday, a number of these securities firms have closed, again radically changing the structure of the U.K. market for specific software and services vendors.

U.K. companies like NMW and Quotient offered back-office processing services for securities firms. SD-Scicon, with its Deal Information System (DIS), and Data Logic, via its package the Aztec Trading Room System, developed custom front-office trading systems. All grew exceptionally fast in the period leading up to Black Monday, but all have suffered serious financial losses since October 1987.

NMW's revenues fell from a peak of some £20 million in mid-1987 to £9 million in 1989, and Quotient's revenues dropped from £23 million to £19 million between 1988 and 1989. Although NMW had moved into profit in 1989, Quotient was still reporting losses of £1.6 million.

Data Logic (owned by Raytheon of the U.S.) has not been affected by Black Monday as were other U.K. securities vendors. Only some 40% of its revenues were from securities markets. Revenues for 1988 were up some 10% on £40 million for 1987, at £44 million. However, in early 1990, Data Logic has been forced to cut back and announced a 20% reduction in staff.

It has taken until 1990 for the fortunes of many vendors in the London securities market to turn around. In early 1990, the ISE itself reacted to the effects of the late 1980s and announced that it would be cutting back some 15% of its 3,000 employees, of which 150 would be computing personnel. It was announced that it would be changing its policy and looking to outsource new technical development where possible—a good sign for software and services vendors for the 1990s. In response to the growing competition from Paris and Frankfurt, in April 1990 the London-traded options market, LTOM, and the London international financial futures exchange, LIFFE, agreed to merge.

At last, there may be a revival in the London market. Most vendors have overcome the problems of Black Monday; the London International Stock Exchange is finalising its plans for TAURUS. The world business cycle seems to be bottoming out, and so 1991 should start to see a stock market recovery.

b. Frankfurt and Other German Bourses

Although Frankfurt is the second largest exchange in Europe, it is far behind London and most other bourses in the development of electronic systems, as it has yet to install any electronic dialing systems. There are eight exchanges in Germany. Frankfurt is by far the largest and has some 70% of the total German trading volume.

Frankfurt has had a very efficient electronic settlement system since 1970. This system allows a two-day delay in settlement, as compared to the current minimum two weeks in London. However, as with many other European exchanges, a significant proportion of Frankfurt's local trading is channelled via London and has much catching up to do. To compete effectively Frankfurt has to reduce commission rates, extend trading hours, and introduce competitive electronic systems.

In August 1989, an electronic futures and options exchange, Deutsche Terminbourse (DTB), began trading. DTB has been established by 53 German banks, of which 24 operate as market makers. Because software for options trading could be readily bought from the Swiss options and Futures Exchange, DTB started with just stock options. Andersen was awarded the contract to modify the software for DTB. Bonds and stock futures trading is planned to begin in August 1990.

The DTB host system runs on Digital equipment and traders link in via Digital or IBM equipment. In Germany, IBM dominates the banking market with some 75% of back-office systems; there has been resistance to the Digital option.

In December 1989 the Deutsche Wertapapierdaten-Zentrale (DWZ) launched Inter-Bank-Information-System (IBIS) for all eight German exchanges. DWZ is ultimately owned by the major German banks. DWZ has developed IBIS itself, with initial assistance from IBM. All future developments will be handled in-house, rather than by using external vendors.

Participating banks are German-owned or branches of foreign banks. They link into IBIS through the IBM LU6.2 communications protocol and standard IBIS message formats. As with DWZ, the majority of German banks have and will develop most of their dealing systems in-house.

The current initial phase of IBIS is a pure information system covering the major 30 German blue chip equities, to be shortly followed by the leading 30 German bonds in Autumn 1990. Phase 2, which should be launched by the end of 1990, will also cover electronic dealing.

IBIS is competing with the Makler-Tele-Information-System (MATIS), owned by brokers and delivered by Reuters. Quotron is planning to launch its competitive system, MIDAS, in mid-1990.

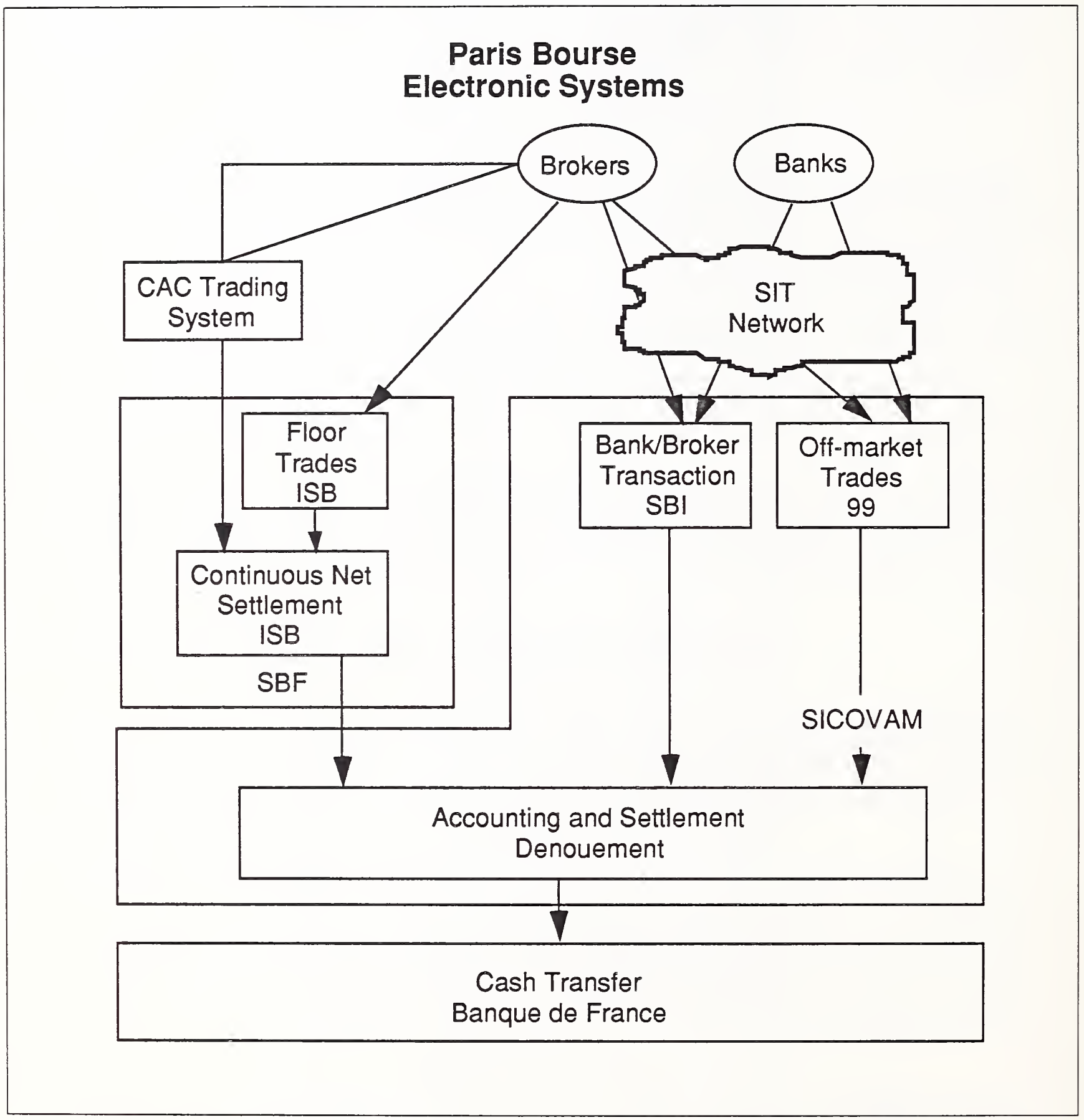
DWZ sees that, although the German bourses have moved into the electronic era some 3 to 4 years behind London and Paris, the PIPE project (see section 3 below) is the door to Europe for the German exchanges. Competition from London and Paris is not seen as the major problem, but the federal structure of the German market, with eight different competing exchanges, creates fragmentation and slows development.

The reactions of the smaller German bourses to EEC deregulation and the introduction of full electronic dealing systems are mixed. The smaller exchanges—such as Bremen, Hanover and Stuttgart—fear that they might be forced to close.

c. Paris and Other French Bourses

Exhibit III-9 illustrates the different electronic systems planned for the Paris bourse. The Computer Assisted Continuous (CAC) trading system was launched in June 1986. CAC is based on the CATS system of the Toronto Stock Exchange. In January 1989, the Lyons brokers were linked. Plans are in hand to bring in dealing from Bordeaux, Lille, Marseilles, Nancy and Nantes. CAC is run by the Société des Bourse Françaises (SBF).

EXHIBIT III-9



The Paris financial futures market is MATIF. It started trading in 1986 and by 1987 had outstripped the London ISE's equivalent, LIFFE. However, some 15% to 20% of French bonds and equities trading is still done in London.

The major new development by the Paris exchange is an electronic settlement/delivery system, RELIT (Réglement-Livraison de Titres). Work started on RELIT in 1987 and it has four distinct subsystems:

- ISB (Inter-Sociétés de Bourse)—the clearing function for brokers
- SBI (Sociétés de Bourse-Intermédiares)—the clearing function between banks and brokers
- G/G (Gré à Gré)—matching of trades for all participants
- Denouement—settlement for all participants

ISB is similar to the North American clearing system. All messages, except those of ISB trades, are transmitted in standardized form over the dedicated SIT Bourse network. This network is a remodelled version of the cash-clearing network used by the French banks.

RELIT is planned for launch in early 1991. Andersen was the project manager for the first three stages and has involved some 350 banks and 45 stockbrokers. For the last stage, Andersen will co-operate with other vendors—such as Cap Sesa Finances, SG2, Sligos, Unilog, Tibet (now owned by Sema), GFI (owned by SD-Scicon) and Steria—to integrate all the different systems.

The network is owned by the Paris bourse, SIT, and will interconnect banks and brokers through Bull and Digital stations. The French market sees that with the completion of RELIT, Paris will have a significant advantage over London. Until TAURUS is fully working, Paris will be able to capture business from London.

d. Other European Exchanges

Other European stock exchanges are gradually developing into full electronic exchanges. Most are moving step-by-step, starting with the major shares.

Copenhagen's electronic systems went live in May 1988. As part of the Danish government's strategy to increase invisible exports, Copenhagen is planning to attract much of the rest of Scandinavia's trading volume with the EEC. Already some other Scandinavian financial institutions have joined with Danish broking firms.

In Finland, an agreement to develop an electronic equity trading system for the Helsinki exchange was made with the banking unit of Tietotehdas in 1988. In 1989, an additional agreement with Tietotehdas and APC-Keskus was reported to develop a central clearing system for the Helsinki exchange.

Brussels has followed Paris and installed the Toronto-developed CATS system. Andersen was again involved in the development, and electronic trading first started in January 1989. By mid-1990, all 500 Belgian and foreign stocks are planned to be on the system. The next phase of development will be to launch the OBLICATS system for bonds.

Amsterdam is currently upgrading its computer system, HOS (trade-underpinning system), following a number of serious breakdowns in 1989. New software has been acquired from the Midwest Stock Exchange in Chicago and modified for the Dutch environment. HOS will run on Digital equipment.

All the four Spanish exchanges—Barcelona, Bilbao, Madrid and Valencia—have also opted for CATS. The Madrid system went live in August 1989 and has increased its share of the total Spanish securities trading volume. This change is stimulating other exchanges, in particular Barcelona's, to fight back, and the concept of an Iberian-peninsula system that links the four Spanish and the two Portuguese exchanges (in Lisbon and Oporto) into a single dealing system is now being discussed.

Italy has yet to agree to plans for electronic systems for its ten exchanges. In mid-1989, the first steps were made with the creation of the Generale Telematica per la Borse Valori Italiane (GTB). This joint-venture company between the Italian banks and an association of stock brokers is charged with developing electronic systems for and between the Italian exchanges. The electronic infrastructure has been in place in Milan for some three years. However, no firm plans and launch dates have yet been announced, since agreement has yet to be reached as to which types of financial institutions will be allowed to trade these systems.

3. Pan-European Plans

As European stock exchanges rapidly move to deregulation in the EEC market, the first signs of a major restructuring can be seen. Many of the small regional exchanges will have to close or merge with the leading national exchanges in order to compete. The remaining exchanges will have to specialise in specific financial instruments or local stocks and bonds.

As Germany and the Iberian peninsula accept that collaboration or rationalisation of local exchanges must be considered, there are moves within the EEC for joint development of the major national bourses. In addition to Copenhagen's attempt to become the centre of Nordic securities trading, Oslo is looking at an intra-Scandinavian information system.

The Federation of Stock Exchanges of the European Community (FSEEC) in Brussels is planning to develop a Europe-wide, not just EEC-wide, electronic equity information service, followed by a pan-European equities-dealing system. PIPE (Price Information Project Europe) has been put out to tender. The short list of possible designers includes ADP, Andersen, EDS, GEIS, Price Waterhouse and Quotron.

It is interesting that neither of the two market leaders in electronic equity information, Reuters and Telerate, is on this list of tenders for PIPE. Both would be significantly affected by the FSEEC's developing a electronic pan-European equities information system.

At the pre-tender stage there were various reports of attempts by some of the European exchanges themselves to break ranks and tender—London, Frankfurt, Paris and Stockholm have all been mentioned in the press. If any one of them were awarded the project, it might put that exchange at an unfair advantage over other European exchanges.

There is growing open competition between the major bourses to gain the long-term supremacy within a deregulated Europe. In March 1990, the London International Stock Exchange made an unexpected offer to the German Federation of Stock Exchanges to join forces and become the dominant joint exchange. This offer was not-unexpectedly rejected by Germany as being un-European.

4. Opportunity Areas

Opportunity areas in the European securities market in the 1990s will stem from a number of prime areas, as is indicated by Exhibit III-10. The initial opportunities for software and services vendors will be in assisting their local bourse and local securities firms to develop local systems. However, as competition between European bourses gains momentum, INPUT believes there will also be considerable opportunities for vendors to assist bourses and securities houses to link into other bourses' systems.

EXHIBIT III-10

Major Opportunity Areas in European Securities Markets

- Assisting individual bourses to develop:
  - The electronic stock exchange for all financial instruments
  - Interlinking information and dealing systems between regional and Europeanwide exchange groupings
- Selling, supporting and upgrading systems for individual Securities houses:
  - For their local bourse
  - For linking to other European bourses for specific financial instruments

Exhibit III-11 illustrates the different opportunity areas within a single securities house and Exhibit III-12 shows the opportunity areas within a specific bourse. If vendors are targetting products and services in securities houses, there is considerable scope for software product solutions for back-offices, as well as custom-developed solutions for front-offices. As opportunities develop for securities houses to link into neighbouring exchange systems, vendors will have to be able to offer pan-European networking and integration skills.

If vendors are targetting systems for the exchanges themselves, they must plan to offer systems integration skills, not just at a local level, but also on a multinational, pan-European basis.

EXHIBIT III-11

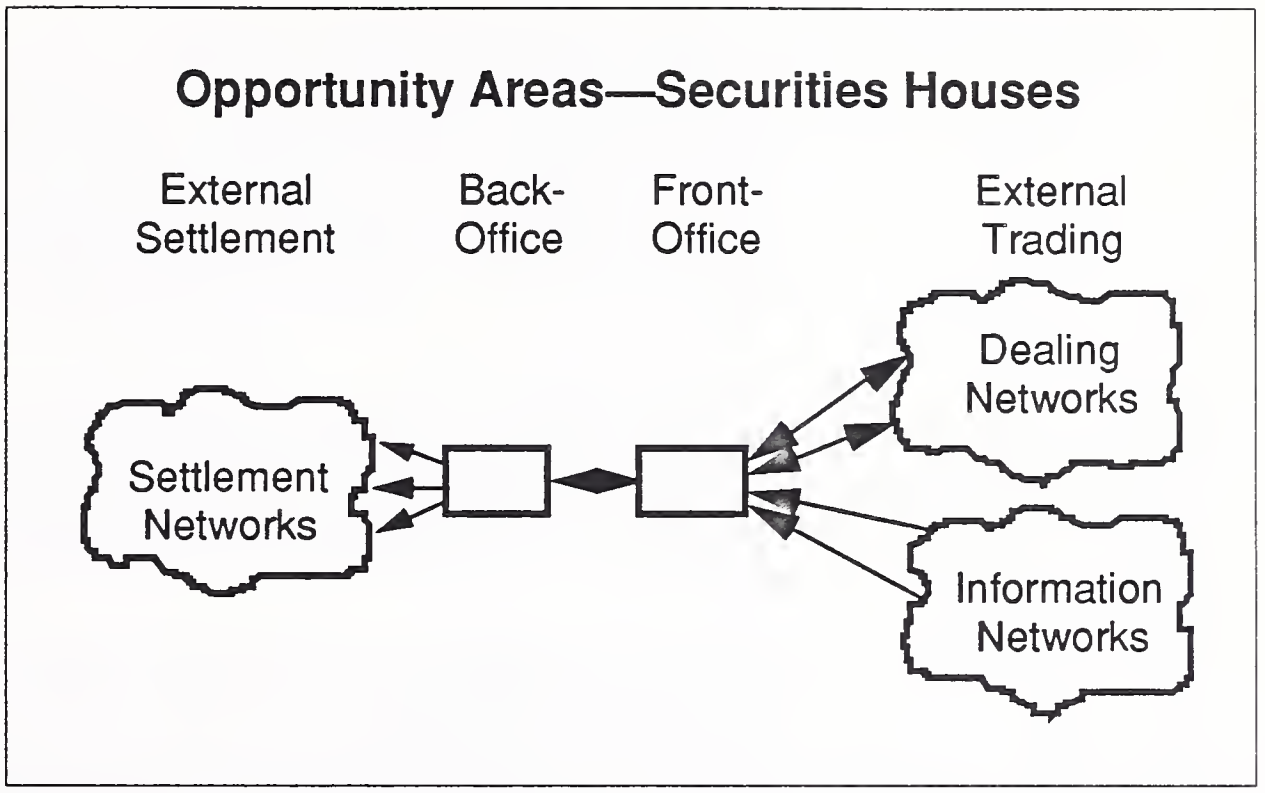
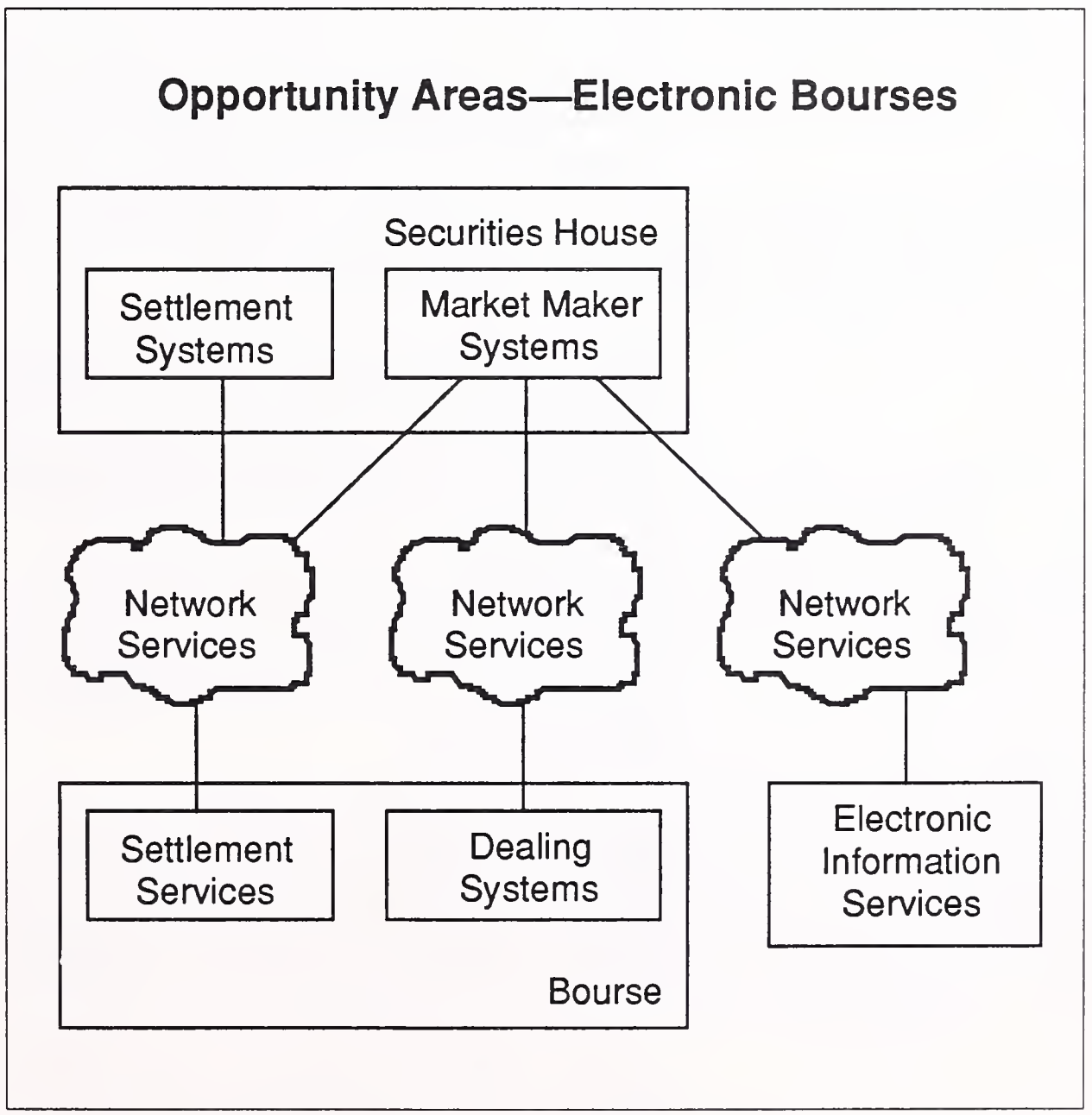


EXHIBIT III-12



a. Back-Office Solutions

With London securities houses having invested very heavily for Big Bang in 1986 and then been faced with a major downturn of the market a year later, it is no wonder that there has been little activity in new firms entering the London market and little activity in new back-office systems.

Traditional back-office processing vendors such as NMW and Quotient suffered major revenues losses following Black Monday. As is discussed in the NMW profile in chapter IV, NMW's revenues have dropped from a peak of some £20 million in mid-1987 to £9 million in 1989.

Similarly, software products vendors of back-office systems have seen little growth in sales since 1987. U.K. vendor BIS, with its MIDAS financial institution package, sees little growth potential in London in the short term, but good prospects elsewhere in Europe as more exchanges go electronic.

MIDAS is available on IBM S/36, S/38 and AS/400 midrange equipment. It is a full integrated back-office package for foreign exchange, securities, financial futures and options, money markets, corporate and private banking. It provides general-ledger, statutory returns and risk management facilities. It integrates into the front-office BIS MIDAS DRS (Dealing Room System).

McDonnell Douglas Information Systems has developed a similar integrated international banking package suitable for securities back-office systems on Digital equipment. Its product range is called the GLOBAL BANKING SYSTEM and integrates into front-office modules for portfolio management, trading room systems and credit management.

In France, Tibet was set up by the SBF to specifically develop back-/front-office solutions for the French securities market in 1987. Some 25 brokers have signed up for Tibet packages to date and each has retained a small percentage in the company. In February 1990, 49% of Tibet was acquired by Sema.

Tibet offers back-office processing services for the smaller securities houses and a range of software products for the larger. Its software products range is titled INVESTICIEL. It also provides consultancy, training, maintenance and systems operations services. It is looking to develop disaster recover services for the Paris market.

It is interesting to note that Sema has a number of shareholdings in vendors involved in the banking and finance market. Sema also has a 50% involvement in the EFTPoS software vendor BASE24 since January

1989, through CAP Group's involvement with BASE24 prior to the merger of CAP and Sema Metra. In recent months, Sema has acquired shares in:

- Tibet (France, 49%)
- ADV-Orga (Germany, 51%)
- ENMID (Germany)
- Abacus (Italy)

Through its acquisition of ADV-Orga, Sema has established a long-term partnership with Commerzbank. Sema also has a 20% holding in the French banking and finance vendor Axone, along with IBM (45%) and various French banks (35%).

b. Fault-Tolerant Processing

As the pressure on fast settlement and clearing gains pace in individual exchanges, especially with the introduction of electronic settlement and clearing systems, there is pressure on securities houses to move their back-office systems to fault-tolerant equipment. Front-office systems demand high guaranteed availability and thus front-office fault-tolerant processing has already become standard for many securities houses.

Stratus is undoubtedly the leading fault-tolerant equipment vendor in the U.K. securities market with its equipment in some 90% of London securities firms. Through its OEM agreement with IBM, which resells the Stratus minicomputer under the title of IBM System/88, some 35% of Stratus' worldwide sales have traditionally been made by IBM, although this percentage has recently dropped to 25%.

The move towards fault-tolerant back-office equipment is not just due to the pressure to ensure fast settlement and clearing. Having installed fault-tolerant front-office equipment, securities firms have began to appreciate the benefits of having nonstop processors and are questioning why they should have traditional processors with 7 days per year unpredictable downtime in an environment where time can all too readily be equated with money.

In the U.K., NMW has over the past two years developed an integrated package: EQUITY, on IBM System/88 in conjunction with Winterflood Securities and IBM. Initially this integrated package is just for U.K. equities, but will be expanded to the foreign exchange market. Because of the trend of banks' buying securities houses and the strength of IBM in the banking sector, NMW chose System/88 rather than Tandem as its platform. NMW is planning to sell this package internationally.

In April 1990, Stratus launched its fault-tolerant mainframe with new high-end machines in the XA2000 series—models 2260 to 2860. For software and services vendors in the securities market, this launch is an extremely important development: alongside the launch of this hardware, Stratus also released the associated Platform/2000, which is described by Stratus as a "backbone software platform product."

Platform/2000 has its own development tool kit and communications protocols built in. Platform/2000 will allow software developers to integrate different separate software packages onto one platform relatively easily. For the securities market this feature means that the various different back-office settlement and clearing systems, plus front-office trading systems, can be pulled together onto one fault-tolerant processor, even if each package is supplied by different vendors.

In addition, Platform/2000 has built-in transaction monitoring facilities that allow additional umbrella functionality, such as risk management, to be added. For securities firms, the prospect of a single fault-tolerant processor managing all their activities, plus giving them overall management functionality, must be an attractive prospect. However, as with many of the latest developments in fault-tolerant processing, such solutions are just not available off the shelf. There are, therefore, considerable opportunities for vendors to develop the relevant integration skills and total solutions on the XA2000 for securities houses.

With Digital launching its fault-tolerant machine, the VAXft 3000, in February 1990, there are now three major fault-tolerant equipment vendors in the market—Digital, Stratus and Tandem. Digital is strong in front-office systems in a number of securities markets with its traditional strength in LANs. A choice of fault-tolerant platforms gives software and services vendors greater choice of platforms on which to develop specific solutions.

Many smaller securities firms, especially those not owned by a major bank, should be seriously looking at disaster recovery services for fault-tolerant processing in-house. In the U.K. market Sema and Nexus Payment Systems have established disaster recovery services for Stratus equipment in the securities market. Reports indicated that out of the 60 to 70 Stratus sites in the U.K., fewer than 50% have disaster recovery.

c. Front-Office Integration

As Exhibit III-11 indicates, front office systems for securities houses have to be highly complex and to link into a variety of electronic information services (EIS) vendors—Reuters, Telerate, Extel, Quotron—as well as log into different trading systems for specific trading positions.

EIS vendors such as Reuters and Telerate also supply turnkey systems for dealing systems. These vendors supply their proprietary equipment and support equipment and software. For the smaller firms, individual trading positions have their own Reuters or Telerate terminals. For the larger firms, it becomes preferable to acquire the different information services digital streams and to manage these via a custom-built front-office system. This system can be designed to ensure that regularly used screens are constantly refreshed and made available more easily to traders than are the less frequently used information screens.

U.K. vendors such as SD-Scicon, Logica and Data Logic have all developed custom development services in this front-office market, as have Cap Gemini Sogeti and SG2 in France. Data Logic also suffered from Black Monday in the U.K., but luckily was not too dependent upon the securities market: only some 40% of Data Logic's global revenues came from this sector.

NMW has also been involved in this market in the U.K. using Digital equipment as the front-office platform. NMW feels very strongly that Digital has the best LAN capability and this gives NMW considerable advantage in this demanding sector.

d. Artificial Intelligence

In the back offices of securities houses, there are many opportunities for expert systems based on AI technology:

- Charting
- Market analysers
- Risk management
- Forecasting
- Deal ticket making

These software products are often developed for high-power PCs or workstations. With the launch of the Intel 486 machines, there will probably be less of a demand for workstations.

Again U.K. and French vendors are strong in this area. Data Logic has developed a number of software products for securities firms' back offices; so has Concept in France through Technic Informatique, which Concept acquired in 1987. Gecosys of Belgium has developed an expert system that automatically captures Reuters dialogues and creates electronic deal tickets which Gecosys sends to back-office systems for settlement. Gecosys is a joint development between Générale de Banque of Belgium (69%), Cognitive Systems of the U.S. (25%) and private interests (6%).

e. Networking Skills

As illustrated in Exhibits III-11 and III-12, networking and integration skills are an essential requirement in the securities market.

In addition to LAN skills in building front-office systems, wide-area network skills are needed to create front-office links to EIS and dealing systems networks. Similarly WAN skills are needed to link back-office systems into settlement and clearing networks. Traditionally it has been similar vendors to those supplying front-office systems that have WAN skills—Cap Gemini Sogeti, Sema, SD-Scicon, Logica. These skills are delivered either as professional services (IT consultancy or custom software development), or as systems integration projects.

Networking and integration skills are needed to assist bourses to develop their local systems and for the planned interlinking of systems between different bourses. Andersen has been involved in many of these projects—e.g., the Paris, Brussels and Madrid exchanges. Similarly the major French vendor SG2, which is wholly owned by the major French bank Société Générale, is involved in developing the RELIT system for the Paris bourse. Concept, through its Italian subsidiary Concept Dati e Sistemi (CDS), is involved in the Milan exchange.

The list of tendering companies for the PIPE project—ADP, Andersen, EDS, GEIS, Price Waterhouse and Quotron—is an indicator of the type of vendor targetting this sector.

Large U.S. network services vendors such as EDS and GEIS have considerable expertise in pan-European networking and systems integration, as does IBM. It may be difficult for some European vendors to compete against the considerable experience of these U.S. vendors in this area unless the Europeans ensure that they can offer services throughout Europe.

C
Banking Market

1. Mergers and Acquisitions

Even in 1990, it is clear that the effect of the Single European Act legislation on the European banking market will be considerable.

The first repercussions are being seen as a restructuring of national banks through mergers. The U.K. went through this restructuring in the 1980s. Denmark and the Netherlands have announced similar moves in early 1990. Individual bank mergers have been announced in Sweden and Norway. France is considering major regional restructuring, whilst Germany's more rigid structure has so far prevented changes.

As these waves of national restructuring move through all types of national banking—retail, savings, co-operative—a second wave of international mergers and acquisitions is likely to appear. In addition, insurance and retail organisations will undoubtedly move into banking—either through mergers and acquisitions, or internal developments.

The effect of these restructuring developments on the software and services industry will be very significant. Banks will become bigger and more international, with wider portfolios of products and services. As a result, banks will have to go through major restructuring and rationalisation of internal systems.

Historically many banking systems have developed piecemeal, especially at the larger banks. Linking new systems acquired through mergers and acquisitions with existing systems will only exacerbate the problems of rationalising different systems for the IS manager in banking.

Most of the European banking market has standardised on IBM equipment, especially for back-office systems. IBM accounts for some 60% to 65% of back-office banking systems in Europe, although in certain markets such as Germany and Spain this percentage rises to 75%. Unisys is the other major back-office vendor and is strong in areas such as U.K. building societies' back-office systems. In front-office banking systems, IBM is also strong, but does not have the same penetration as in the back office.

This strength of IBM in back-office banking has advantages and disadvantages for the European banking market of the 1990s. In many cases, it may be relatively easy to rationalise separate banking systems because they are on the same IBM hardware. However, many systems are based on the old IMS database and different IBM operating systems. In these cases rationalisation is far from trivial.

2. Customer Name Database

At the same time that banks are having to contend with rationalising different systems through mergers and acquisitions, IT managers in banks throughout Europe are being faced with new demands to deliver flexible customer-related systems that will allow their banks to compete in the deregulated market of the 1990s.

The prospect of a deregulated European banking market is forcing banks to offer a wide range of products and services—current and loan accounts, insurance, house financing and investment and foreign exchange services. For banks to be able to manage this new wider range of products and services, they have to use integrated systems and individual customer files. For example, banks need to identify whether they have the best profile of customers by age group for specific products and services.

Historically banks have developed separate systems for different products and services. These systems have been developed via account number databases, not customer name records. To integrate these records and to migrate them from the old account number to customer name record structures is not a trivial matter.

The problems associated with these redesigns will be exacerbated by mergers and acquisitions. Banking IS managers also have to contend with the looming date problem of the year 2000 and ensuring that all their systems will be able to cope with the transition from 31st December 1999 to 1st January 2000 without major failures—most year date fields are only three digits.

For the smaller banks, many of these problems can be successfully resolved through their current systems. Many of these banks have either packaged software solutions or central processing services. The third-party vendors supplying solutions are aware of these demands from customers and can resolve problems relatively easily. However, the solution for the bigger banks with far more complex and nonstandard custom systems is considerably more difficult to implement.

3. Other Back-Office Developments

In addition to developing the prime customer databases, banks are keen to reduce the manual tasks of managing back-office paper, such as through:

- Image processing systems
- Expert systems

Most of the major equipment vendors—IBM, Unisys, Digital, NCR and Philips—have developed image processing systems and are looking to the banking market for sales. IBM launched Imageplus in 1989. Running on IBM mainframe equipment, Imageplus is targetted at cheque processing in banking. Also in 1989, Digital announced its image processing product line. Digital's Decimage Storage Control Manager runs on VAX equipment under its version of UNIX, ULTRIX. Traditional image processing vendors, such as Kodak and Xerox, also offer ranges of products in this sector.

Expert systems are seen as potentially cutting back-office manual tasks. Gecosys in Belgium has develop a expert system to monitor SWIFT telex messages and identify whether they are concerning payment. If they are, the system automatically converts them into computer-readable format. It is understood that such systems are only suitable for banks with high volumes of transactions.

In France, the savings bank Caisse d'Epargne uses expert systems for checking loans. American Express uses expert systems to assist in authorising specific credit transactions. Expert systems have also been developed to monitor card transactions to identify fraudulent use.

4. UNIX

Open systems such as UNIX will do little to ease development problems for banks. UNIX is principally suitable only for front-office branch banking systems and also for specific department solutions such as OCR systems that read cheques.

A number of equipment vendors—NCR, Olivetti, and Unisys—have developed UNIX platforms for branch systems. It is considered likely that banks will be able to buy cheap off-the-shelf branch systems without really appreciating that they are UNIX-based.

INPUT's research indicated a very mixed reaction by vendors to UNIX in the banking market. Many vendors do not see UNIX as being a major force in banking. Vendors that are in specific niche areas of the banking and finance market tend to see major opportunities for UNIX.

5. Fault-Tolerant Processing

Just as fault-tolerant processing is likely to revolutionise securities houses' systems, it will probably do the same in banking, but for different reasons.

Tandem has been the leading fault-tolerant equipment vendor in banking. Stratus is involved in international banking, but has only a very limited penetration of retail banking.

To date, fault-tolerant processors have been used for front-office controllers for on-line customer services such as ATMs and EFTPoS. As banks look to develop more varied on-line customer services, such as direct current account enquiries and home banking, the demands for fault-tolerant systems have been growing.

Even EDI is seen as a potential major stimulus for fault-tolerant processing in banks. If banks have clients practicing just-in-time (JIT) manufacturing, banks will be forced to front-end their EDI services on fault-tolerant machines. JIT can increase the number of invoices by a factor of 60 and decrease the time lag between ordering and dispatch from weeks to one or two days. If the bank cannot guarantee efficient documentation processing for such clients, the clients will undoubtedly go elsewhere.

The competitive demands on banks in the 1990s are making them look increasing at on-line services to customers. However, the old back-office systems are not the ideal way to offer such services. Traditional back-office systems have been generally designed for batch, not on-line, access. For security reasons, many banks are reluctant to allow external access into their prime customer databases.

Fault-tolerant back-office systems offer the solution, but the implementation of such systems is complex. Exhibit III-13 illustrates three types of fault-tolerant processing implementations in banking. The first places all processing on one of the new fault-tolerant mainframes launched in 1990 by Tandem and Stratus. The argument for the first plan is that back-office systems traditionally do most of their work at night, and front-office by day. By placing all operations on one machine, the overall processing requirements of a bank can be optimised and savings made to pay for the cost of total fault-tolerant processing.

The Clydesdale Bank in the U.K. was the first to announce moving its total systems to the new Tandem mainframe, the Cyclone, in February 1990. The Cyclone was launched in October 1989. The Cyclone contract is worth £2.6 million. The new system will run both the branch office system to the Clydesdale's 350 branches, and the customer information system, including all of Clydesdale's ATMs. The Clydesdale Bank also offers videotex banking over the Midland Bank's FASTRAK network.

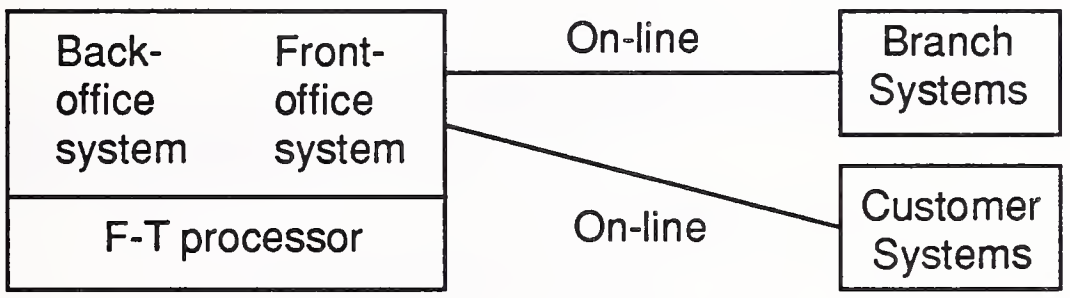
The single-processor solution is suitable for small- to medium-sized banks, but not for large banks where a single machine would be inadequate. Two alternatives are being developed. One is the gradual migration of specific areas of the prime customer database to specialised back-office fault-tolerant machines for direct customer access and to update the main database overnight. The other alternative is based on midrange fault-tolerant regional processors for larger banks. These regional processors will manage perhaps 10 branches and update the corporate mainframe overnight via batch mode.

As an interim step, some banks offer on-line access to customer information, but only via 24-hour telephone enquiries. This service ensures that only internal bank staff can access the prime database. However, this type of service is not seen as an economic long-term solution.

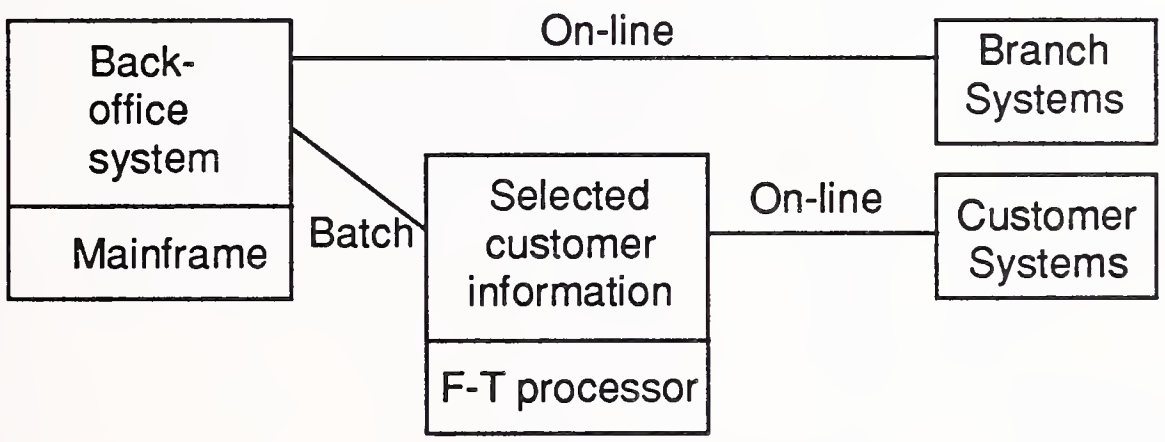
EXHIBIT III-13

Fault-Tolerant Processing in Banking

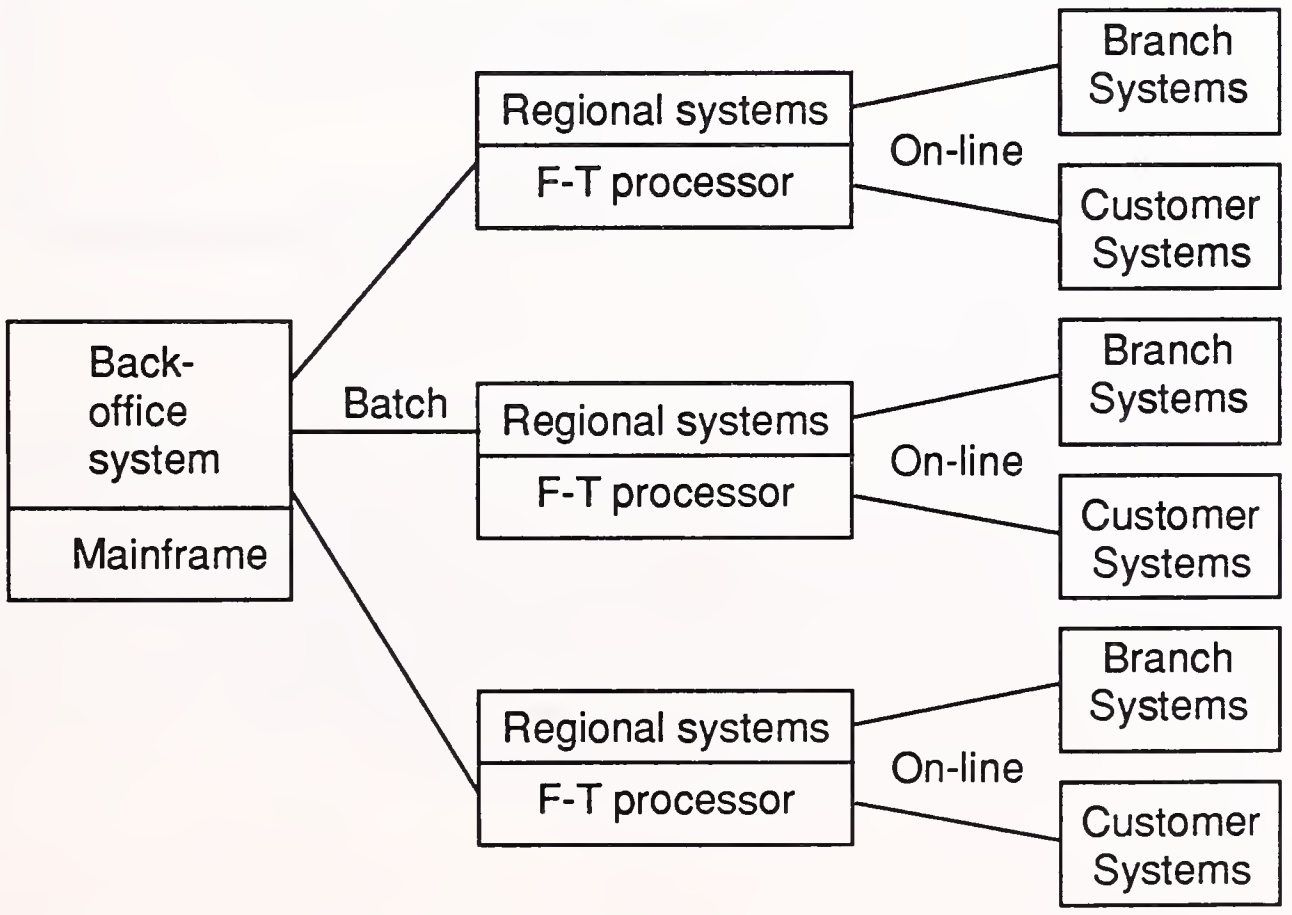
A. Single Implementation



B. Double Back-Office Implementation



C. Regional Implementation



Banks will be forced to develop direct on-line customer services and this means allowing customers access to some form of the prime database. What is lacking in the current state of technology is cost-effective security gateways. INPUT sees tremendous opportunities for third-party vendors to develop a number of services based on the wider introduction of fault-tolerant processing, as indicated in Exhibit III-14.

EXHIBIT III-14

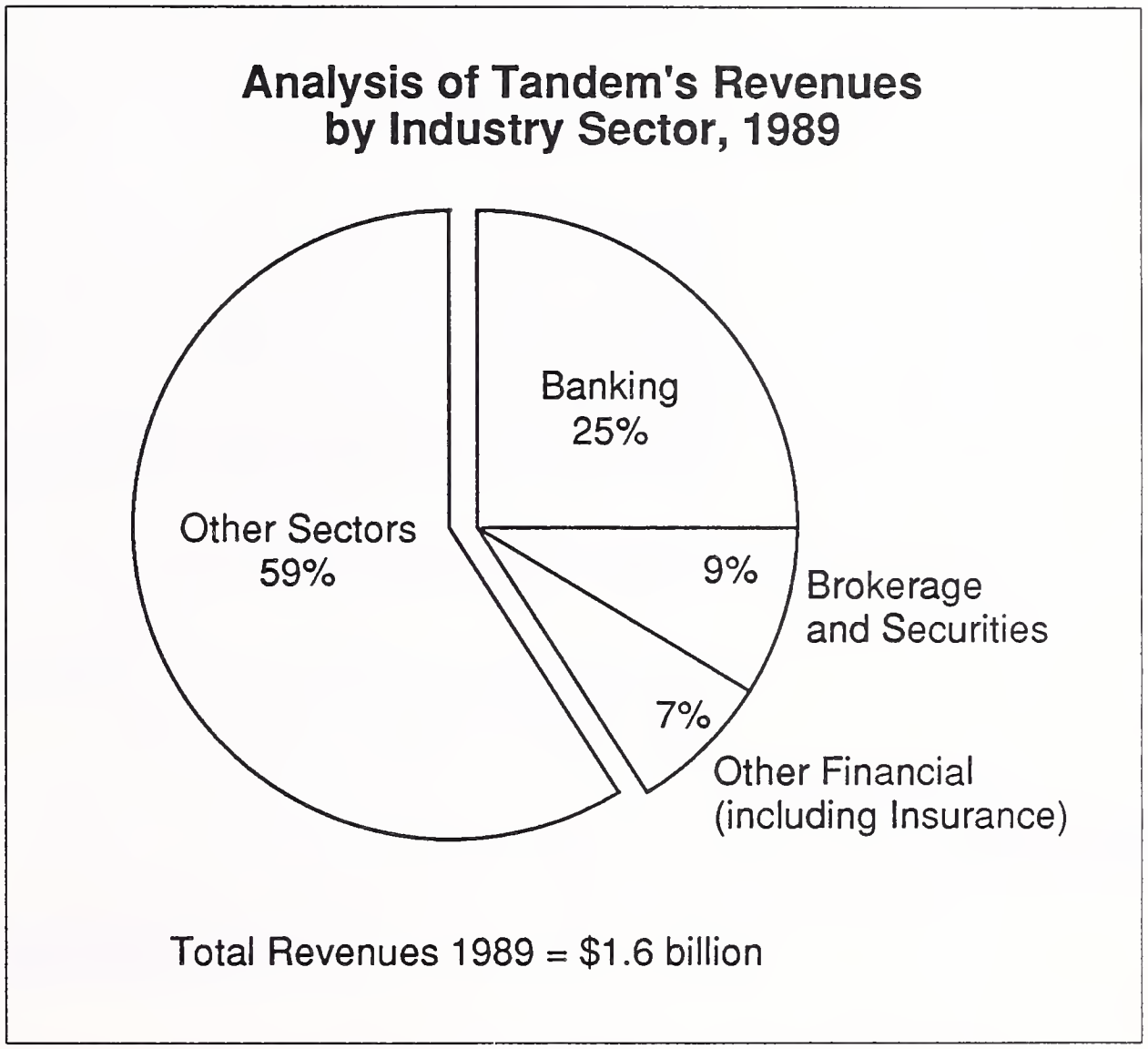
Fault-Tolerant Banking Software and Services Opportunities

- Database development
- OLTP utilities
- Security gateways
- Message-handling systems
- Network management systems
- On-line customer service systems
  - ATMs
  - EFTPoS
  - Home banking
  - EDI
- Integrated banking packages for small/medium-sized banks
- IS consultancy

As an indicator of the success of fault-tolerant processors, the global revenues of Tandem and Stratus have been growing at 25% to 30% per annum. Tandem worldwide revenues, at some $1.6 billion are now comparable to those of the medium-sized European equipment vendors such as Nokia Data and ICL, and even NCR of the U.S. However, none of these companies is are growing at the rates of Tandem or Stratus, and most minicomputer vendors have been seen growth rates of half those for these two fault-tolerant manufacturers.

With banking and finance being one of the key target markets for Tandem, Stratus and now Digital, fault-tolerant processing is likely to cause major changes in the structure of the market. Exhibit III-15 shows that some 40% of Tandem's 1989 revenues came from the banking and finance sector.

EXHIBIT III-15



A prime difference in the demands placed on fault-tolerant processing between the securities market and banking is the demand for expandability in banking. The 1990s bring considerable uncertainty for IS managers in banking. Mergers and acquisitions, or growth through new financial services, may demand very rapid increases in computing power.

IS managers in banking need to consider the ability of their new fault-tolerant systems to be expanded. Expandability is a constraint not so likely to be placed on IS managers in securities houses. INPUT sees considerable opportunities for software and services vendors to develop solutions that can be modified and expanded for the banking market in the 1990s.

6. New Customer Terminal Systems

In order to deliver on-line services to customers, banks need to develop new on-line delivery systems to corporate and private clients. Many of these systems are still in development or only under trial.

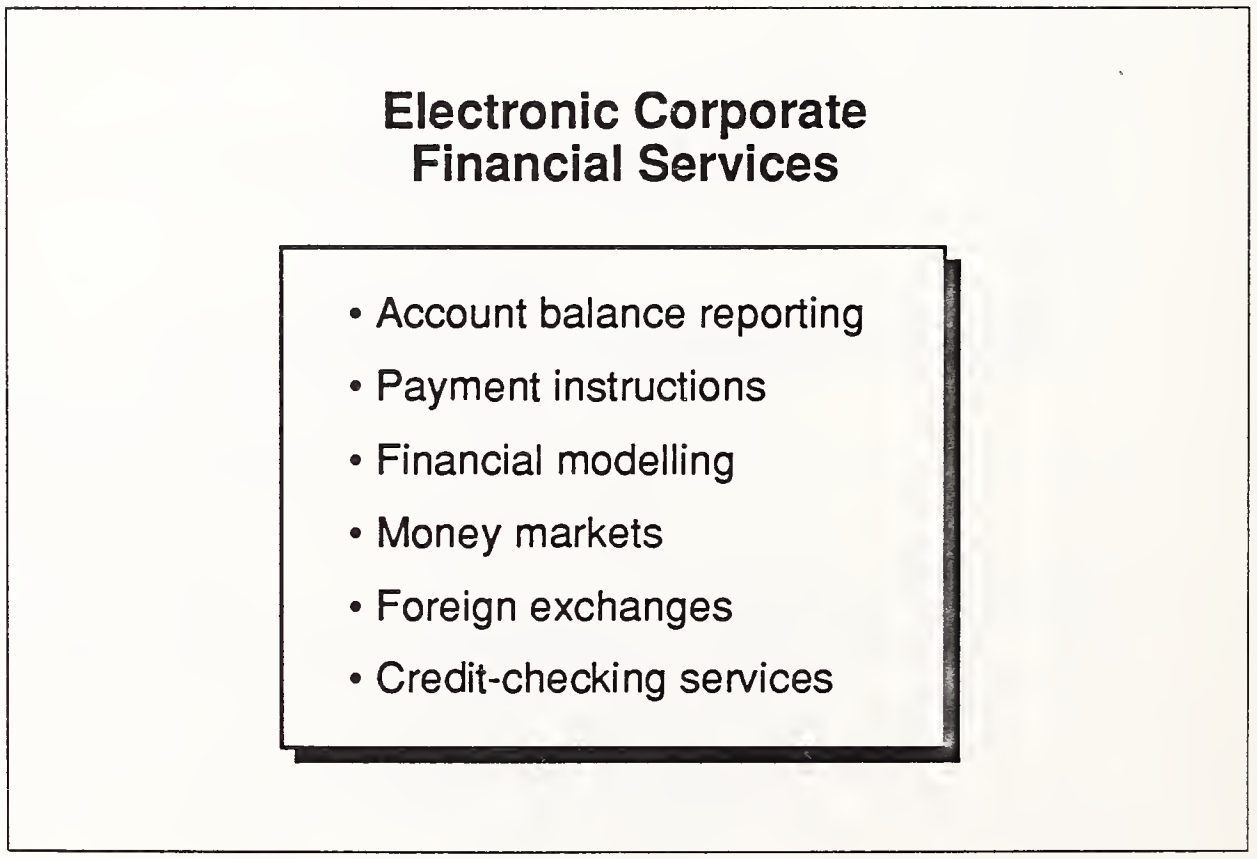
There are many press comments about banks' launching new on-line systems. However, INPUT believes most are only announcements of trials; commercial implementation may be some 3 to 5 years away, assuming that the results of the trials are positive.

Although banks are prepared to consider any new technology, they have learnt from bitter experience that they have to put such new technology through extensive market trials before they can have the confidence to implement it fully. For the software and services vendor considering developing new customer-related services, a careful search throughout Europe, if not the world, should be made because in all likelihood another bank is undertaking a trial of the service in some form and free market research can be gained from investigating such trials.

a. Corporate Customer Terminal Systems

Corporate finance managers are increasingly being offered a growing range of electronic services from a wide range of third-party vendors. Services are illustrated in Exhibit III-16.

EXHIBIT III-16



Some of these services, such as investment and foreign exchange services, are competing directly with the wider services that banks are offering, or wish to offer, in the 1990s. Banks are, therefore, looking to offer a one-stop-shop service, whereby the corporate customer can obtain all the financial services needed via a single terminal supplied by the bank.

Two types of delivery modes are being offered—PC and videotex terminals. In the U.K., the largest retail bank, the National Westminster bank, launched a trial of electronic banking for small business in 1987. BankLine is accessed via an IBM-compatible PC. Software costs around £100, plus a monthly charge of under £10. Modems and cabling are extra at around £300. At the end of 1989, all 650,000 small business customers of the National Westminster bank could subscribe to this service.

GEIS has developed an on-line corporate client service for banks. Using software GEIS developed, the service allows corporate banking customers to access on-line services such as balance reporting and payment instructions. Banks using this service relabel it under their own logos.

French banks have developed videotex services via minitel. German banks are developing similar services using the German CEPT standard for videotex.

b. EDI

Gradually EDI standards are being set for all the relevant documents to complete the EDI chain from purchaser to manufacturer. Banks are showing some reluctance to initiate EDI for relevant banking documents, as EDI is likely to reduce the time banks hold customers' funds and hence banks' profits.

Unlike in the U.S., where major customers such as GM have forced banks to work together and agree standards, in Europe banks have not shown the co-operative spirit. Until EDIFACT standards are agreed upon for banking documents, there is likely to be little pressure on banks to make more than token moves to EDI.

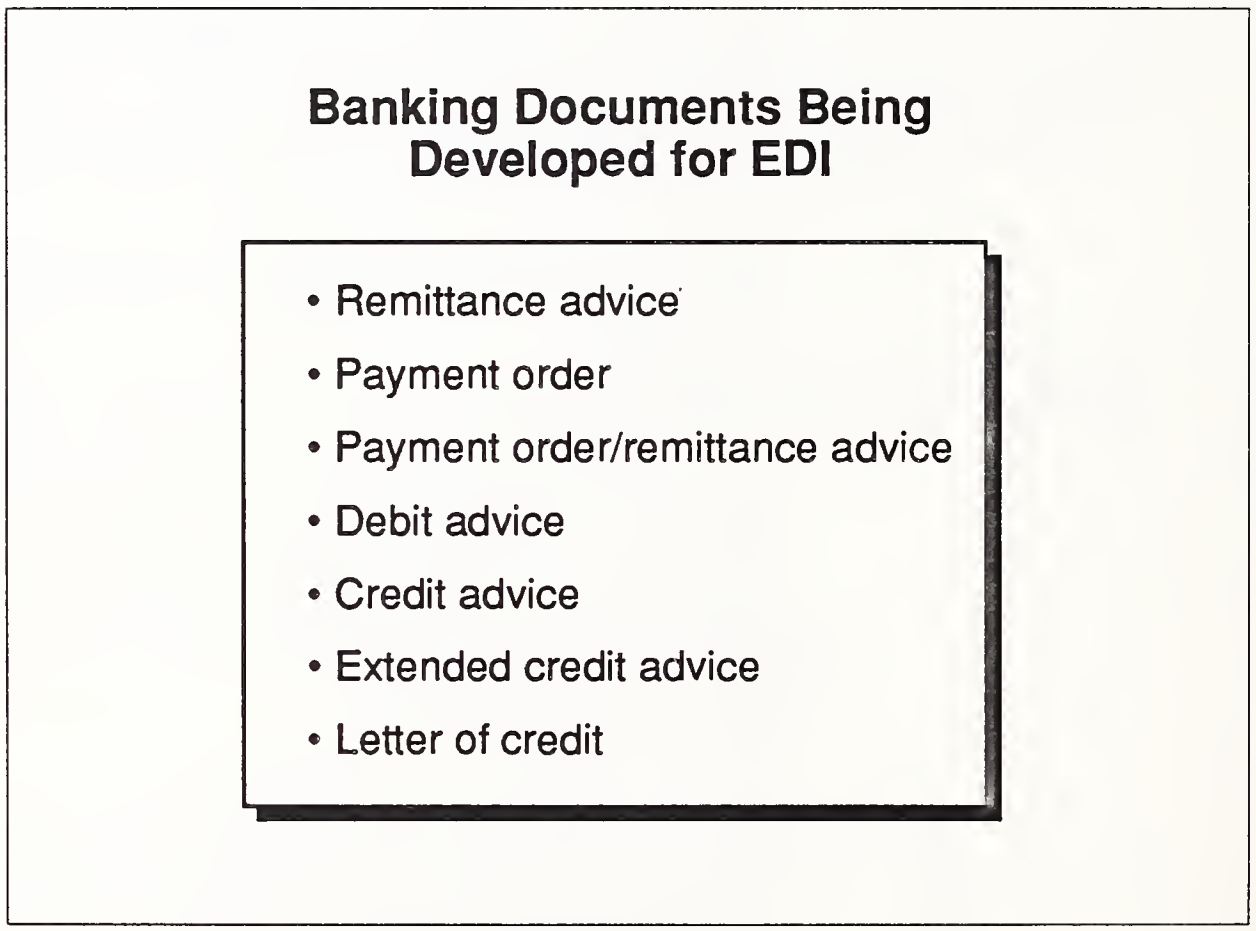
The EDIFACT Board in Brussels under Directorate General XIII has set four UN statuses in agreeing to documents and message standards:

1) Draft document
2) Agreed proposal for Rapporteurs
3) Draft for formal trial
4) Recommendation as a standard

Exhibit III-17 lists the different banking documents that have to be developed for EDI. By the 4th quarter of 1990, all except the letter of credit are planned to be at status 3, a draft message standard ready for formal trial. The banking documents that are under trial or planned for trial are as follows and are illustrated by Exhibit III-18:

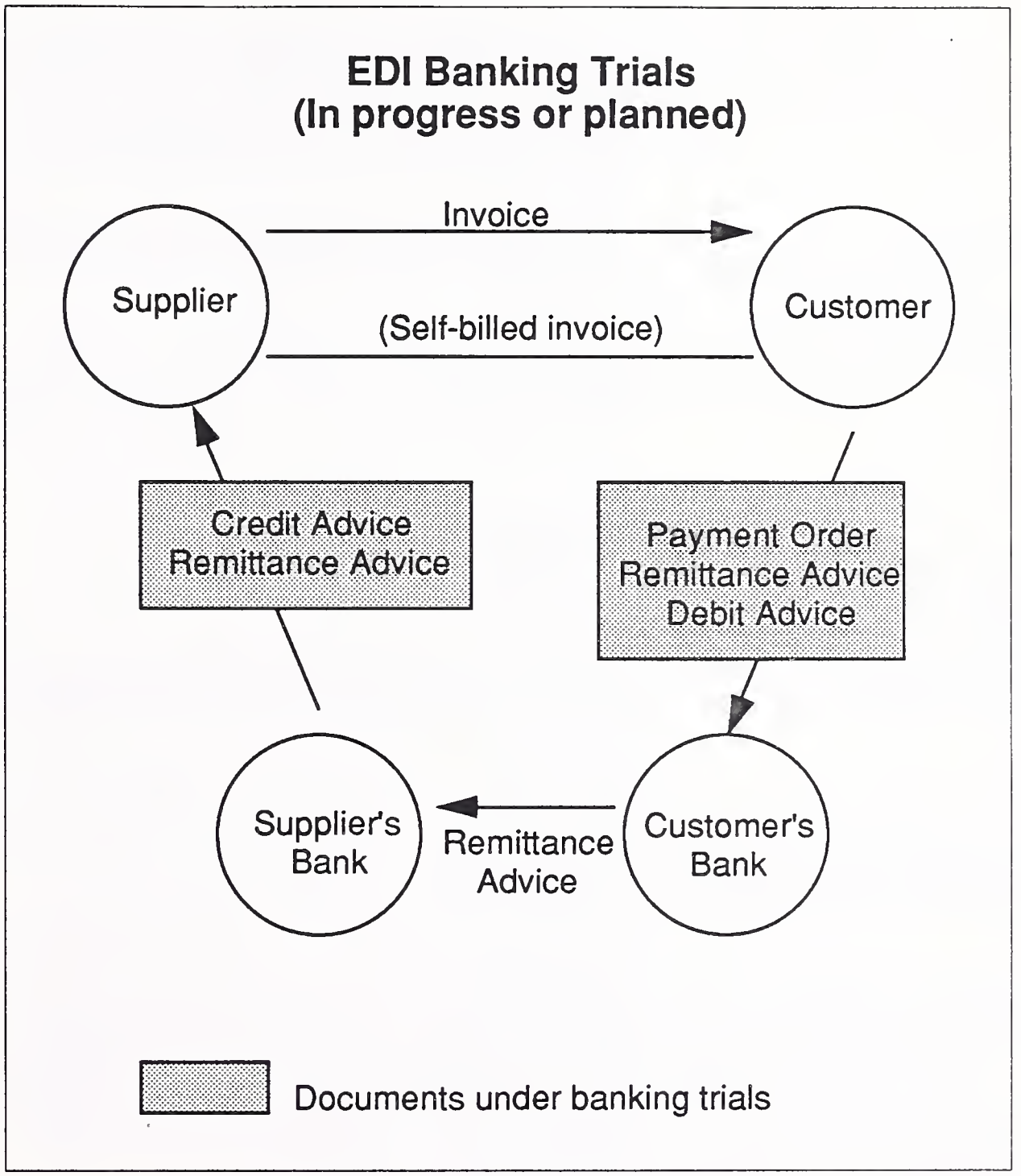
- Supplier's bank
  - Credit advice
  - Remittance advice
- Customer's bank
  - Payment order
  - Remittance advice
  - Debit advice

EXHIBIT III-17



As in other areas of EDI, the U.K. is considerably farther advanced in banking EDI than are other European nations. Barclays Bank is currently participating in an EDI trial with Peugeot Talbot Motor Company and one of Peugeot Talbot's main parts suppliers, Rists, which is part of the Lucas Group. The Bank of England is very keen to see the major U.K. banks use EDI, but will not be involved itself. The National Westminster Bank has announced that it will offer a combined electronic trading and payment service via the joint ICL/GEIS-owned U.K. network INS.

EXHIBIT III-18



In Denmark banks are already offering EDI-like banking products for funds transfer, as is true in Italy. Banks in Italy have been using the Ri-Ba (Ricevuta Bancaria) for electronic payment by instalment since 1985 and replacing promissory notes. Some 200,000 Ri-Ba items are processed by the Italian clearing banks each day. This figure represents some 40% of the total paper bills in Italy. Consideration is being given to converting the Ri-Ba to EDIFACT standards.

Recently, the Philips EDI group in Brussels warned that cross-border EDI will be much harder to implement if proprietary, rather than open, standards are not rigidly adhered to. Each country has its own banking regulations, currencies and payment instruments and, if open standards are not universally used, international EDI will be very difficult to implement.

A key banking document that is still creating problems for the developers of EDI is documentary credit. Legally, documentary credit must be a physical document that can be handed between parties, one of which is a bank giving the seller its conditional undertaking to pay, once certain stipulated documents are physically handed over. EDI transmits only information, not the document, and cannot today transmit the legal characteristic of negotiability, which is possessed only by certain paper documents.

In addition to agreeing to relevant document standards and the legality of paperless EDI documents in certain areas of finance, banks have to resolve which networks they will use. There are two principal networking problems to be resolved:

- Interbank transfers
- Client/bank transfers

It is likely that interbank transfers will be handled by the national or international interbank network services, such as BACS in the U.K. and SWIFT internationally. The cost difference between using these joint bank-owned networks and third-party VANs is considerable. However, there could be opportunities for third-party vendors to run these interbank networks for the banks under systems operations contracts.

Different banks are considering different solutions to client/bank transfers. Banks with their own networks will try to channel clients and other external EDI partners to use these networks. The U.K.-owned Midland Bank owns the third-party VAN FASTRAK, and hopes to gain EDI traffic through it. Similarly the bank-owned co-operative processing centres of Scandinavia are considering exploiting their networks. PBS in Denmark has its own network and is considering using it for EDI in conjunction with DanNet.

Other banks see that external VANs should be used. The National Westminster Bank in the U.K. is proposing links to all major U.K. EDI networks—INS, Istel and IBM's IN. Similarly, Barclays and Lloyds in the U.K. are looking to open-systems solutions.

c. ATMs

Considerable advances are being made in different areas of Europe in developing the automatic teller machine (ATM) to be a multifunctional customer facility. Many of the developments have been made in Scandinavia.

The original ATM was just for 24-hour cash dispensing. Many also allowed daytime inquiry of current accounts by down loading the status of each customer's account each night to a file that can be accessed on-line via the ATM. Authorisation is still given through personal identification numbers (PINs) that are keyed in at the ATM.

Scandinavia has started trials of MultiBank and miniBank ATM facilities. In Norway, Fellesdata is developing the miniBank. Fellesdata has its own X.25 network with 17,000 terminals throughout Norway. Fellesdata has set up a trial of four miniBank ATMs with the intention of expanding to 100 or 200 in 1991. These have the following functionality:

- Cash points
- Current account inquiry
- E-mail for ordering cheque books, foreign currency and even small loans
- Teller printers to update pass books, print vouchers and customer letters

Problems with the OCR in the teller printer during the trial has necessitated modifications. Authorisation is via PIN.

d. EFTPoS

The initial development of EFTPoS was for credit cards, such as European cards (Visa, Mastercard, Carte Bleu) or international cards (American Express).

Authorisation was generally via signature, although in smaller European markets such as Belgium, Denmark and Norway, PINs have been used for some time. Although the use of PINs might appear to be a simpler route for all electronic transactions, in markets where the plastic card proliferates through banks, retail and petrol outlets, such as in France and the U.K., it is not practical for the person on the street to be expected to remember a larger number of PIN access codes. In fact, research has shown that a high proportion of individuals carry their PINs in the same place as their cards, negating the security that PINs give and making signatures the more secure authorisation method.

The latest state-of-the-art EFTPoS terminals keep a "hot card" file of stolen or lost card numbers. This file is updated every night. Any payment below a set floor limit is not checked with the card company, but automatically guaranteed. Payments above this limit are checked on-line with the bank in 2 to 3 seconds. The details of the transaction are held in the EFTPoS terminals, which are polled every night. The next day these transactions are processed by the card company. The second day they are passed to the relevant bank and the third day the bank settles transactions via interbank transfers.

When a new card is issued and the bank is uncertain about the credit rating of the individual, the bank will check worthiness of this individual with a national credit database. It is reported that of 50 million individuals in Italy, credit databases in Italy hold the names of some 20 million bad debtors.

Two of the leading EFTPoS software vendors are BASE24 and SD-Scicon. BASE24 was formally established in January 1989 as a joint venture between ACI of the U.S. and Sema. BASE24 followed the merger between Sema Metra of France and Cap Group of the U.K. Prior to 1989, the activities of BASE24 were run by Cap Financial through a licence agreement to sell ACI's products. BASE24 markets these products in the U.K., Ireland, the Benelux countries and Scandinavia, whereas ACI has retained the rights to market throughout the rest of Europe, including France (even though Sema is an equal partner in BASE24). Andersen is being considered as a distributor by ACI in certain southern European countries.

BASE24 has close links with Tandem and prefers Tandem's equipment to Stratus'. BASE24 has developed a standard IBM CICS mainframe interface, LINK24, to BASE24 software. BASE24's strongest competitor is SD-Scicon.

SD-Scicon sells CONNEX software from Delux in the U.S. for both ATMs and EFTPoS systems. SD-Scicon has distribution rights throughout Europe. This software runs on Tandem or IBM mainframe equipment. SD-Scicon considers itself the leading EFTPoS supplier in the U.K. and Italy, as well as very important in the Swedish market.

INPUT sees that there are considerable opportunities for vendors to deliver not only EFTPoS software, but also a complete EFTPoS service—central processing, software and even network and retail terminal software. The operation of an EFTPoS network is relatively standard; the network needs only to be customised to link to the relevant different banking networks from the central switching system. Vendors should be able to develop and sell turnkey EFTPoS systems or even the complete third-party EFTPoS service.

i. Debit/Credit Cards

Today, the U.K. is the largest market for electronic payment cards. Penetration of electronic payment cards in the major European markets is as follows:

- U.K. - 37 million and very strong growth due to the debit card
- France - 10 million and significant potential as in the U.K.

- Germany - No electronic payment, only cheque guarantee cards, but potential is large
- Spain - Nearly 10 million and very strong growth
- Scandinavia - Small market, but already very advanced
- Benelux - Small market, but strong growth

Banks and leading vendors see that the major development in EFTPoS will come through debit, rather than credit, cards. There are two key reasons for this trend:

- Transaction cost for the retailer
- Spending patterns of consumers

In the U.K., the cost of credit cards for the retailer is between 1.5% and 2.0% of the transaction. The cost for the debit card has been forced by the retailer to equate to that of a cheque, or £0.05 ($0.08) per transaction. For a weekly grocery bill of $100, the saving to the retailer of a debit versus a credit card is, therefore, $1.42 to $1.92. No wonder one of the largest retail food chains in the U.K., J. Sainsbury, has been the prime force in introducing the U.K. Switch debit card throughout the country.

Research undertaken by debit card companies has indicated that 80% of consumers would prefer to pay using cash, rather than credit. Researchers see this attitude as an explanation for the relatively limited penetration of the credit card; the debit card will have a far higher penetration. Experience with debit cards has tended to back up this research, as card companies have found that many users of debit cards use them for round sums of petrol purchases, £10 or BF 100, just as through they were still paying cash.

With the possibility of far higher penetration of the consumer market with the debit than the credit card and the obvious economic advantage to the retailer of the debit card, card companies see an explosion in the use of debit cards that will push EFTPoS into totally new areas of the consumer market.

To aid this expansion, the development of handheld EFTPoS terminals will allow EFTPoS to move into a new range of retail outlets. Waiters in restaurants, clerks in corner shops and travelling salespeople will all be able to have affordable EFTPoS.

Two types of handheld EFTPoS terminals are being tested. In Belgium, terminals are linked by radio to local stations in the retail outlet and from there on-line to banks for authorisation. In the U.K., handheld terminals with plug-in memory modules are being tested. These memory modules are being made by Mitsubishi for $60 each and can be removed from the portable terminal and plugged into a local PC to be downloaded to the bank overnight. Alternatively, they can be handed or posted to the bank

in exchange for a new module. Since most small retailers go to the local branch of their bank every day, there is no extra effort required to exchange their EFTPoS memory modules rather than hand in their daily cash takings.

ii. Smart Cards

France has been the most advanced nation in developing and testing smart cards. The French government has invested large sums of money in the development of smart cards. However, a number of major problems have been encountered on the initial chip designs and initial deliveries have had to be recalled. EFTPoS terminals destroyed some 22% of the microprocessors in smart cards in the summer of 1989 in France. As a result, retailers covered the chips with sticky tape to ensure that their terminals would read only the magnetic strips and not the chips.

The Union Bank of Switzerland (UBS) has been running a trial of smart cards in St. Moritz. Thirty EFTPoS terminals in shops, restaurants and kiosks have been specially set up. The trial has been funded 40/40/20 by UBS/the Swiss PTT/St. Moritz. In the U.K., the Midland bank has recently extended a trial at Loughborough University for an extra year to off-campus sites—launderettes and pay phones.

The advantages of smart cards is that "they allow us to exploit our creativity", as one bank told INPUT. Since banks are desperately looking for competitive advantage in the 1990s, smart cards seem extremely appealing. However, international standards need to be set and chips must have sufficient memory, which the latest generation of cards would seem to offer.

For the general introduction of smart cards, EFTPoS terminals throughout Europe, or at least in specific countries, will have to be changed, as virtually all existing terminals cannot read smart cards. The new handheld terminals are being designed to accept smart cards. Most major retailers change their EFTPoS terminals every two years; thus, given a delay in initiating the introduction of smart cards, the earliest that the smart card could be commercially launched would be 1995.

e. Home Banking

As with smart cards, home banking will be a commercial service only in the second half of the 1990s. The French have extensive home banking via Minitel. Finland has had home banking for some years, but due more to necessity with its climate than special technology. Because of the limited success of videotex in the consumer market, attempts to launch home banking in the U.K. have not been successful.

Market Structure

IV

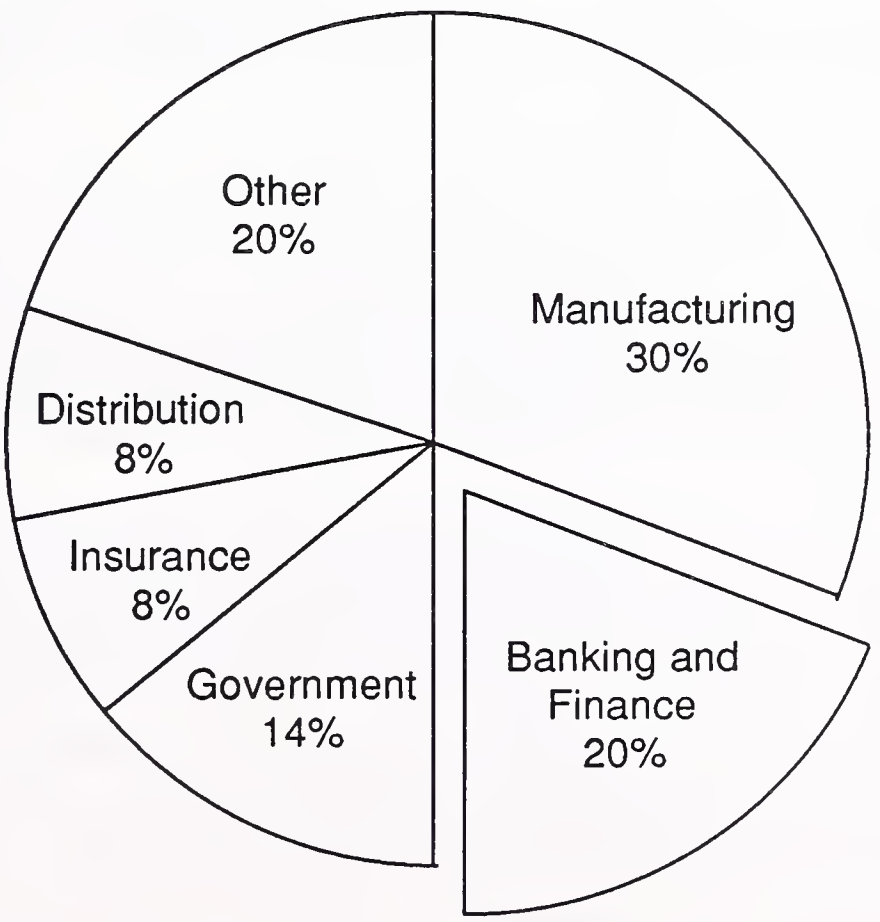
Market Structure

A Overview

Exhibit IV-1 illustrates the breakdown of the West European software and services market by industrial sector. INPUT estimates that the banking and finance share totals $11.7 billion in 1990 and represents just under 20% of the total European market. Banking and finance is the second most important sector after manufacturing.

EXHIBIT IV-1

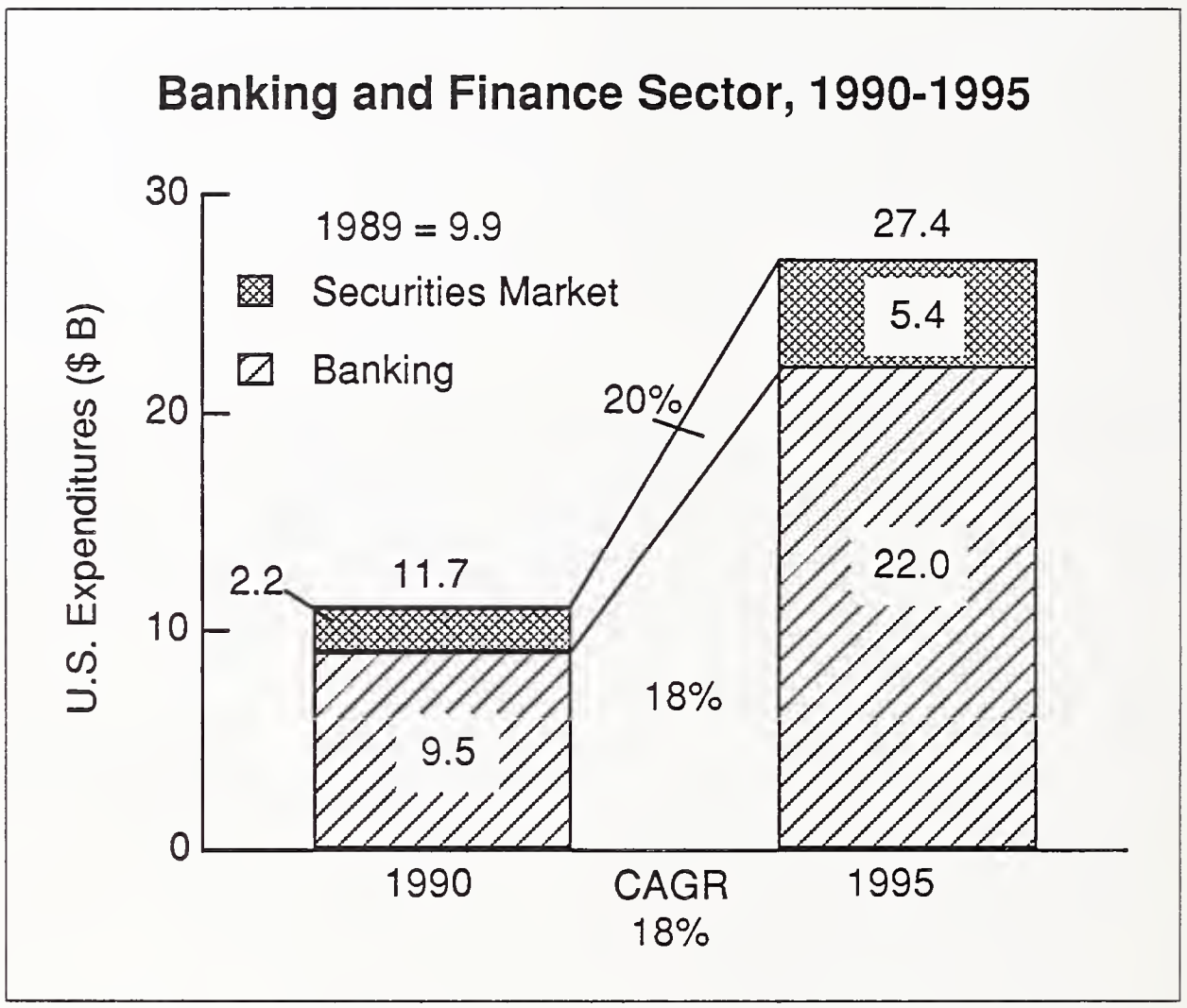
European Software and Services Market by Industrial Sector, 1990



Total Market 1990 = $59.6 billion

INPUT forecasts the compounded growth of banking and finance sector to be 18% per annum on average over the period 1990 to 1995. Growth will be from $11.7 billion to $27.4 billion, as illustrated in Exhibit IV-2. The securities subsector is seen to be growing slightly faster on average (at 20% per annum) than the banking sector (18%).

EXHIBIT IV-2



Although the securities market has been going through a few lean years following the collapse of world stock markets in 1987, INPUT believes that the current downturn in the world business cycle will bottom out in 1990 and 1991 will see the beginning of a global recovery in economic activity that will, in turn, positively affect world stock markets.

In addition to a recovery in securities, the continuing development of electronic stock exchanges throughout European financial centres and the interlinking of electronic exchanges will give growing stimulus to the software and services market for the securities subsector.

When the EEC financial markets become deregulated after 1992, the resulting competition may force the closure of some of the smaller bourses, or their merger into bigger national competitors. This consolidation will strengthen the leading national bourses and their move into electronic systems. The growing competition between the leading national bourses is likely to create a trend in specialisation, with different

bourses targetting specific financial instruments. Through electronics, securities houses will be able to link to these specialised markets wherever they are within the EEC, and will thus stimulate further the demand for software and services.

The software and services market for the banking subsector is forecast to be more stable, with a steady healthy growth of some 20% per annum. Some major retail banks have cut expenditures on external software and services due to problems in writing off third-world debts. However, these cuts are a short-term effect. With the major redevelopment programmes that virtually all banks have to go through over the next few years, plus any additional development demands created through mergers and acquisitions, banks are having to look more to external vendors to ensure that development projects are completed within budget and on time.

1. Small Number of Vendors

INPUT estimates that there are only some 2,500 vendors servicing the total West European banking and finance software and services market. This number can be compared with some 40,000 for the total market. Proportionately, one might expect some 8,000 vendors in banking and finance because this sector represents some 20% of the total market.

The reasons for this small number of vendors are:

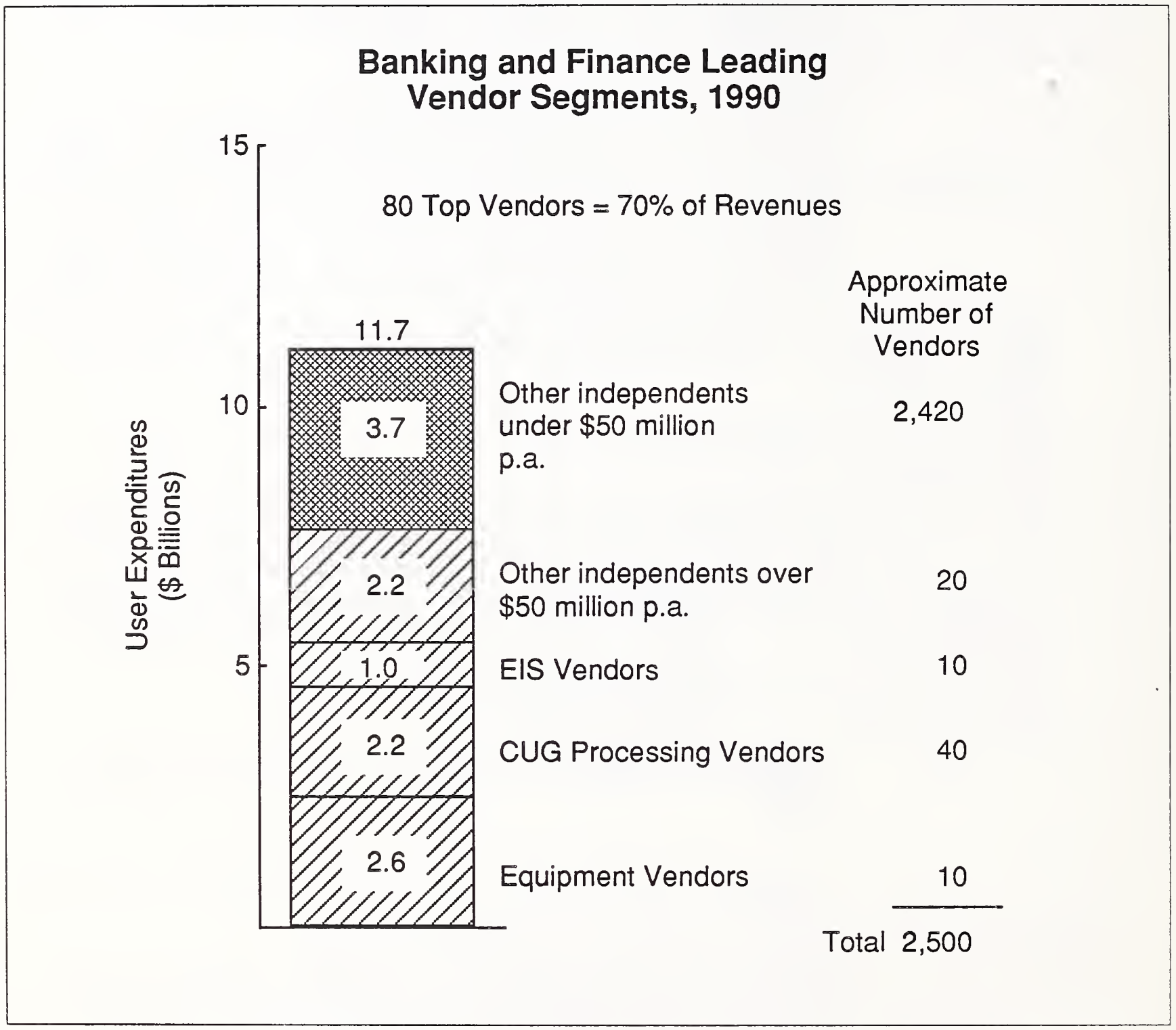
- Banking and finance purchasing decisions are highly centralised, creating an environment allowing large vendors to gain large market shares.

- A few key areas of the market are controlled by a small number of large vendors.

INPUT estimates that some 80 vendors control some 70% of the total banking and finance revenues. Exhibit IV-3 illustrates the breakdown of the banking and finance market for 1990 by the leading segments of vendors.

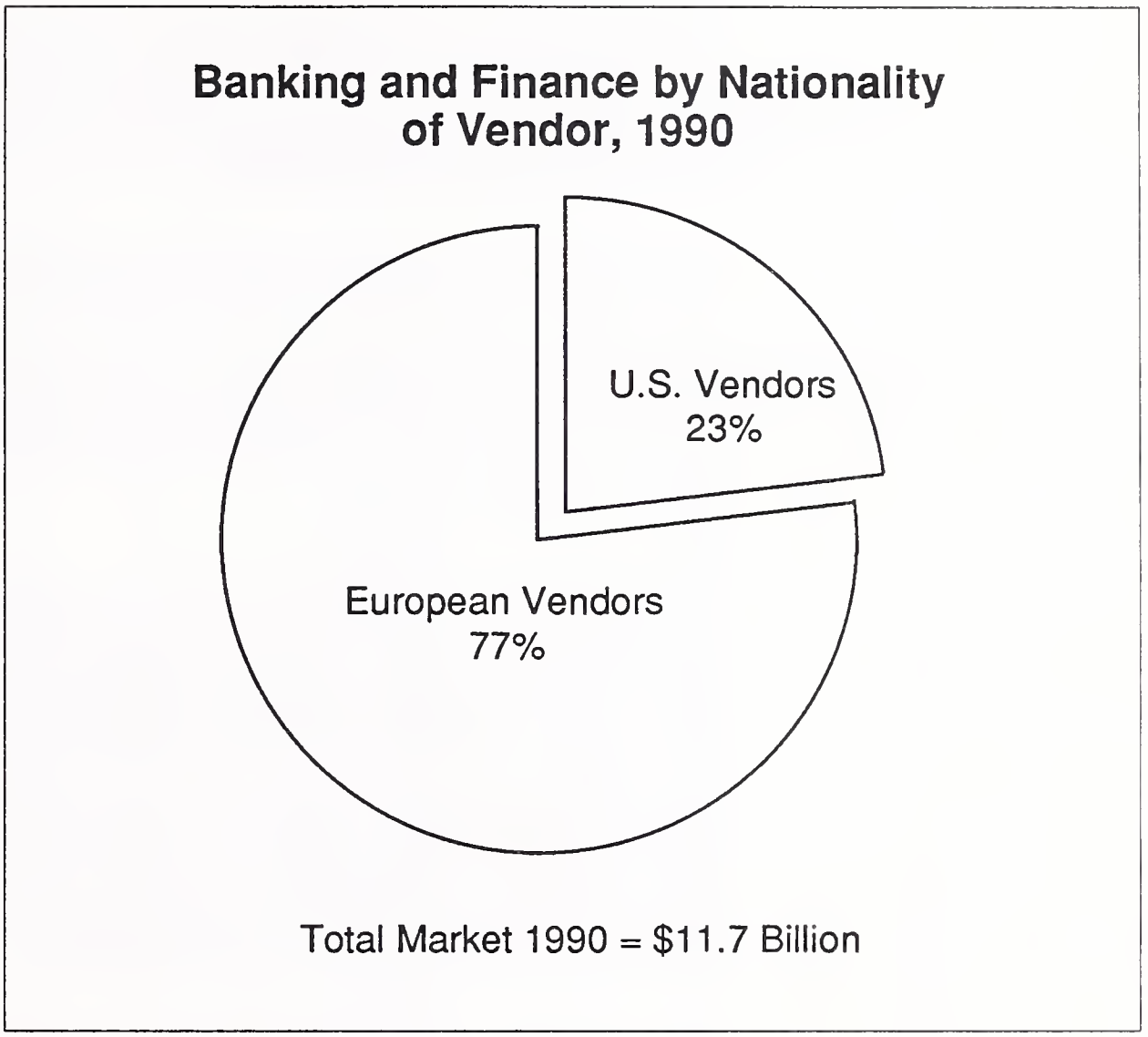
Equipment vendors, notably IBM, account for a significant proportion of total end-user revenues in the banking and finance sector. INPUT estimates that equipment vendors account for 23% of the total 1990 banking and finance sector. Semiclosed CUG processing services centres represent some 19%, and EIS vendors some 8%, of the banking and finance market. There are some 60 leading vendors in these three specific market segments; banking and finance revenues are between $10 and $1,000 million per annum. To these 60, some 20 other leading independent vendors with general banking and finance revenues over $50 million per annum can be added to give a total of about 80 vendors controlling some 70% of total banking and finance revenues.

EXHIBIT IV-3



In addition to a high proportion of total revenues controlled by a limited number of vendors, INPUT estimates that some 23% of the total banking and finance market in 1990 was accounted for by U.S. vendors, as is illustrated by Exhibit IV-4. This percentage is marginally higher than the penetration of U.S. vendors in the overall West European software and services market, which INPUT estimates to be some 21%.

EXHIBIT IV-4



The reason for this slightly higher involvement in banking and finance is that this sector has been one of the first industrial sectors in Western Europe to begin to become pan-European. Although there have been significant differences from country to country, these differences have tended to be in front-office banking and finance systems. As discussed in Chapter III, IBM accounts for some 60% to 65% of back-office equipment in European banks. Unisys is also strong in back-office systems.

The leading U.S. vendor in the Western European banking and finance sector is Andersen Consulting. It has become a major vendor in developing and assisting in the development of complex banking and finance systems, such as electronic stock exchanges. BIS, owned by Nynex, is the market leader in back-office packages for securities houses and international banking, whereas Telerate is second to Reuters in EIS for securities markets. Other important U.S. vendors are GEIS, (processing and network services) and EDS (processing, systems integration and custom software services for the securities market).

Following 1992, INPUT considers that the involvement of U.S. vendors, especially equipment vendors, could well increase further in the banking and finance sector. There is considerable interest in EEC market sectors that will become more uniform after 1992 from larger vendors, both U.S. and European. Banking and finance is a prime target.

As Exhibit IV-4 indicates, equipment vendors are another key sector of this market. Competition between equipment vendors to control key market sectors is growing, especially as the general effect of UNIX and declining equipment prices force vendors to look more to software and services as an alternative profit stream. INPUT identified this trend in 1989 research. INPUT research in 1990 indicates that this trend is becoming more widespread.

INPUT believes that European and U.S. equipment vendors are trying and will continue to try to develop strategic alliances with key software and services vendors in the area of banking and finance over the next few years. These equipment vendors would like exclusive agreements, but such agreements will be resisted by the independent software and services vendors. This resitance may lead to certain equipment vendors' acquiring independents. Without any doubt the moves that IBM has made in taking minority shares in many small- to medium-sized independents in many market sectors has lead to most equipment vendors' seriously reviewing their acquisition policies.

Exhibit IV-5 lists the leading vendors in the banking and finance sector of the West European software and services market. Of these top 10 vendors, three are equipment vendors; IBM and Unisys specialise in back-office systems and Nixdorf in front-office turnkey systems.

Of the remaining seven independent leading vendors, three are EIS vendors (Reuters, Telerate and Telekurs). All three sell other services than EIS; in particular, Telekurs provides bank processing services for Swiss banks. Of the remaining four vendors, three are French (Cap Gemini Sogeti, Sligos and Sema) and one is a U.S. vendor (Andersen); all provide professional services to the banking and finance sector.

2. Semiclosed Segments

A number of key areas of the software and services market in banking and finance are effectively semiclosed to many independent vendors. This closure is because of historic alliances between vendors and end users or due to the dominance of certain vendors in particular market areas.

EXHIBIT IV-5

Top Vendor Rankings and Market Shares, 1989 Total Banking and Finance Sector

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	IBM	9.3	920
2	Reuters	6.6	650
3	Nixdorf	4.4	435
4	Unisys	2.3	230
5	Cap Gemini Sogeti	2.2	220
6	Telekurs	2.1	210
7	Sligos	1.6	160
8	Telerate	1.5	150
9	Sema	1.3	130
10	Andersen	1.3	130
	Other	67.4	6,645
	Total	100.0	9,880

a. EIS

A considerable proportion (at least 40%) of the securities subsector is revenue from electronic information services (EIS) vendors. Vendors are Dun and Bradstreet's Datastream, Extel, Quotron, Reuters, Telerate and Telekurs. Dun and Bradstreet put Datastream up for sale in April 1990. Reuters is reported to be interested in purchasing it. Reuters is by far the largest of these EIS vendors, controlling over 60% of the West European EIS market for the securities subsector. The leading EIS vendors in the banking and finance sector are listed in Exhibit IV-6.

EXHIBIT IV-6

Leading EIS Vendors in Banking and Finance

Vendor	Country of Ownership
ADP	U.S.
Affarsdata	Sweden
DAFSA	France
Datastream (Dun and Bradstreet)	U.S.
Extel (United Newspapers)	U.K.
Finstat (Financial Times)	U.K.
Quotron (Citicorp)	U.S.
RCI	France
Reuters - Finsbury - IPSharp	U.K.
Tele Colomus (Radio Schweiz)	Switzerland
Telekurs	Switzerland
Telerate (Dow Jones)	U.S.
Topic (International Stock Exchange, London)	U.K.

b. CUG Processing Centres

Some 24% of the banking subsector is obtained by closed user group (CUG) processing centres owned by groups of banks. In northern Europe, it is common for the smaller savings and co-operative banks to have all their software and services supplied by central processing centres.

In West Germany, there are 19 of these centres. There are 11 centres for savings banks owned by county councils, and 8 for co-operative banks. The largest is Fiducia, with annual revenues around DM 180 million. Most of these centres have revenues of no more than DM 30 million. In Switzerland, Telekurs is owned by the leading Swiss banks and supplies central processing services to Swiss banks, as well as EIS and other software and services.

In Scandinavia, the concept of co-operative processing centres is common in many areas of the economy—local government, agriculture, and banking. PBS in Denmark, with revenues of DK 605 million ($80 million) in 1988, supplies all Danish savings banks with central processing services—plus software products, IS consultancy and training. PBS also supplies some services to the Danish retail banks. Similarly, Bankens Betalingssentral and Fellesdata in Norway supply processing and other software and services to savings and small banks. PBS reported revenues of NK 450 million ($65 million) in 1988 and Fellesdata NK 528 ($75 million) in 1989.

In southern Europe, there are also similar centres. In Italy, there are some five co-operatively owned bank processing centres. In addition, there are a number of credit/debit card processing centres throughout Europe and national interbank clearing centres owned by retail banks, plus the international interbank clearing centre in Brussels (SWIFT), which has annual revenues of around $90 million.

These centres are owned by a number of different banks, none with a majority share. If a centre is majority-owned by a single bank and provides services to this bank, then INPUT excludes such captive revenues from its market estimates.

c. Trends for the 1990s

The 1990s could see the control that these key vendors have in these areas gradually diminish.

In the area of EIS Reuters and Telerate are beginning to lose control over end users, as securities houses have forced EIS vendors to deliver information as direct digital feeds rather than as complete turnkey information systems via proprietary terminals. The development of PIPE will compete directly with these traditional EIS vendors for intraEuropean securities information. PIPE could deliver information cheaper than traditional EIS vendors and so begin to break the control that they have over this part of the market.

In the area of CUG processing centres, mergers and acquisitions activity could substantially affect the banking user base of specific processing centres. If mergers and acquisitions do affect CUG processing centres, then these centres will have to look to sell their traditional services and expertise to the open market, as their captive market could change radically or disappear.

In Denmark, mergers and acquisitions have already affected the market. The merger of the leading six banks is likely to make them develop future products and services internally, rather than use external vendors such as PBS. As a result, PBS is already considering the implications and looking at the external markets, such as EDI, to which PBS might sells its expertise.

In early 1990, the largest credit card processing services company, SIGNET, was put up for sale. This U.K. processing centre is currently owned by National Westminster Bank, Midland Bank, Lloyds Bank and Royal Bank of Scotland. It accounts for about 50% of U.K. credit card processing. Parties interested in buying SIGNET are reported to be First Data Resources, American Express, EDS, GZS of Germany and Crédit Lyonnaise of France. The sale of one of the traditional jointly owned bank processing centres may also be an indication of the type of changes in the CUG processing sector that can be expected in the 1990s.

System software is supplied by a number of vendors, both equipment and independent vendors. The new fault-tolerant mainframes from Tandem and Stratus, plus the new fault-tolerant minicomputer from Digital, could take market share from IBM and open this sector for independent vendors.

The 1990s could see significant changes in the European banking and finance market. This area of the market, traditionally controlled by a limited number of vendors, could become more open. As the effects of the Single European Act make the individual European banking and finance markets more similar, large vendors are likely to try to capture and control sectors of it.

B

Delivery Modes

Exhibit IV-7 illustrates the breakdown of the banking and finance sector by delivery mode. Accepting that some 70% of processing services is supplied by CUG vendors and that 30% of software products is systems software delivered by equipment vendors, the largest sector available to independent software and services vendors in banking and finance is professional services.

EXHIBIT IV-7

Banking and Finance Sector by Delivery Mode
1990-1995

Subsector	Market Forecast ($ Millions) 1989	1990	1990-1995 CAGR (Percent)	1995
Processing Services	2,700	3,000	10	4,900
Network Services	1,200	1,630	25	4,900
Software Products	1,980	2,360	19	5,620
Professional Services	2,880	3,450	21	8,900
Systems Integration	300	370	22	1,000
Turnkey Systems	820	960	17	2,100
Total	9,880	11,770	18	27,420

1. Processing Services

Processing services in the banking and finance market is a mix of the CUG services offered by vendors owned by groups of banks (as discussed in section A-2 above), and independent vendors.

CUG processing services vendors researched by INPUT are currently benefiting from the demand for increases in computer systems by the end-user base. In many instances, vendors are national leaders in developing sophisticated customer terminal systems, such as ATMs, EFTPoS, home banking and EDI.

There are a number of vendors owned by banks, or in whom banks have a significant equity stake. Some of these vendors sell processing services to clients of the parent banks, such as Centre File in the U.K., which is owned 100% by the National Westminster Bank. Centre File sells processing services to small businesses accessed through PC terminals.

GEIS offers similar customer-related processing services for banks. It has developed its own generic software that allows corporate customers of banks to access customer services, such as balance reporting and payment instructions. GEIS runs this service for individual banks, which relabel this service under their own logos.

In the U.K. securities market, independent vendors such as NMW and Quotient offer back-office processing services. Similarly in France, Tibet offers processing services for securities firms.

The increasing use of fault-tolerant processing has generated demand for disaster recovery services for specific types of fault-tolerant equipment. Any end user moving to fault-tolerant equipment needs to have the guarantee that its systems will be up and running at all times. Fault-tolerant systems can easy lull companies into false senses of security. If there is a disaster, such as a fire (or earthquake as in California), these end users need disaster recovery services. Sema and Nexus Payment Systems have recently established disaster recovery services for Stratus equipment and specifically for the U.K. securities market.

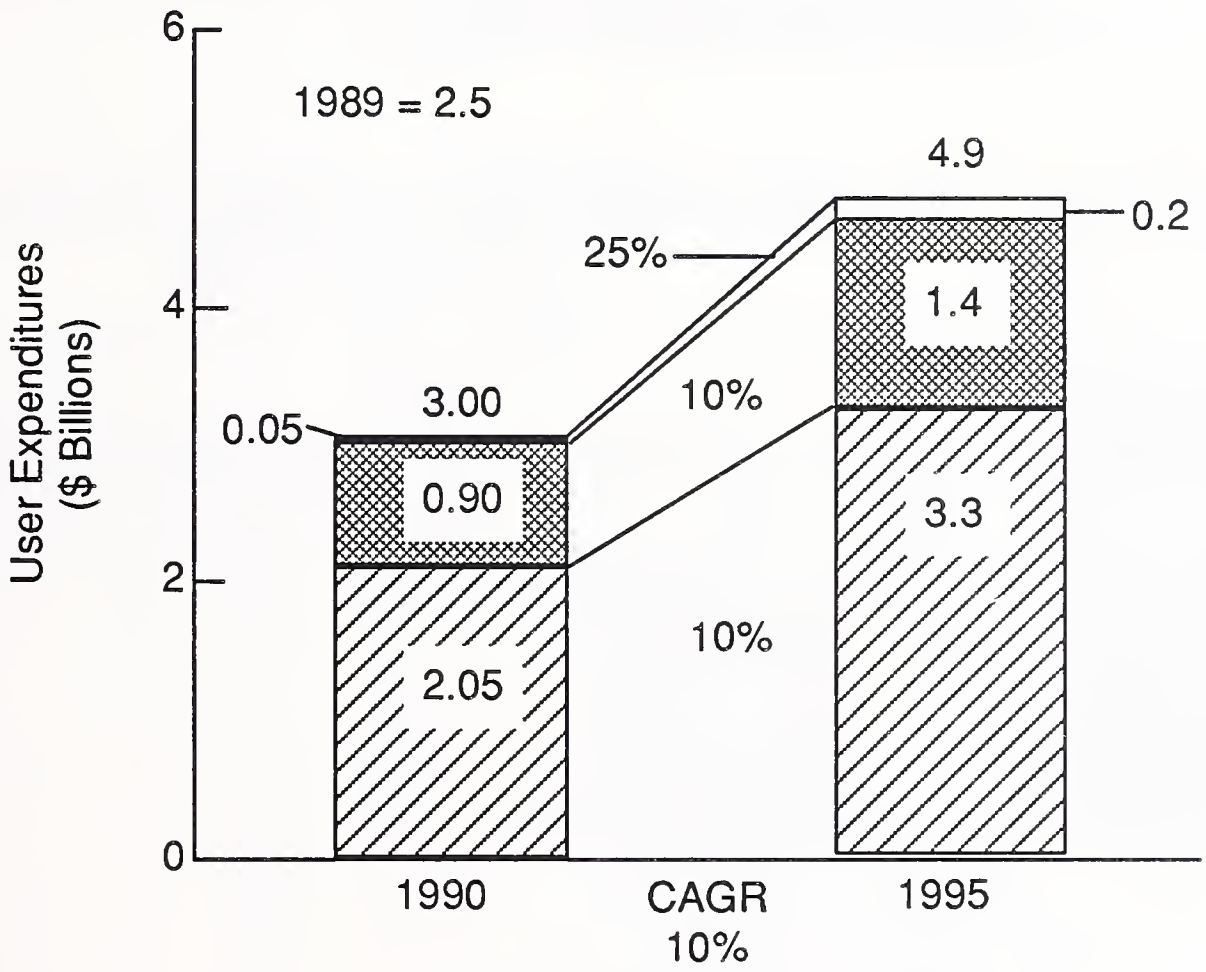
The systems operations market based on vendor-owned equipment for banking and finance is small. Very few banks are prepared to let external vendors manage their information systems, especially if the bank's prime customer database resides on the system. System operations contracts, therefore, tend to be for departmental systems, rather than major banking systems.

INPUT sees that a potential development area for systems operations services in the 1990s might be EFTPoS services. The vendor would own the equipment and the central EFTPoS software. A packaged solution could be developed for specific financial institutions or for retail groups whereby the vendor operates the complete EFTPoS system and possibly rents the software to the client. Similarly there may be options in the 1990s for independent vendors to manage card-processing networks under systems operations contracts.

INPUT estimates that processing services total $3.0 billion in 1990 and should grow by 10% per annum to $4.9 billion by 1995, as illustrated by Exhibit IV-8. Systems operations revenues are forecast as $50 million in 1990. With the tendency for banks to grow through mergers and acquisitions, INPUT sees that there should be more opportunities for systems operations in this sector and that systems operations revenues should grow by some 25% per annum over the period up to 1995.

EXHIBIT IV-8

Processing Services by Subsector, 1990-1995



- Systems Operations
- Non-CUG Transaction, Utility and Other Services
- CUG Processing Services

Exhibit IV-9 lists the top processing services vendors in the banking and finance sector. Of these top ten vendors, two are U.S. owned (GEIS and IBM), the rest European. Five are co-operative processing centres—Telekurs in Switzerland, Fiducia in West Germany, Bankens Betalingssentral and Fellesdata in Norway and PBS in Denmark. Sligos processes plastic and smart card information for a wide range of financial institutions and retailers.

EXHIBIT IV-9

Top Vendor Rankings and Market Shares, 1989 Processing Services

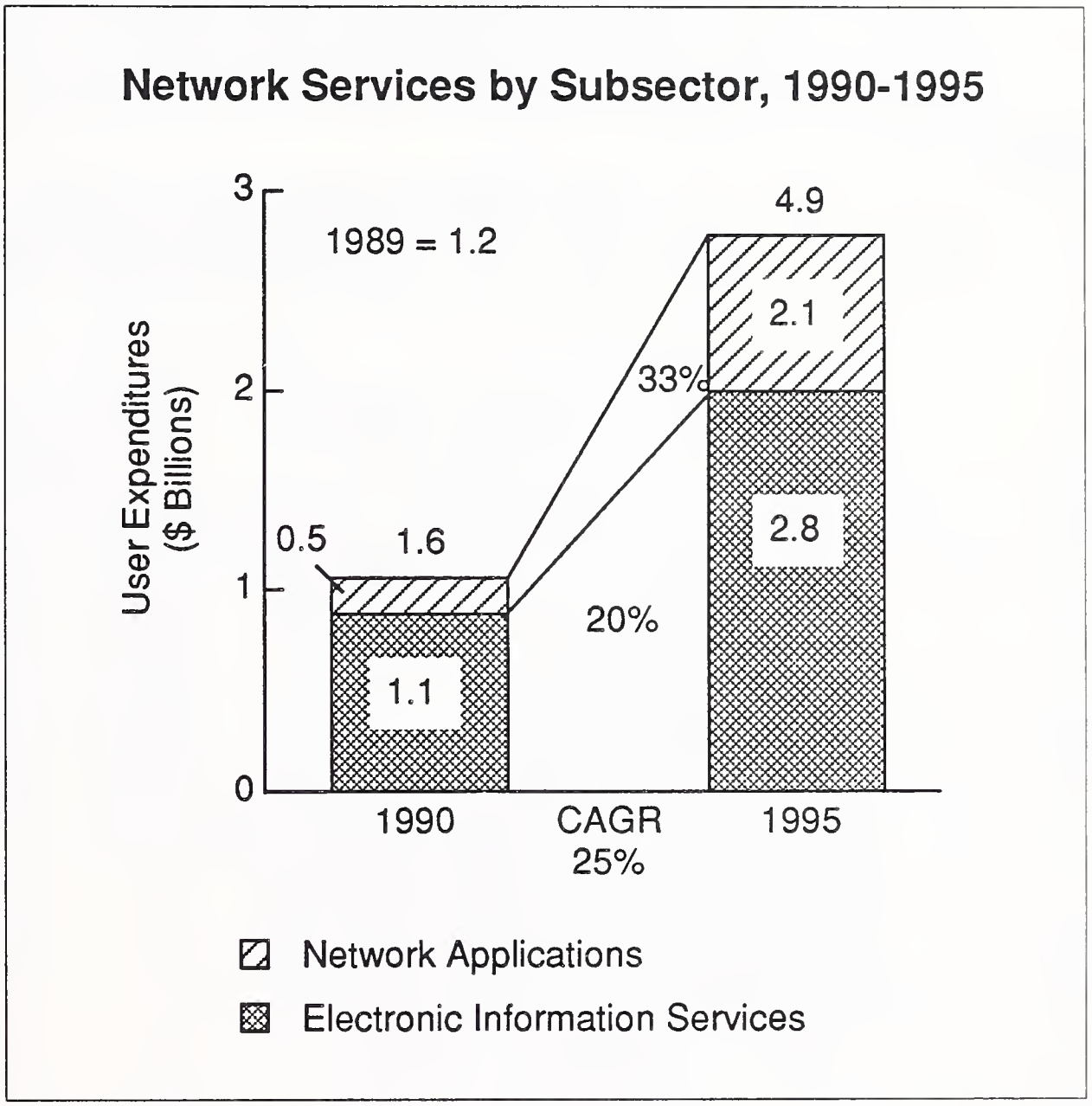
Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1 =	Telekurs	3.5	95
1 =	GEIS	3.5	95
3 =	Fiducia	3.1	85
3 =	Finsiel	3.1	85
3 =	Sligos	3.1	85
6	IBM	3.0	80
7	Bankens Betalingssentral	2.8	75
8	PBS	2.6	70
9	Fellesdata	2.4	65
10	SG2	2.0	55
	Other	70.9	1,910
	Total	100.0	2,700

2. Network Services

EIS represents some 70% of network services for the banking and finance sector. INPUT forecasts that demand for EIS will be driven by the development of the full electronic stock exchanges in all major

European bourses. The analysis of percent growth in the network services sector is shown in Exhibit IV-10.

EXHIBIT IV-10



The network applications subsector is largely made up of EFT services, its strong growth will be maintained through EFTPoS systems' being extended through the demand for debit cards.

Exhibit IV-11 lists the leading vendors in network services for banking and finance. Three of the top vendors—Reuters, Telerate and Telekurs—are EIS vendors. The international interbank clearing service, SWIFT in Brussels, has around $85 million in revenues within Europe. Major network operators—such as GEIS, Transpac and AT&T Istel—are also key vendors in this sector.

EXHIBIT IV-11

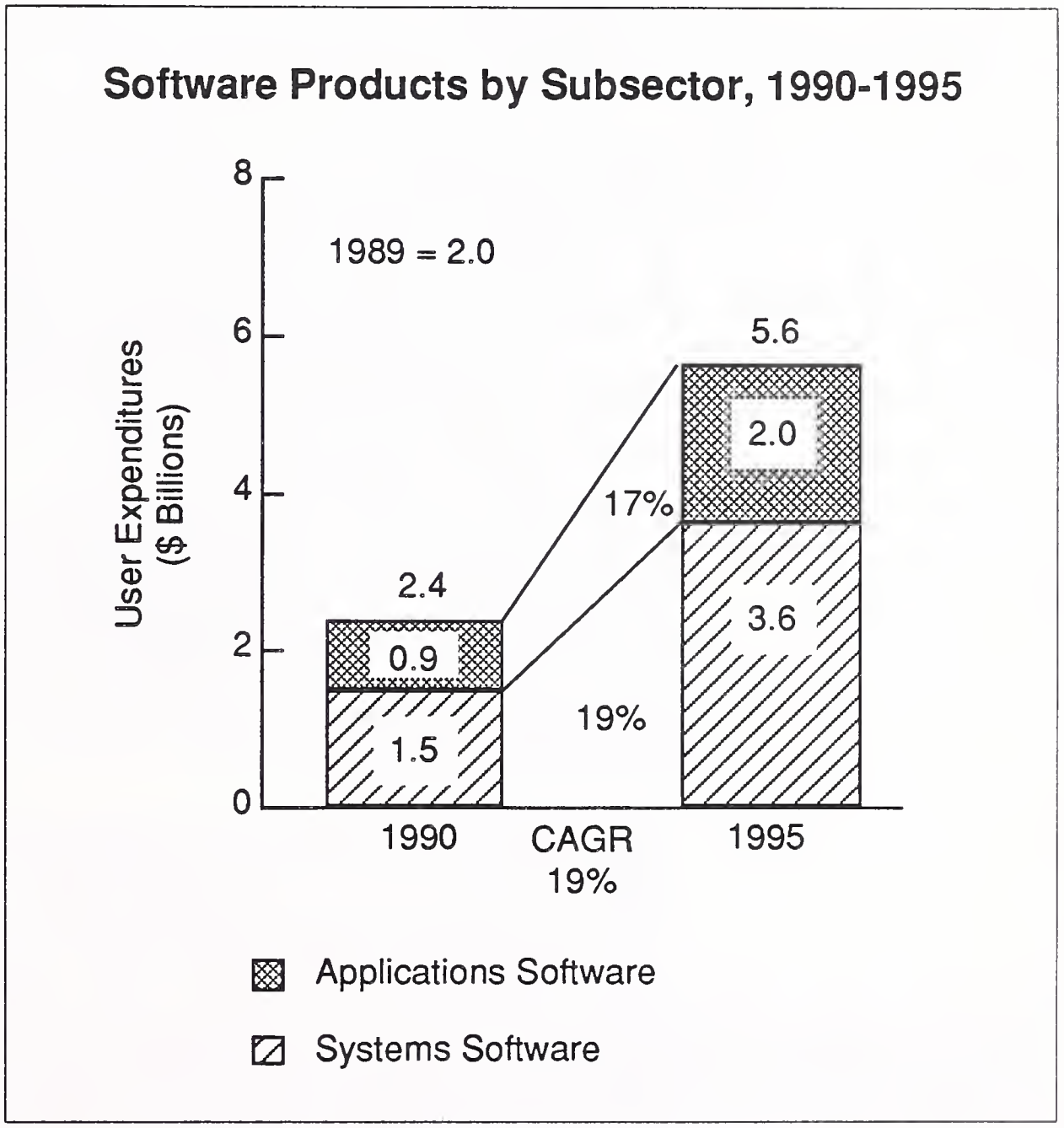
Top Vendor Rankings and Market Shares, 1989 Network Services

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	Reuters	43.0	520
2	Telerate	8.8	105
3	SWIFT	7.1	85
4	Telekurs	5.0	60
5	Telesystemes	2.1	25
6 =	Transpac	1.3	15
6 =	AT&T Istel	1.3	15
8	GEIS	1.1	13
9	PBS	1.0	12
10	ADP	0.8	10
	Other	28.5	340
	Total	100.0	1,200

3. Software Products

As discussed, system software is an important sector for the banking and finance software and services market. As Exhibit IV-12 illustrates, systems software represents some 70% of the total software products market for the banking and finance sector. This systems software is principally mainframe software, with IBM by far the most important vendor.

EXHIBIT IV-12



The main areas of system software for the banking and finance sector can be summarised as follows:

- Operating systems
- Database (in the future, relational)
- Utilities

- Development tools
  - CASE
  - 4GLs

- Expert systems

- Image processing

- Networking
  - Management
  - Enabling
  - Switching (EDI, ATMs, EFT, EFTPoS, E-Mail)

IBM's IMS database has been used extensively in the banking sector of the market. Some of these systems have been developed using IBM's DB2 relational database, but in many cases this has not yet been done. As discussed, the development of prime banking customer databases from the old account number structures to customer name records is a major issue for the industry. The fact that many banks are still using IMS only exacerbates the problem of migrating these systems to new, flexible database structures for the 1990s.

Unisys has exploited its two 4GLs, MAPPER and LINC, in the financial market. It has developed FSA (Financial Systems Architecture) as a base for branch office solutions and Global Wholesale Banking (GWB-LINK) to develop international wholesale banking systems. The Skipton Building Society in the U.K. has used LINK as the base for Skipton's mortgage administration package, which it is now looking to resell to other financial institutions.

CASE tools and 4GLs are being increasing used in the banking market. They are seen as very important to assist banks to develop the complex custom solutions that they need for the 1990s. IS managers in banks have stated clearly to INPUT that it is critical that they complete development projects successfully and on time. Managers are increasingly seeing that CASE tools will assist internal custom software development, especially in the larger financial institutions. For the smaller banks, 4GLs can provide flexible total solutions that can be relatively easily modified and changed.

Expert systems have begun a revival, especially in France, after a few years of low interest. In the banking market, expert systems are used as part of large systems to improve overall efficiency. In the mid-1980s, expert systems were seen as a major opportunity area. However, the initial solutions developed using expert systems often did not meet expectations and so interest died. Vendors that have specialised in expert

systems and persevered, such as Gecosys in Belgium and Concept in France, are finding a considerable renewal of interest, with growth rates over 30% per annum.

Because networking is an essential element of today's banking systems, network management and enabling software are also an important growth area. Growth potential for sales of this type of software will be particularly good for EDI when standards are agreed on by the EDIFACT Board for banking documents. The agreement of EDIFACT standards for banking documents will generate considerable demand for EDI enabling software and software linking in-house systems to specific EDI networks.

With the prospects for very strong growth in EFTPoS, there is also good growth potential for central EFTPoS switching software. Vendors such as BASE 24 and SD-Scicon are competing strongly in the area.

The demand for applications software in the banking and finance market is in specific areas:

- Securities back-office solutions

- AI for securities back-office systems
  - Charting
  - Market analysers
  - Risk assessment
  - Forecasting
  - Deal ticket making

- Small to medium-sized banking total solutions

- Customer terminals
  - ATMs
  - EFTPoS
  - Corporate PC access systems

There are many vendors competing in the applications software products market. The banking and finance sector is an area where there is potential to develop a single product that can be readily exported throughout Europe. Concept in France has been successful in this strategy, especially for the securities market.

Exhibit IV-13 lists the top vendors for software products in the banking and finance sector. Five are equipment vendors; all sell systems software, with the exception of Nixdorf, which specialises in turnkey systems.

EXHIBIT IV-13

Top Vendor Rankings and Market Shares, 1989 Software Products

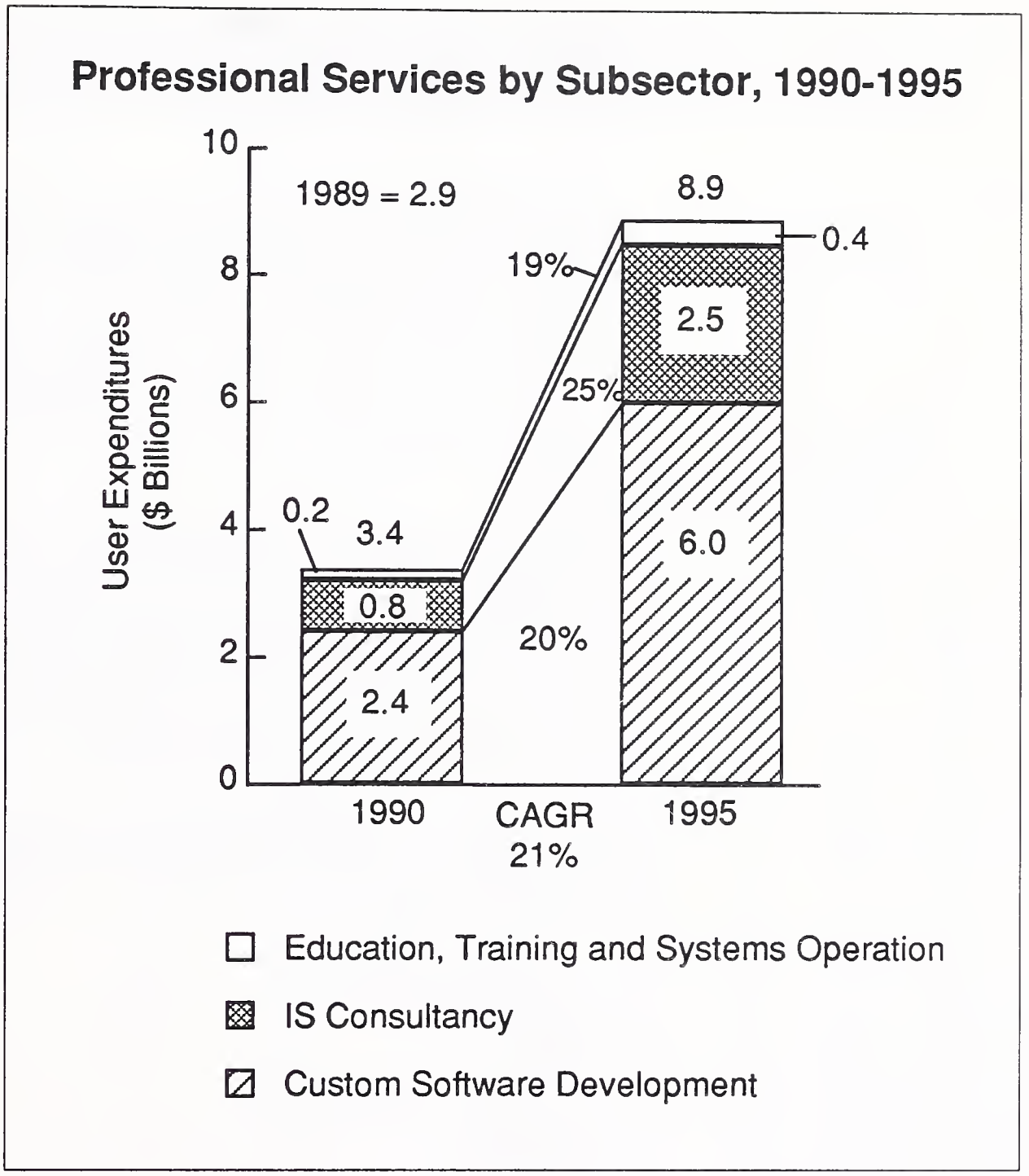
Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	IBM	27.8	550
2	Unisys	6.1	120
3	ICL	2.3	45
4 =	Bull	2.0	40
4 =	Sema	2.0	40
6 =	Nixdorf	1.8	35
6 =	BIS	1.8	35
8 =	Computer Associates	1.5	30
8 =	Concept	1.5	30
8 =	Andersen	1.5	30
	Other	51.7	1,025
	Total	100.0	1,980

4. Professional Services

Of all delivery modes, professional services is the largest and most important for banking and finance, especially for independent vendors.

Exhibit IV-14 illustrates the growth of this subsector of the market as forecast by INPUT. Custom software development accounts for some 70% of professional services revenues in the banking and finance sector, but INPUT sees that IS consultancy has the highest growth potential at 25% per annum over the next five years.

EXHIBIT IV-14



As financial institutions become bigger and more pan-European during the 1990s, they will tend to move from packaged solutions to custom solutions. There are few packaged solutions that can support large banking systems, and the bigger banks tend to look to software products for departmental solutions. The larger banks will also try to handle this custom development in-house, but increasing they are likely to have problems in guaranteeing delivery times.

Take for example two medium-sized banks that merge. Before the merger they might have been able to find software products solutions for their systems, but afterwards they might jointly be too big and have to look to custom solutions. The joint entity will shed some IS staff, leaving the best to develop what they can in-house. To ensure that development deadlines are met, IS consultants will be brought in to assist in a number

of key development areas where the bank's in-house team does not have sufficient competence. External professional service vendors may also be used to develop specific subsystems or modules through custom software development contracts.

The above scenario will push up the demand for IS consultancy and custom software at the expense of software products solutions in the banking sector. If the bank is looking to become international within the European arena, then it is very likely that not only IS consultancy will be demanded from external vendors, but also custom software development. Very few financial institutions have international experience and would look to external vendors in trying to integrate systems over a number of European countries.

Most securities firms will not undergo the same structural changes through merger and acquisition activities. Software products solutions will, therefore, often remain as the best solution. However, as front-office demands from traders become more complex, the continuing increase in the complexity of financial markets and the growing competition between European bourses will place demands on securities firms to upgrade customised front-office systems.

INPUT believes vendors should look at developing specific professional services skills to exploit niche areas in the banking and finance sector in the 1990s, such as:

- IS consultancy
  - CASE tools
  - 4GLs
  - Fault-tolerant processing
  - Security
  - Networking

- Custom software development
  - Database migration services from account number to customer name record structures for banks
  - Fault-tolerant systems development
  - Security gateway development for on-line customer systems
  - Dealing rooms' front-office systems for securities houses
  - Customised settlement and dealing systems for electronic exchanges
  - Interlinked electronic exchanges

Exhibit IV-15 lists the leading professional services vendors as identified by INPUT in the banking and finance sector. Equipment vendors such as IBM and Unisys are leading vendors in this subsector, as is ICL, principally in the U.K. Leading independent vendors are French—Cap Gemini Sogeti and Sema. Cap Gemini Sogeti sells a wide range of professional services to the banking and finance sector from IS consultancy, through

custom software development to training. U.S.-owned Andersen is very strong in assisting different bourses to develop electronic exchanges. Similarly, SD-Scicon sells custom software services to the securities market.

EXHIBIT IV-15

Top Vendor Rankings and Market Shares, 1989 Professional Services

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	IBM	8.4	240
2	Cap Gemini Sogeti	6.9	200
3 =	Unisys	3.1	90
3 =	Sema	3.1	90
5 =	Reuters	1.7	50
5 =	Andersen	1.7	50
5 =	SD-Scicon	1.7	50
8	ICL	1.4	40
9	Volmac	1.2	35
10	BIS	1.0	30
	Other	69.8	2,005
	Total	100.0	2,880

5. Systems Integration

The systems integration market in the banking and finance sector is relatively small. Banks do not look to external vendors to develop complete complex systems for themselves. Banks retain the overall management themselves and subcontract parts of their development as professional services, rather than as systems integration contracts.

Exhibit IV-16 illustrates the growth of the systems integration market for the banking and finance sector as forecast by INPUT for the years 1990 to 1995.

EXHIBIT IV-16

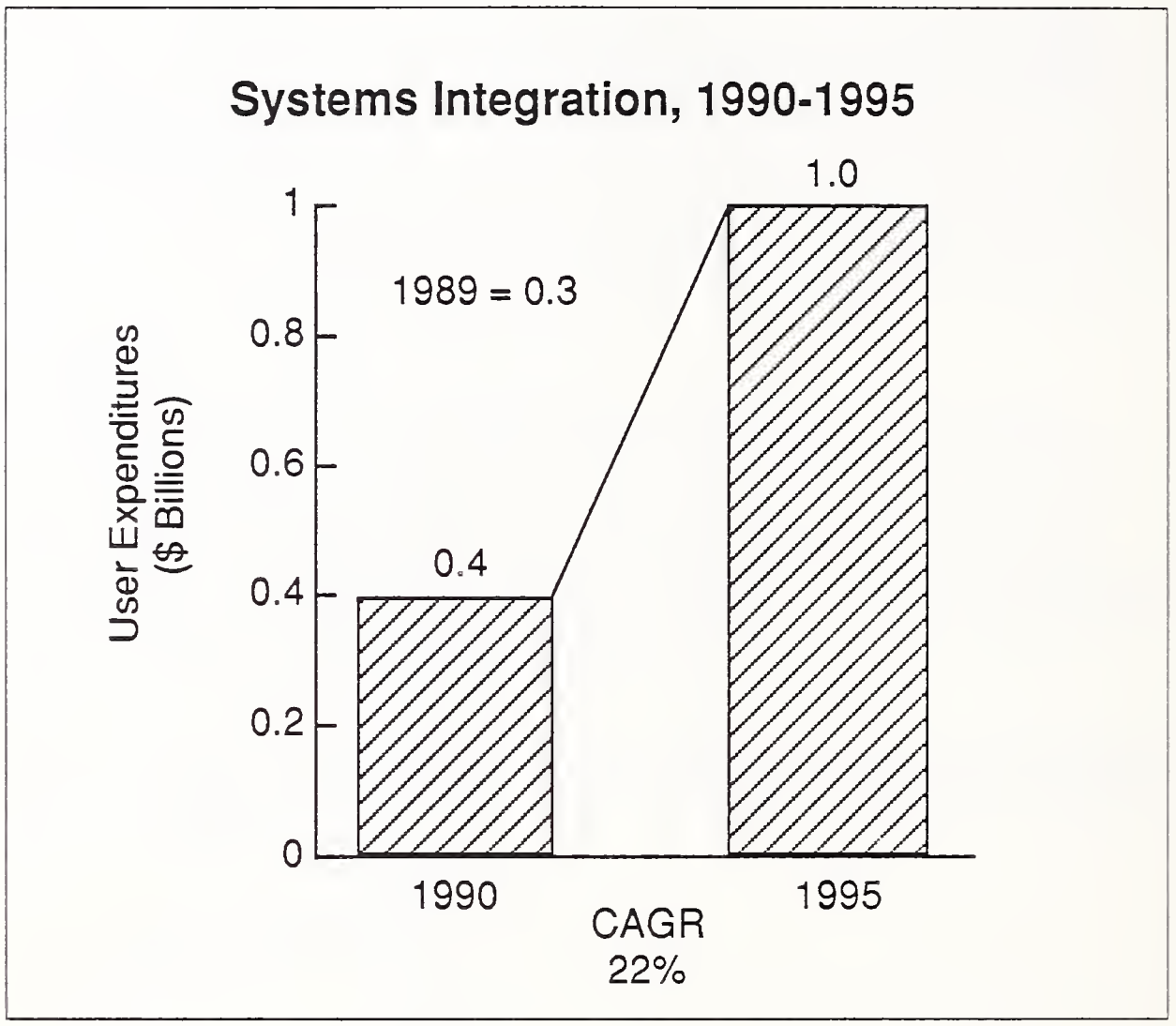


Exhibit IV-17 illustrates the leading vendors as identified by INPUT in systems integration for banking and finance. IBM is the leading vendor. Dominating the banking back-office market, IBM is involved in number of integration projects for large banks. Andersen is the top independent vendor and it has been involved in most of the major systems developments for European stock exchanges.

INPUT sees the growth potential for this market segment principally coming from the securities sector. During the first half of the 1990s, all major European bourses will continue their development of electronic systems. Pan-European projects like PIPE will add to the demand for local and international integration projects.

EXHIBIT IV-17

Top Vendor Rankings and Market Shares, 1989 Systems Integration

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1 =	IBM	16.7	50
1 =	Andersen	15.0	45
3	SD-Scicon	8.3	25
4	Cap Gemini Sogeti	6.7	20
5	Logica	5.0	15
6	Steria	4.3	13
7 =	Unisys	3.3	10
7 =	Data Logic	2.7	8
9 =	Siemens	2.3	7
9 =	ICL	2.3	7
	Other	33.4	100
	Total	100.0	300

6. Turnkey Systems

The turnkey systems subsector for banking and finance is forecast by INPUT to be $1.0 billion in 1990 and should rise to $2.1 billion by 1995, as is illustrated by Exhibit IV-18. The two prime markets for turnkey systems in banking and finance are branch office systems for retail banks and EIS systems for securities traders. With IBM dominating back-office systems and preferring to sell its equipment through channels in which it maintains a positive relation with the end user, the opportunities for turnkey systems in many areas of banking are limited. Also, since these back-office systems are generally on mainframes, turnkey is not an appropriate delivery mode.

EXHIBIT IV-18

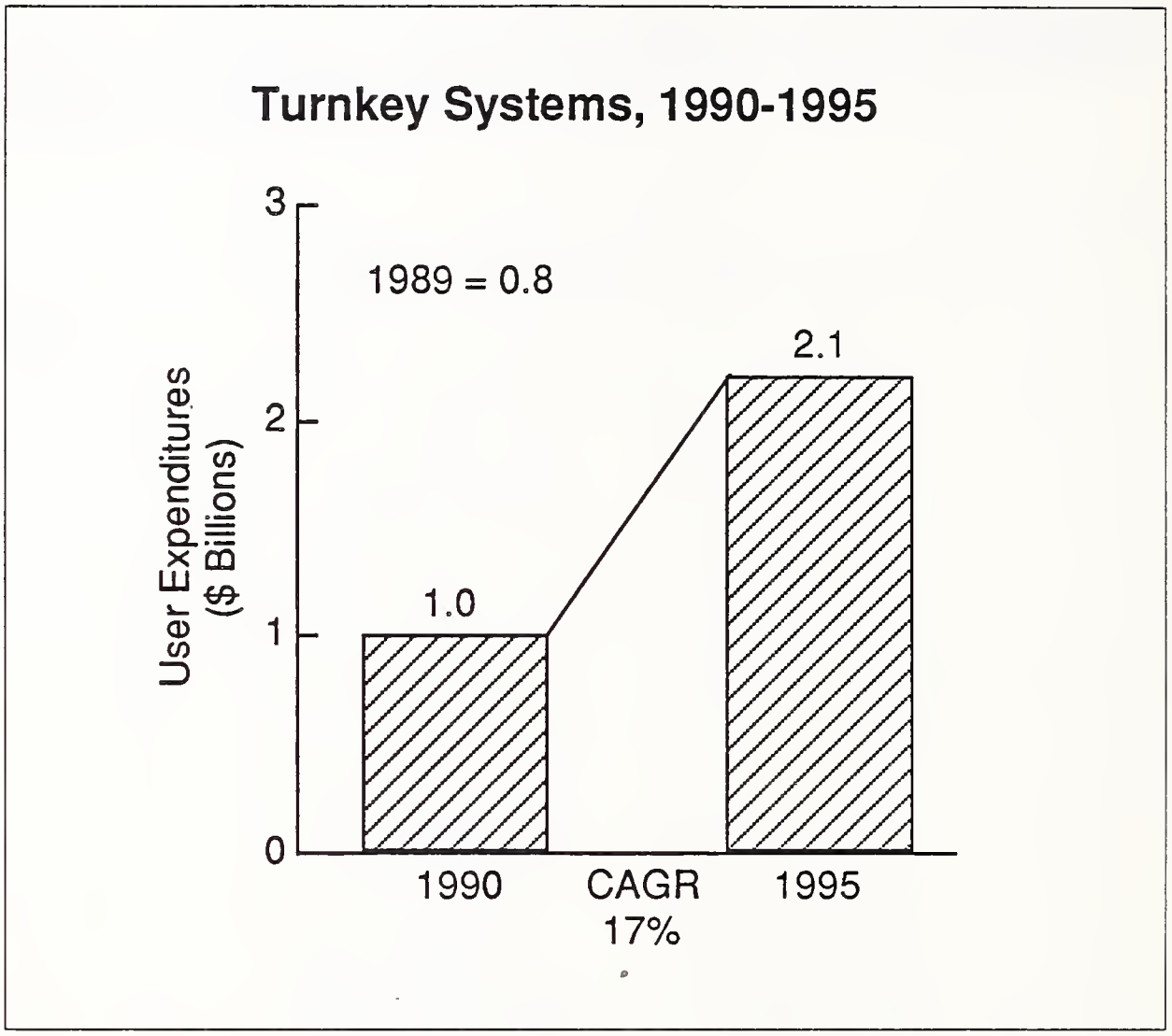


Exhibit IV-19 lists the leading turnkey vendors in banking and finance as identified by INPUT. Nixdorf, the leading European turnkey vendor, is the most important vendor in turnkey systems for banking and finance. The West German banking market is Nixdorf's main market. Having recently been bought by Siemens, Nixdorf will be able to consolidate its total banking systems as a division of Europe's largest equipment vendor.

EIS vendors Reuters and Telerate sell turnkey dealing systems. Both have sophisticated touch-sensitive terminal systems for foreign-exchange dealing, plus systems for equity quotations.

EXHIBIT IV-19

Top Vendor Rankings and Market Shares, 1989 Turnkey Systems

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	Nixdorf	48.8	400
2	Reuters	9.8	80
3	Sligos	6.1	50
4	Nokia Data	4.3	35
5	McDonnell Douglas	3.0	25
6 =	Telekurs	2.4	20
6 =	Hoskyns	2.4	20
8	Telerate	1.8	15
9	Olivetti	1.5	12
10	Unisys	1.0	8
	Other	18.9	155
	Total	100.0	820

C

Leading West European Country Markets

Exhibit IV-20 illustrates the West European banking and finance sector by country. France, the U.K. and West Germany account for some 66% of the total banking and finance sector and are substantially larger markets than for any other country. However, the detailed makeups of the banking and finance sectors for these three leading countries are significantly different.

EXHIBIT IV-20

Banking and Finance Sector by Country, 1990-1995

Country	Market Forecast ($ Millions)			
	1989	1990	1990-1995 CAGR (Percent)	1995
U.K.	2,280	2,670	17	5,890
France	2,180	2,610	18	5,980
West Germany	2,140	2,550	18	5,880
Italy	770	930	19	2,240
Benelux	720	840	20	2,090
Scandinavia	1,080	1,280	20	3,200
Rest of Europe	710	890	19	2,140
Total	9,880	11,770	18	27,420

Exhibit IV-21 shows the breakdown of the 1990 securities subsector by country. The U.K. accounts for some 40% of total revenues for this subsector, followed by France with 20%.

Exhibit IV-22 illustrates the breakdown for the banking subsector by country for 1990. For banking, Germany is the largest country market and accounts for 25% of total 1990 revenues. The three leading country markets—Germany, France and the U.K.—total some 65% of total 1990 revenues.

EXHIBIT IV-21

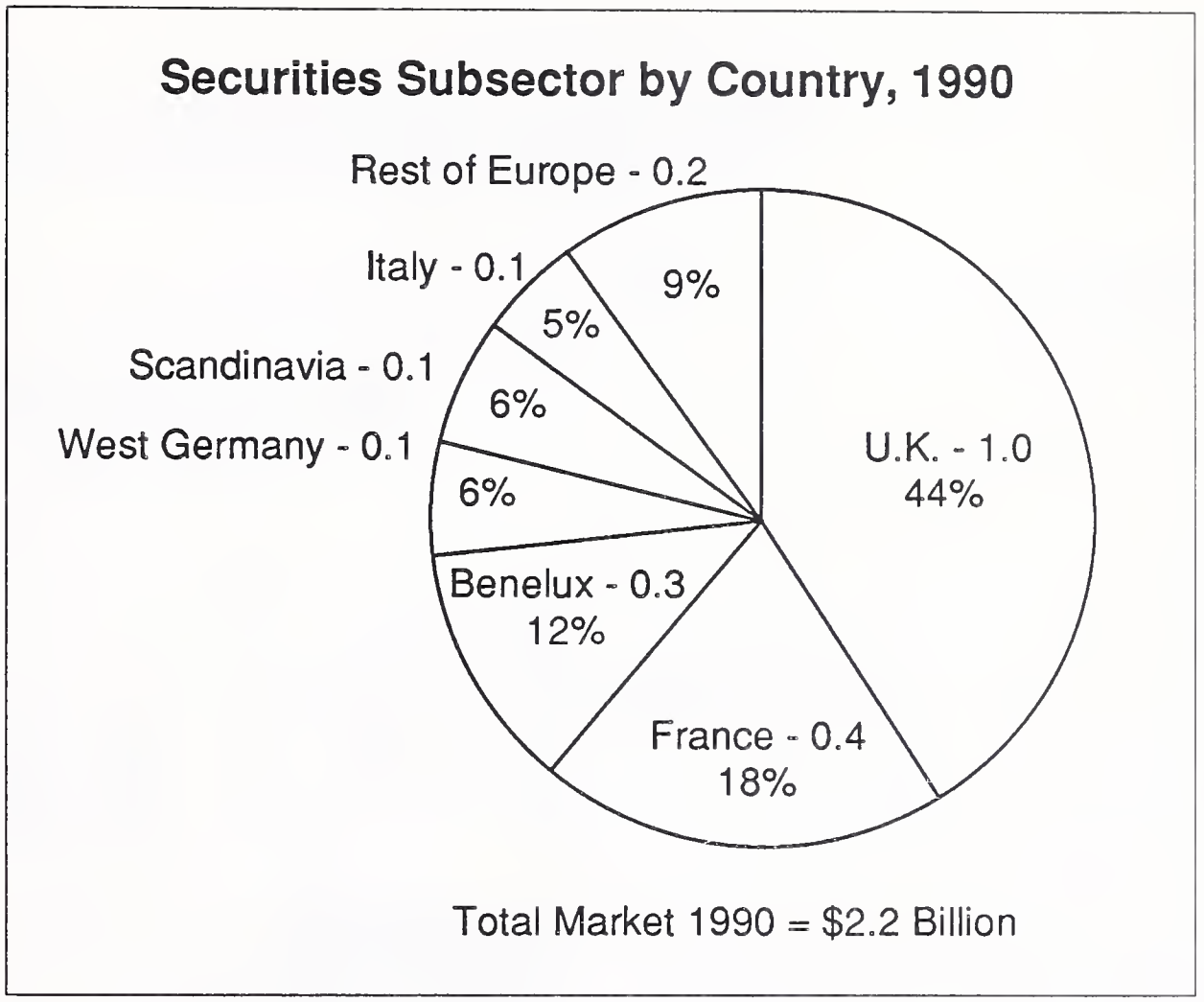
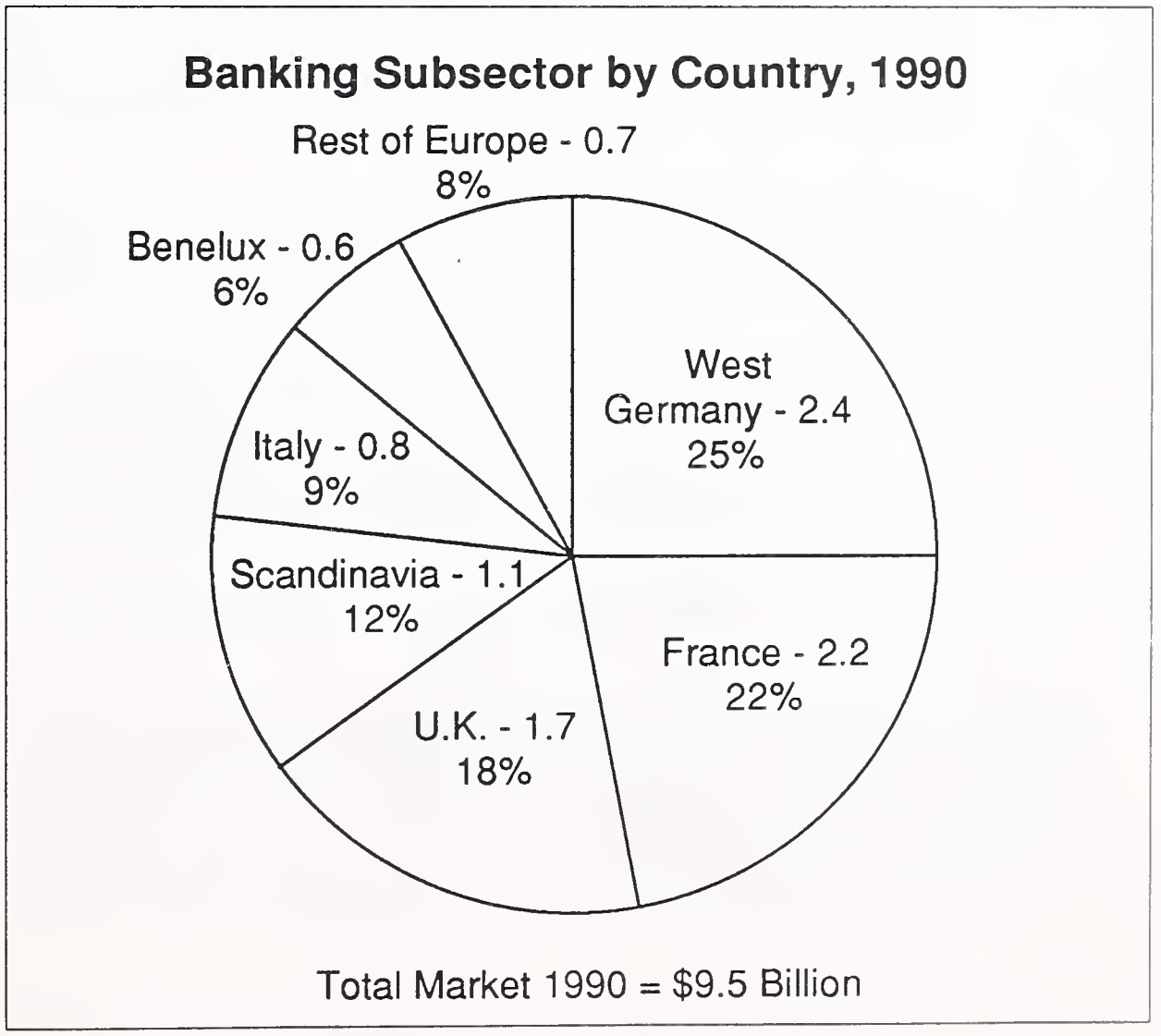


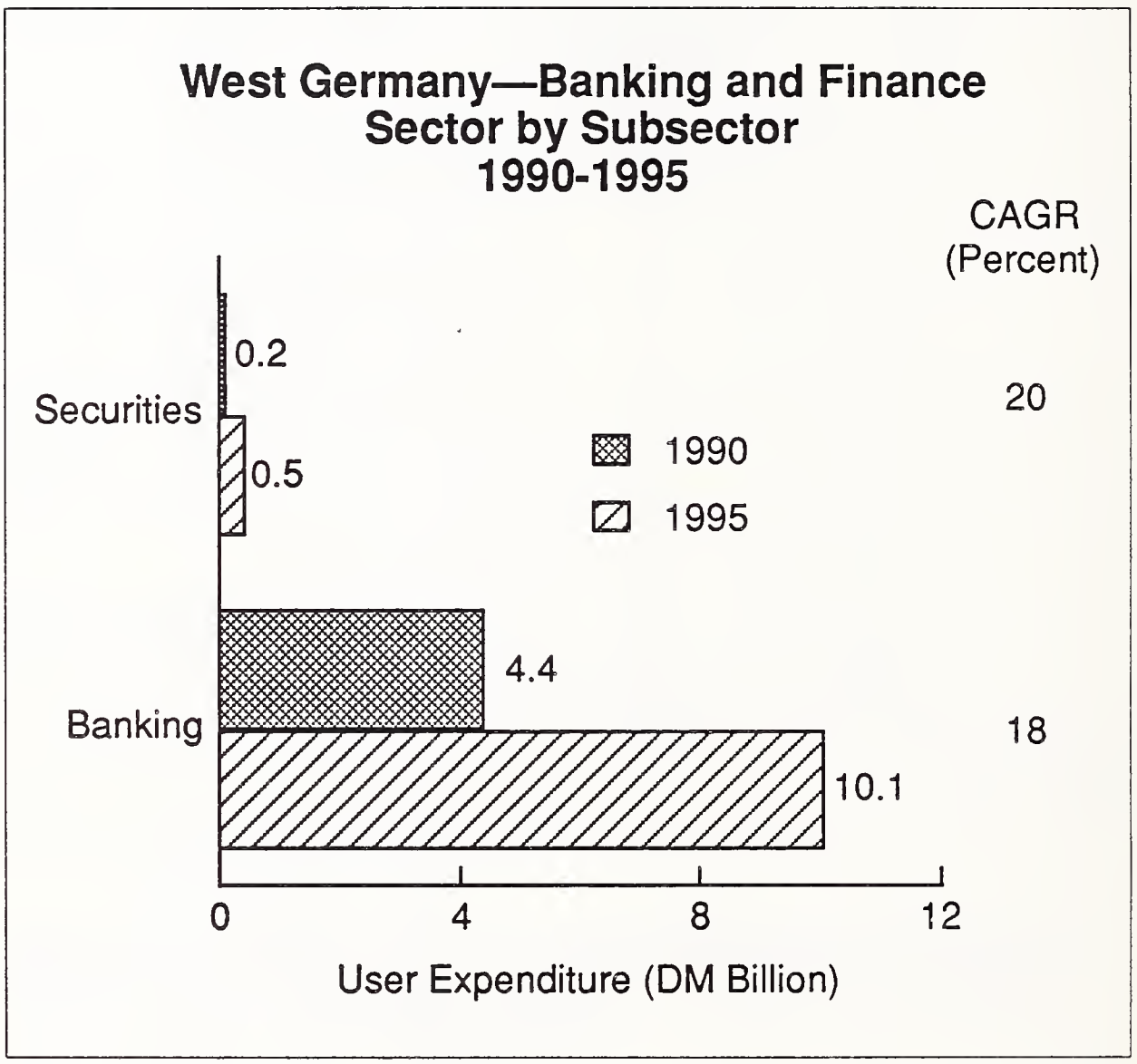
EXHIBIT IV-22



1. West Germany

Exhibit IV-23 illustrates the growth of the software and services market for the securities and banking subsectors of the West German market for the period 1990 to 1995.

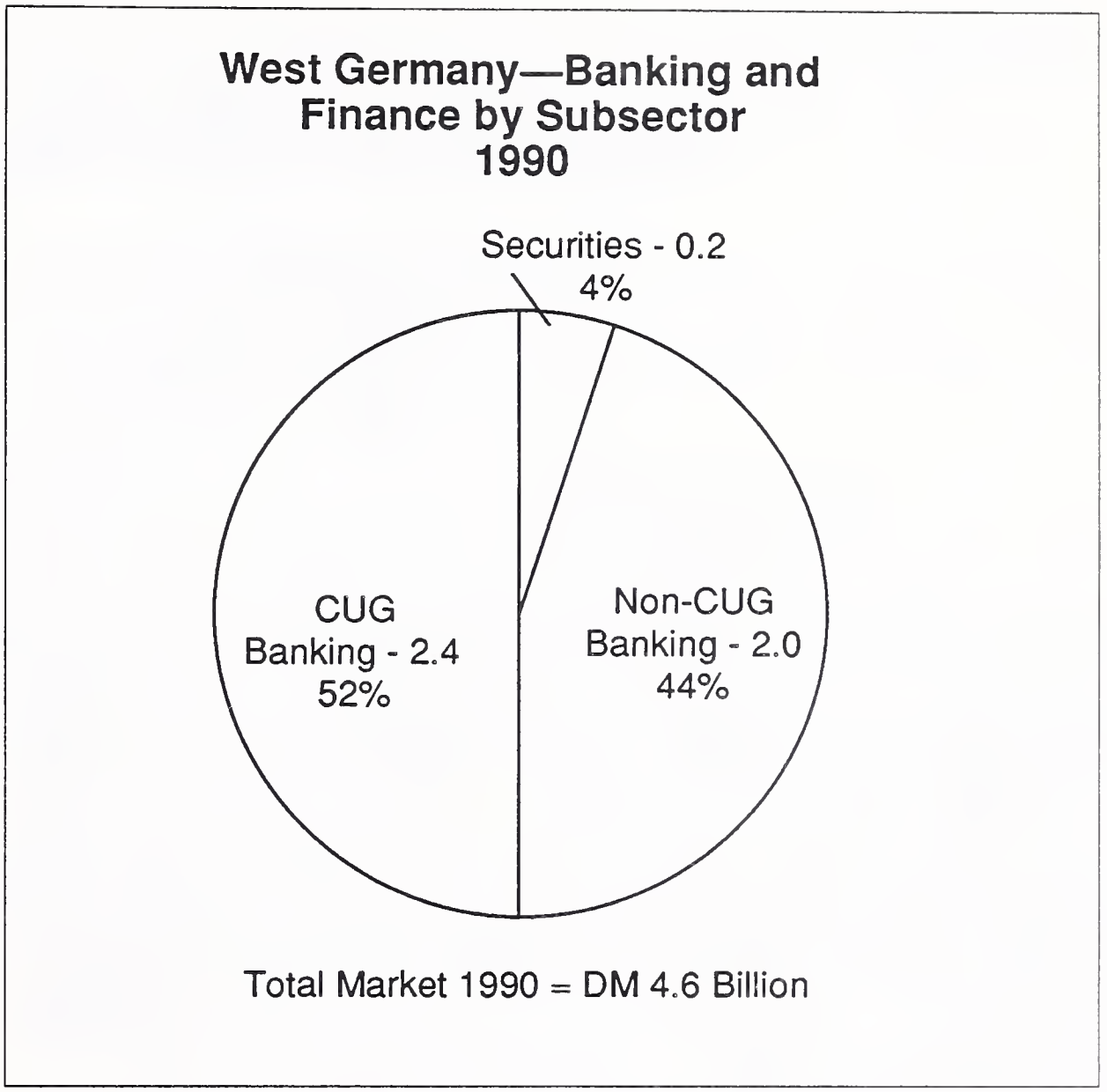
EXHIBIT IV-23



In Germany the market for software and services for the securities subsector is very small, accounting for only some 4% of the total banking and finance sector revenues. Currently nearly all developments are handled by the German stock exchanges or by the leading banks that control securities trading. INPUT does not see that this control is likely to significantly change over the next few years.

The software and services market for the banking sector in Germany is the largest country market in Western Europe. However, as Exhibit IV-24 illustrates, over half of this banking subsector is controlled by the 19 CUG processing centres servicing Germany's 600 savings and 3,000 co-operative banks.

EXHIBIT IV-24



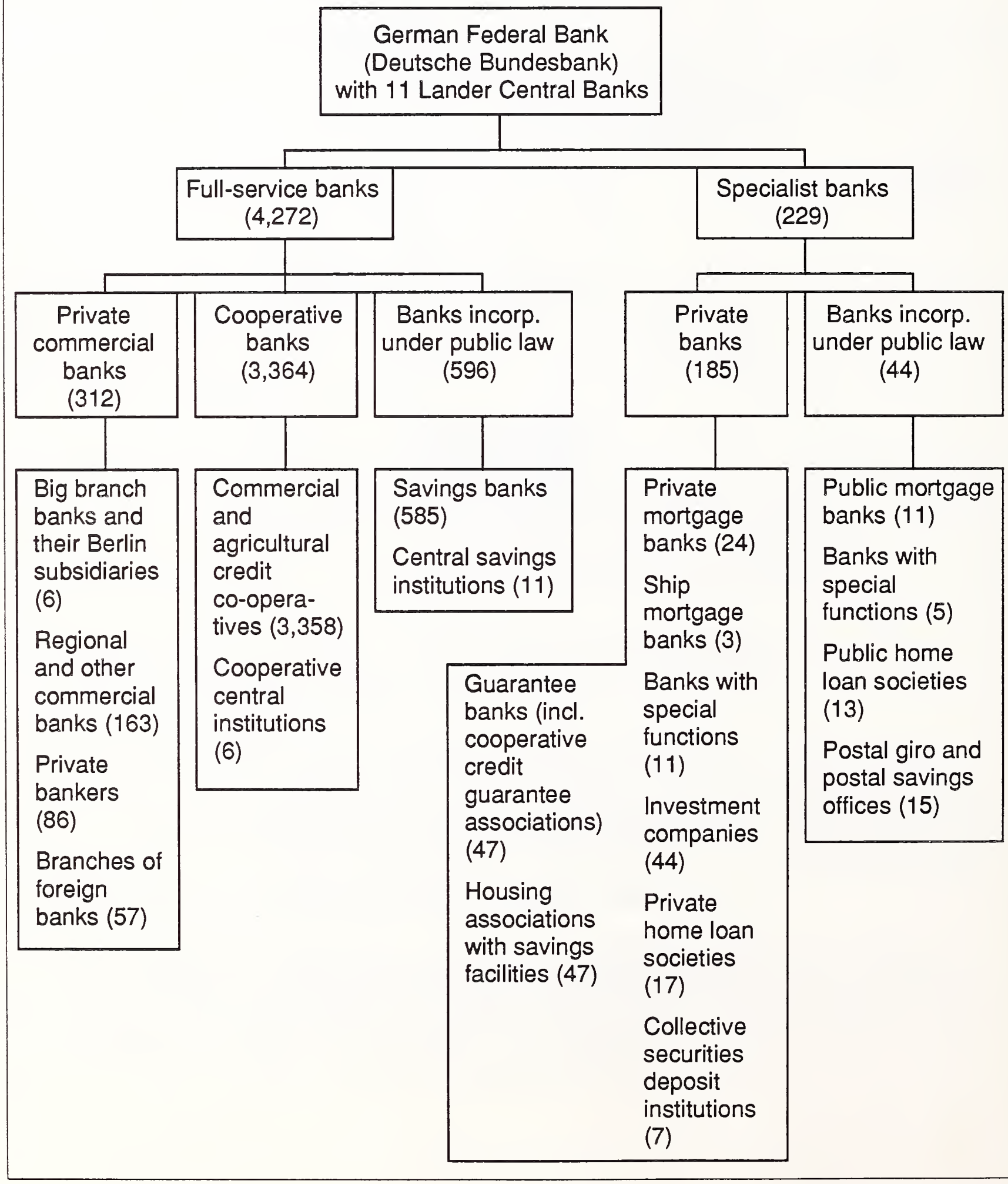
The structure of the German banking market is shown in Exhibit IV-25. The full-service or universal banks are split into three groups:

- Private banks - these are large and medium-sized retail banks and the only financial institutions allowed to trade in securities on bourses.
- Co-operative banks - these are retail banks owned by groups of individuals and are allowed to buy and sell bonds.
- Savings banks - these are retail banks owned by county councils.

Only some $1.1 billion of software and services banking revenue is currently available to non-CUG vendors in the German market. Out of this remaining total, over half is generated by the equipment vendors, leaving only some $0.5 billion for non-CUG independent vendors. For the largest single economy in Europe, the open market for independent software and services vendors is one of the smallest.

EXHIBIT IV-25

West German Banking System
Number of Institutions at End of 1988



As discussed above, IBM dominates the back office of banks and accounts for some 75% of systems. There are only about 500 private banks not covered by the CUG processing centres. Much of the software and services demand for these banks is handled internally, which explains why the German banking market is so small.

Independent vendors in this market are few. Actis is one of the largest and sells its total banking package on IBM midrange equipment. Actis' total annual revenues are only some DM 26 million ($14 million) in 1989 and are significantly lower than leading independent software and services vendors in France and the U.K.

In addition to the German banking market being dominated by IBM back-office systems, Nixdorf is very strong in front-office systems. The West German banking market is Nixdorf's prime market for IS products and services. Together IBM and Nixdorf have, therefore, effectively closed large sections of the market to independent vendors.

Relative to other European markets, the German market for securities and banking is still very traditional. German stock exchanges started developing into electronic systems some 3 to 4 years after other leading European bourses. German banks look to develop their systems internally, or at least through jointly owned CUG processing centres. As an example of the relatively unsophisticated nature of the German banking market, the only use of German bank plastic cards is for cheque guarantees and not credit or debit transactions.

Although the German market is characterised by many small to medium-sized banks, it is unlikely to be one of the first European markets to change after 1992. Its traditional nature will make it slow to change and it will resist the foreign competition that 1992 should eventually bring to the German market. However, INPUT does not see that Germany can stay immune from these forces and that the protective structure for the savings and co-operative banks may well be eroded after 1992.

Changes brought about through foreign competition could result in the CUG processing centres being forced to look externally at other areas of the market to sell their services and compete as open independents. The two largest CUG centres, Fiducia and RRZ, already sell their service outside of their co-operative banking clients. If the German CUG processing centres were forced to move extensively into the nonprotected external software and services market, the whole structure of the German software and services market would radically change.

The leading vendors in the German banking and finance market are listed in Exhibit IV-26. As can be seen, equipment vendors (such as Nixdorf and IBM) and CUG processing centres (such as Fiducia and RRZ) are very important in the German market.

EXHIBIT IV-26

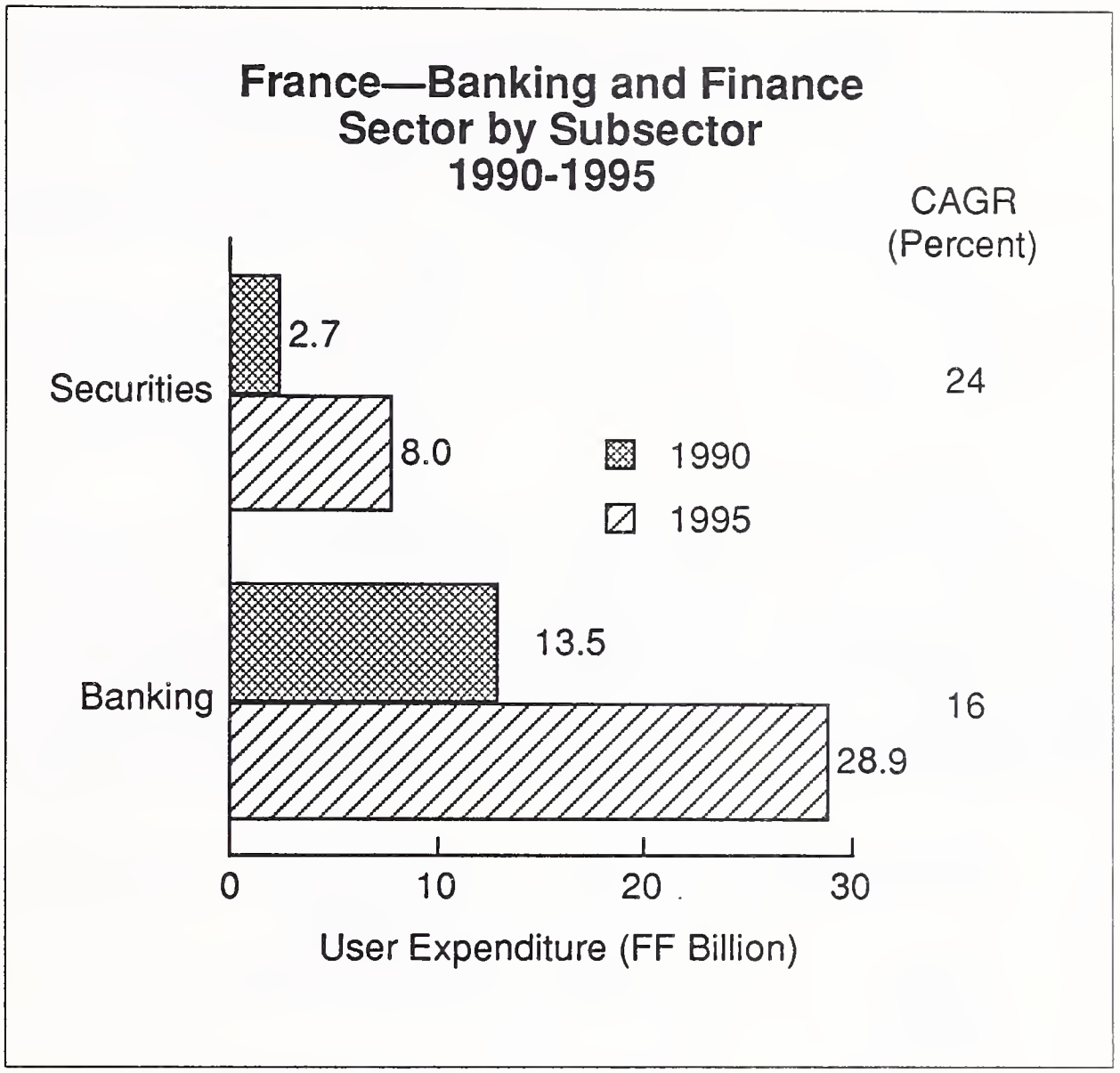
Top Vendor Rankings and Market Shares, 1989 West Germany

Rank	Company	Market Share (Percent)	Estimated Revenues (DM Millions)
1	Nixdorf	12.2	480
2	IBM	9.7	380
3	Fiducia	4.6	180
4	Reuters	3.6	140
5 =	Siemens	1.7	65
5 =	RRZ	1.7	65
7	Unisys	1.0	40
8	Telerate	1.0	40
9	Cap Gemini Sogeti	0.9	35
10	SD-Scicon/SES	0.8	30
	Other	62.8	2,465
	Total	100.0	3,920

2. France

Exhibit IV-27 illustrates the breakdown of the French software and services market for banking and finance and its growth over the period 1990 to 1995. The banking subsector accounts for some 85% of the total French banking and finance market and the securities subsector 15%, in 1990. INPUT believes that the French securities market will be growing very strongly over the next five years and by 1995 should account for some 20% of the total French banking and finance software and services market.

EXHIBIT IV-27



Although French banks are looking to expand through a deregulated Europe, there is still major government involvement in French banking. The three largest French banks—Crédit Lyonnais, Crédit Agricole and Banque Nationale de Paris (BNP)—are still state owned. French banks have started to buy into French securities houses. Some have bought into the second-tier firms after the experience in London of staff leaving following the expensive acquisition of the top London security firms.

The French software and services market for banking and finance is characterised by the number of larger vendors partially or completely owned by banks. In the late 1960s and early 1970s, many French banks outsourced their internal IT departments by setting them up as independent vendors. Today these companies are some of France's largest and most prestigious independent software and services vendors. Exhibit IV-28 lists the leading banking and finance software and services vendors in which French banks are equity shareholders.

EXHIBIT IV-28

Major French Banking and Finance Vendors with Bank Shareholders

Vendor	Share (Percent)	Bank Shareholders
Axone	45.0	IBM
	35.0	Paribas/Crédit Agricole/Crédit du Nord
	20.0	Sema
Cerg Finance	35.0	Crédit Lyonnais
	12.0	Générale
	1.0	Rothschild
Crédintrans	100.0	CIC group of banks
GC2I	100.0	Banque Populaire
Inforsud	80.0	Crédit Agricole
Logos Conseil	34.0	Groupe de la Banque Odier Bungener Courvoisier
Segin	60.2	Crédit du Nord
Sema		
	39.6	Banque Paribas
SG2	100.0	Société Générale
Sicorfé	44.0	Crédit Mutuel
SIS	55.0	SIS employees
	45.0	Company Banquaire
Sligos	63.0	Crédit Lyonnais
Sopra	3.04	Investissement Finance et Développement (subsidiary of AXA)
	2.14	Companie Financière de Rombas (subsidiary of UAP)
	1.18	Fiord (subsidiary of BUE)
	1.15	Banque de Vizille (subsidiary of Société Lyonnaise de Banque)
	0.47	Eurodéveloppement (subsidiary of BUE)
Uniciel	100.0	Crédit Agricole

The French market is also characterised by its bias towards custom, rather than standard, solutions. Many of the largest French software and services vendors, therefore, specialise in professional services rather than software products. This specialization is especially true in banking. Vendors such as Cap Gemini Sogeti, Sema Group, SG2, Sligos and SITB all deliver custom solutions to the French banking market.

France has some 2,000 banks. There are moves to rationalise these banks at a regional level as the French market moves to deregulation. This restructuring will generate many opportunities for software and services vendors in the 1990s.

The securities market is more suitable to software products solutions. Compared to the market in London, the Paris stock market has not been as depressed since 1987. French vendors such as Concept have been very successful in developing software products for this sector. In addition, leading EIS vendors such as Reuters and Telerate and systems integrators such as Andersen are also involved in the French market. Exhibit IV-29 lists the leading software and services vendors in the French banking and finance market.

EXHIBIT IV-29

Top Vendor Rankings and Market Shares, 1989 France

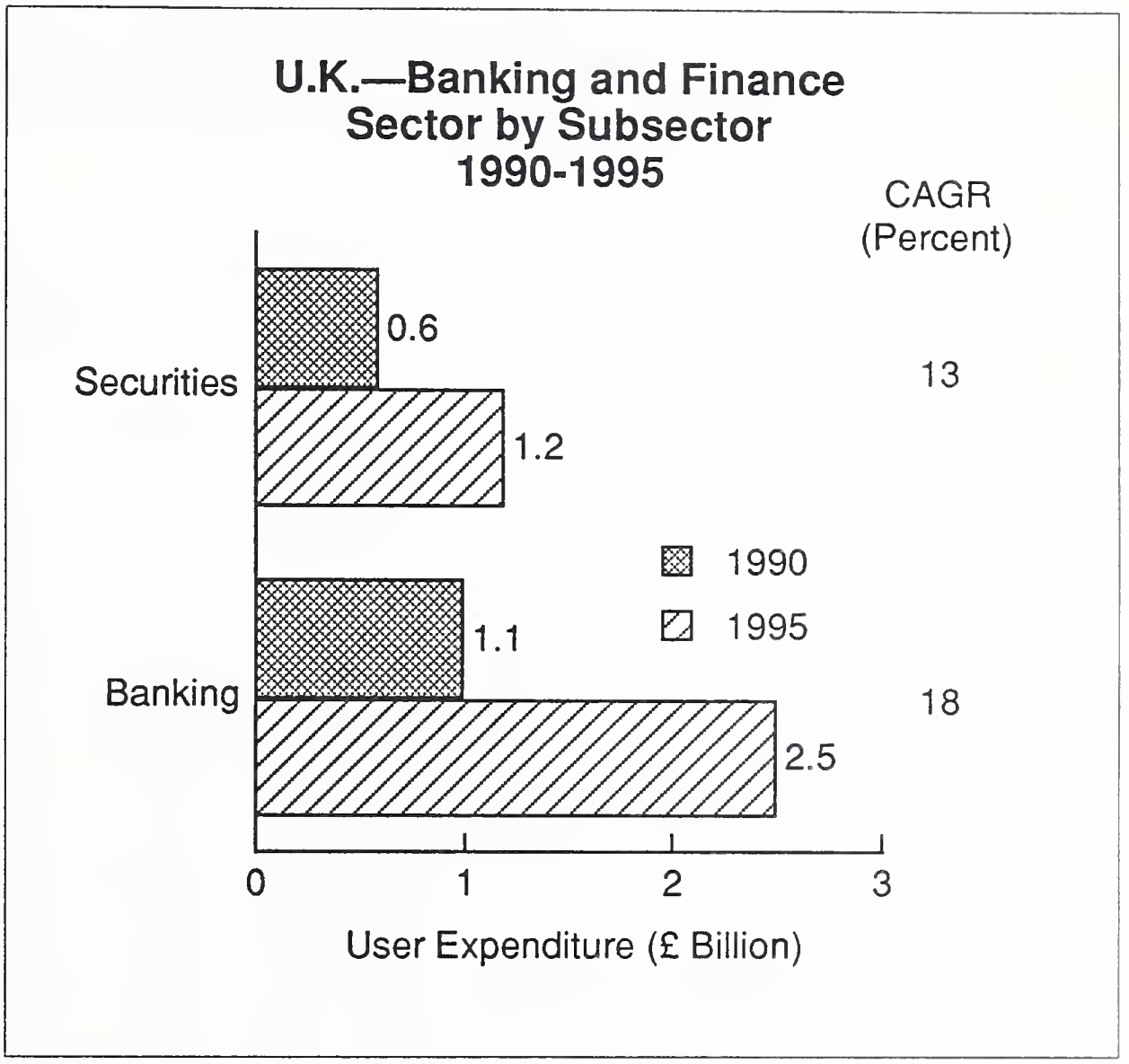
Rank	Company	Market Share (Percent)	Estimated Revenues (FF Millions)
1	IBM	7.8	1,050
2	Sligos	6.7	900
3	Cap Gemini Sogeti	6.3	850
4	Reuters	3.7	500
5	SCZ	3.3	450
6 =	SITB	3.0	400
6 =	Sodinforg	3.0	400
8	Sema	2.2	300
9 =	Steria	1.8	250
9 =	Segin	1.8	250
	Other	60.4	8,170
	Total	100.0	13,520

3. U.K.

Exhibit IV-30 illustrates the breakdown of U.K. banking and finance between the securities and banking subsectors. With the London stock exchange being the largest in Europe and leading in electronic systems, it is perhaps not too surprising to see that the securities market in the U.K. accounts for some 35% of the total banking and finance software and services market.

As has been discussed, the London securities market has been going through a very difficult time since 1987, but there are signs that it should be recovering in 1991. The U.K. securities and banking markets have undergone major restructuring after the U.K. deregulated its market well

EXHIBIT IV-30



before other European countries; the U.K. is more open to mergers and acquisitions activity than are many other European countries. In addition, the U.K. does not have the very large number of small- to medium-sized banks seen in many other European countries. The U.K. banking and finance market has, therefore, already undergone much of the restructuring that other European banking and finance markets are only now experiencing.

Exhibit IV-31 lists the leading software and services in the U.K. banking and finance market. EIS vendors, such as Reuters and Telerate, are important because of the strength of the U.K. securities subsector. Professional service vendors, such as Sema and SD-Scicon, are also strong in the U.K., as they are in other leading country markets. With the U.K. banking market characterised by few, but large banks, the demand for software and services in this sector in the U.K. is biased towards custom, rather than off-the-shelf, solutions.

EXHIBIT IV-31

Top Vendor Rankings and Market Shares, 1989 United Kingdom

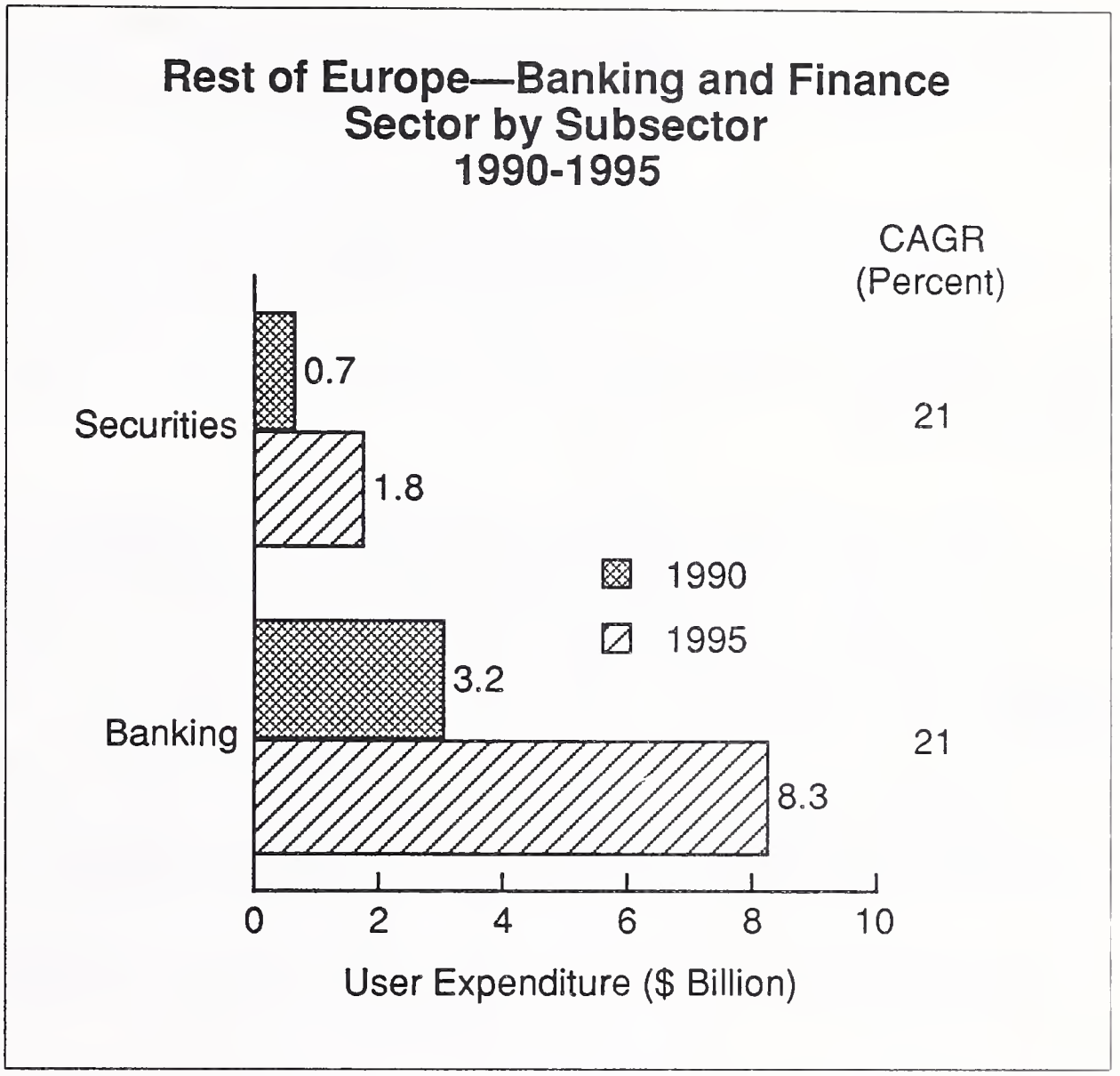
Rank	Company	Market Share (Percent)	Estimated Revenues (£ Millions)
1	Reuters	14.5	210
2	IBM	7.2	105
3	Unisys	4.8	70
4 =	ICL	3.4	50
4 =	Telerate	3.4	50
6	Sema	2.4	35
7 =	Hoskyns	1.7	25
7 =	SD-Scicon	1.7	25
7 =	Andersen	1.7	25
7 =	Data Logic	1.7	25
	Other	57.5	830
	Total	100.0	1,450

4. Other Countries

Exhibit IV-32 illustrates the breakdown of the banking and finance market for the rest of Europe. The securities subsector accounts for some 20% and banking some 80% of this total.

The structure of the other national banking and finance markets around Europe varies significantly from country to country. Scandinavia is characterised by a large number of small to medium-sized banks serviced by central processing centres, as in West Germany. Banking in Scandinavia is very advanced, often through the strength of these central processing centres.

EXHIBIT IV-32



The Benelux countries are having to face the 1990s at a disadvantage relative to their bigger neighbours. Like Scandinavian countries, their economies are relatively small and so are their banks. To compete, banks must consolidate. It is interesting that the two major mergers of banks already reported in 1990 have been in Denmark and the Netherlands. Belgium has also been looking to rationalising its financial services.

Unlike Germany and Scandinavia, Benelux banks are not serviced by co-operative centres. The software and services market for independent vendors is, therefore, more open and larger.

In Spain and Portugal, the market once again becomes very traditional and small. These markets are unsophisticated. Major equipment vendors—such as IBM, Digital and NCR—are strong. Banks were the first sectors of their economies to computerise and thus have developed in-house skills to develop virtually all of their systems.

There are very few independent Spanish and Portuguese vendors supplying the banking and finance markets. However, virtually all the leading French vendors have established themselves in Spain. Many are leading French banking and finance vendors.

In Italy, the state-owned software and services company Finsiel is the leading vendor. It provides processing services and professional services. Many Italian banks develop systems in-house.

D
Vendor Profiles

1. NMW

NMW was one of the fastest growing software and services vendors in the UK securities market in the mid-1980s. As Exhibit IV-33 illustrates, it developed traditional back-office processing services for the small to medium-sized securities houses with revenues in 1986 of £14 million.

EXHIBIT IV-33

Vendor Profile—NMW

- Back-office processing service
- One-third loss with "Big Crash"
- New Strategy
  - Existing processing services
  - DRS "Fortress"
  - Packaged solution "Equity"
  - Exports

It geared up for Big Bang with three new ICL mainframes at two sites, plus its own X.25 network to the UK, Ireland and the Channel Isles with international gateways. It coped well with the exceptionally high volume of trading seen immediately after Big Bang, increasing its annual revenues substantially to nearly £20 million by mid-1987.

In October 1987 Big Crash came. NMW saw its customers' trading volumes and its revenues slashed to £10 million for 1988.

The years 1988 and 1989 saw the management of making some harsh decisions. Staff was cut by one-third, and a completely new strategy evolved. There was still demand for NMW's traditional processing

services, albeit at a far lower level. To utilise the spare processing capacity left after Big Crash, NMW moved into disaster recovery services with its new Fortress service, and not just for the London securities market.

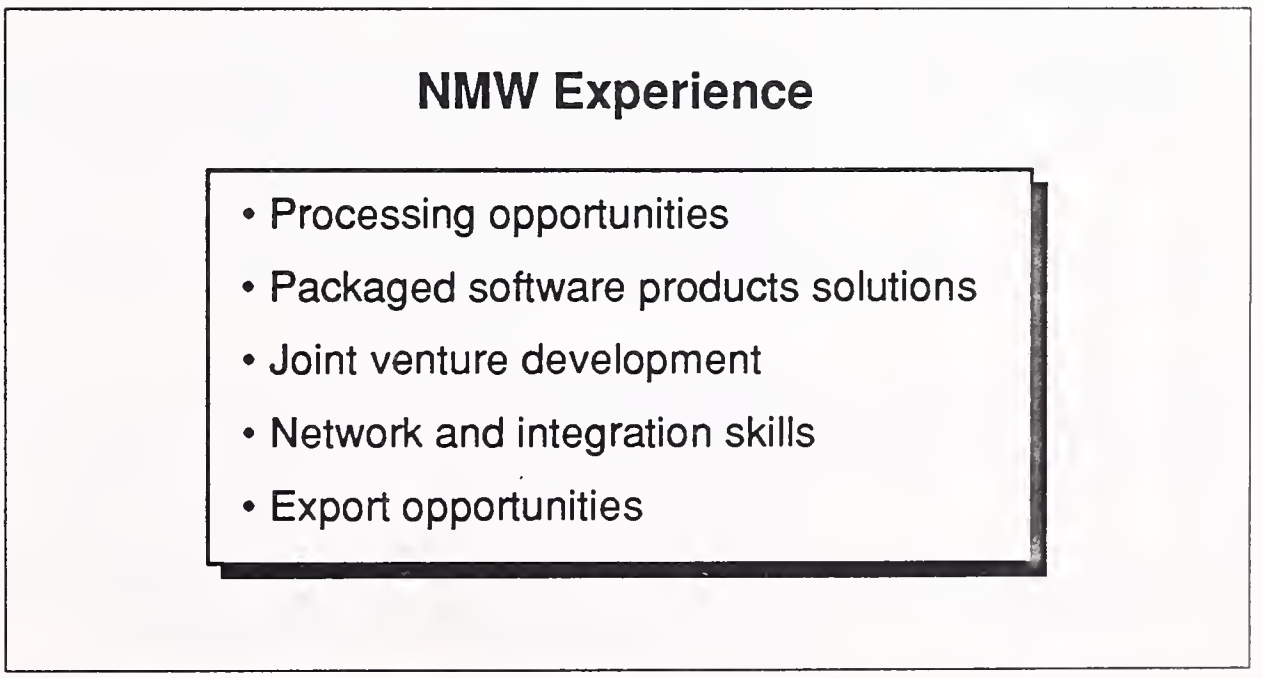
In addition, the company looked for new areas of development. By looking at what happened when Wall Street went electronic, NMW foresaw that it was very likely that it would be the big banks that would buy securities houses. It also saw that the market would look more to standard packaged solutions, especially with the new lower trading volumes. It therefore with Winterflood Securities jointly developed Equity, a packaged solution for securities houses.

Seeing that banks would remain major players in European securities trading markets and with IBM dominating the banking market, NMW chose an IBM equipment platform for this new product. System/88 is the Stratus fault-tolerant minicomputer relabelled by IBM. Some 30% of Stratus' sales worldwide are made by IBM. Having launched Equity in early 1990, NMW now sees new export markets opening.

In addition, NMW used its networking experience to offer integration services based on its X.25 network and DEC capabilities to manage LANs in customer sites. By 1989, after two very hard years, NMW had moved back into profit on revenues of some £9 million.

Exhibit IV-34 summarises the key elements that can be seen from the NMW experience over the past few years:

EXHIBIT IV-34



- Even though the London trading volume reduced sharply, there are still processing service opportunities.

- The collapse of many bank acquisitions in the London securities market has released the golden handcuffs on the old U.K. partners, and this release may well lead to new small securities firms being re-established and looking to minimise their risks through external processing services.

- There are considerable opportunities in the securities market for software product sales of packaged solutions.

- There is considerable commercial merit in developing new products jointly with market parties to ensure that the best functionality is built into the new development.

- Successful vendors in the electronic stock exchange must have network and integration skills.

- Experience in one electronic stock exchange can be exported to others, not just in Europe, but to other global financial centres.

2. Computer Sciences Corporation (CSC)

Computer Sciences Corporation of the U.S. has specialised in information services consultancy in Europe for many years. Until very recently CSC had only a limited involvement in Europe and specialised in NATO and government contracts.

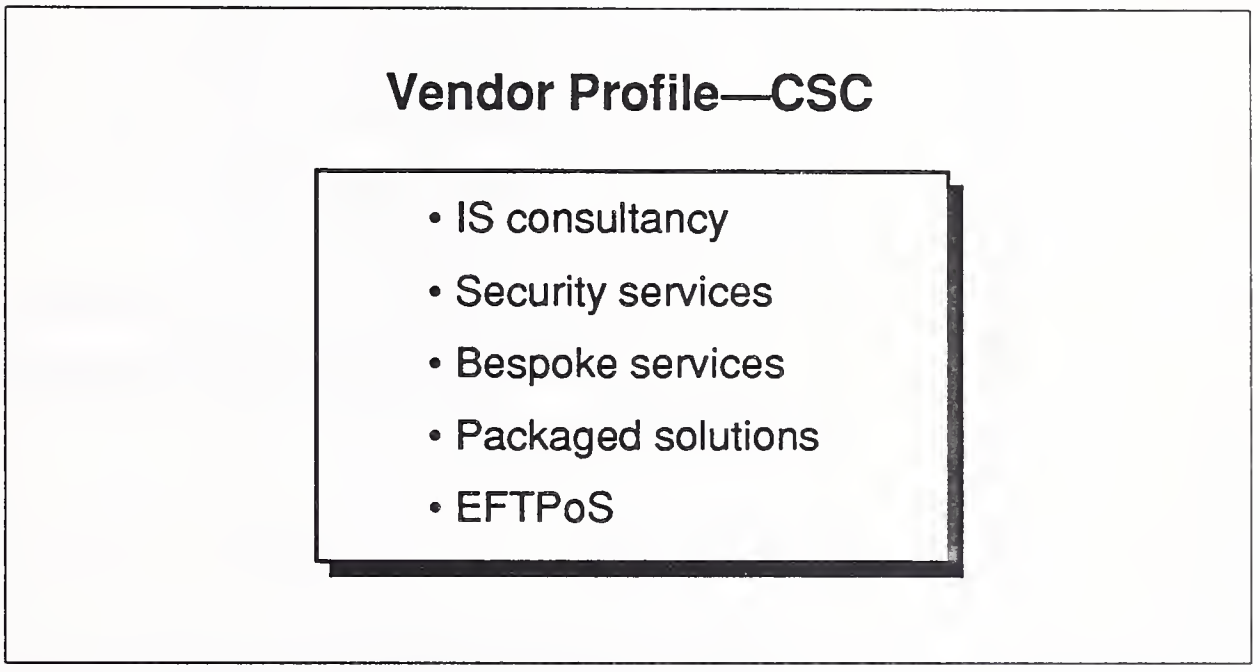
With the European banking market demanding bespoke software development services, CSC naturally developed its talents into this market. It specifically offered services such as quality assurance and strategic development consultancy. In the U.K., it made a short foray into banking software products, but opted out after judging that the market was too crowded.

Within professional services, CSC has identified that fraud prevention and bank security are an extremely lucrative offering if targetted in the right way. Research has indicated that 70% of fraud is carried out within banks. This makes the job of selling security services relatively easy as cost/benefit arguments can be very effective and fees justified directly from potential savings on internal fraud.

In 1989, CSC took over the largest Belgian software and services vendor CIG-Intersys. Together with the acquisition of consultancy services such as Inforem in the U.K. and the Index Group in the U.S., CSC has more than doubled its total European revenues to some $200 million, making it

one of the largest independent vendors in Western Europe. Exhibit IV-35 illustrates the different banking and finance products and services now offered by CSC in Europe.

EXHIBIT IV-35



Before being acquired by CSC, CIG-Intersys had been heavily involved in Belgian banking for many years. CIG-Intersys developed the EFTPoS service MR. CASH and the packaged solution MONEYTOR. It also offered processing services to banks, such as the Bank of Canada.

The CSC takeover forced CIG-Intersys to sell its involvement in MR. CASH. However, through 10 years of experience in EFTPoS, CSC had also developed AURORA, a sophisticated debit/credit card EFTPoS service for retailers. The old management of CIG-Intersys sees tremendous potential for EFTPoS services throughout Europe. CSC has exported its expertise to France, where SG2 sells its products, and sells them directly to Scandinavia and West Germany.

Exhibit IV-36 summarises the experience of CSC in the European banking market. CSC believes that:

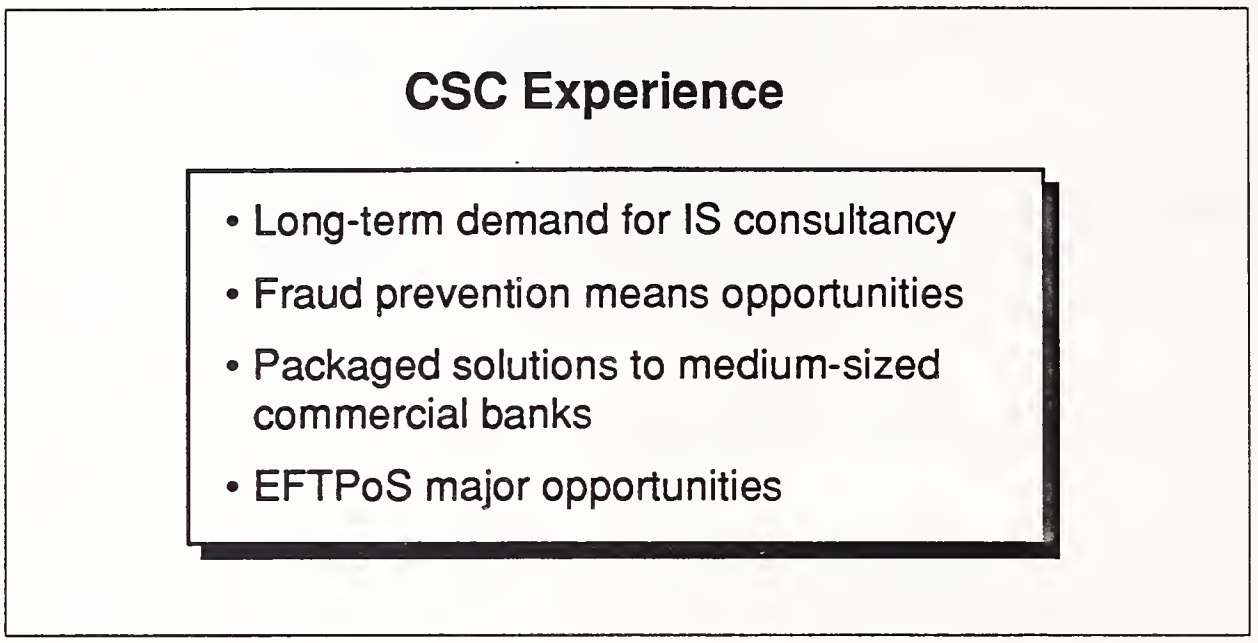
- There is long-term demand for IS consultancy, especially to the larger banks, which look to third-party vendors to bring in project management for specific developments.

- Fraud prevention means opportunities for the software and services vendor if marketed in the right way.

- There are packaged solution opportunities for medium-sized banks in certain, but not necessarily all, markets.

- EFTPoS means major opportunities throughout Europe.

EXHIBIT IV-36



3. Concept

Concept is now the fourth-largest independent French vendor and the eighth-largest in banking and finance.

Virtually all major French software and services vendors have some involvement in banking and finance. Even though only some 18% of Concept's revenues come from this market sector, it generates some 30% of the company's profits. France is Concept's main banking and finance market. France accounts for about 50% of revenues, the remainder being generated from Italy and Spain, and to a lesser extent from Belgium, Portugal, Switzerland and the U.K.

Traditionally the French market has tended to prefer bespoke solutions to standard software product solutions. Concept has specifically gone against this trend by developing software products not just for the French market, but specifically for export. Concept looks for software products that can be readily translated into other European market conditions and for conformity of product lines in all its subsidiaries. Concept even sees that the major southern European markets of Italy and Spain will be modelled on the French market.

As Exhibit IV-37 illustrates, Concept's banking and finance products and services are not just confined to software products, but also cover IS consultancy. In Italy Concept has some processing services through its Italian subsidiary CDS, but these are on the decline and not part of a standard international offering.

EXHIBIT IV-37

Vendor Profile—Concept

- Software products
  - Securities markets
  - Portfolio management
  - Bank management systems
- IS consultancy
- Processing services
  - Italy

Concept's software product portfolio for banking and finance is extensive and covers securities markets, risk management, expert systems, funds and portfolio management and total banking systems. If required, Concept customizes these products. Its professional services are referred to as practical IS consultancy, rather than theoretical management consultancy or project management. Concept is also developing disaster recovery and maintenance services.

Exhibit IV-38 summarises the experience of Concept in the banking and finance market. Concept sees that:

EXHIBIT IV-38

Concept Experience

- Banking sector very profitable
- Use kernels for export
- Practical, not strategic, IS consultancy
- Processing services declining

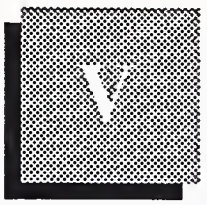
- The European banking and finance market is very profitable, but only by exploiting it internationally; hence Concept's strategy for developing a standard portfolio of products and services that can be readily sold throughout Europe.

- Wherever possible Concept uses kernel products to assist the goal of readily exportable software products.

- Concept's IS consultancy services are geared to support its software products sales, such as advice on operating structures, installation of equipment and networks. Concept sees that UNIX will become a major force in this market in the 1990s, resulting in major opportunities for IS consultancy in advising clients of the best equipment on the basis that it is just a commodity.

- Processing services do not fit into this standard pan-European strategy and Concept is not concerned over its declining involvement in processing services.

Recommendations



Recommendations

A Vendor Challenges

The challenges facing software and services vendors in the banking and finance sector in 1990s are those of targetting niche areas of the market and exploiting the rapid changes that financial institutions are being forced to undergo throughout Europe.

Vendors must also recognise that this market has its risks as well as its opportunities. As the banking and finance sector evolves into deregulation after 1993, short-term overcapacity of financial services or software and services for financial markets could suddenly happen. Radical restructuring of large markets never happens smoothly.

1. The Development Cycle

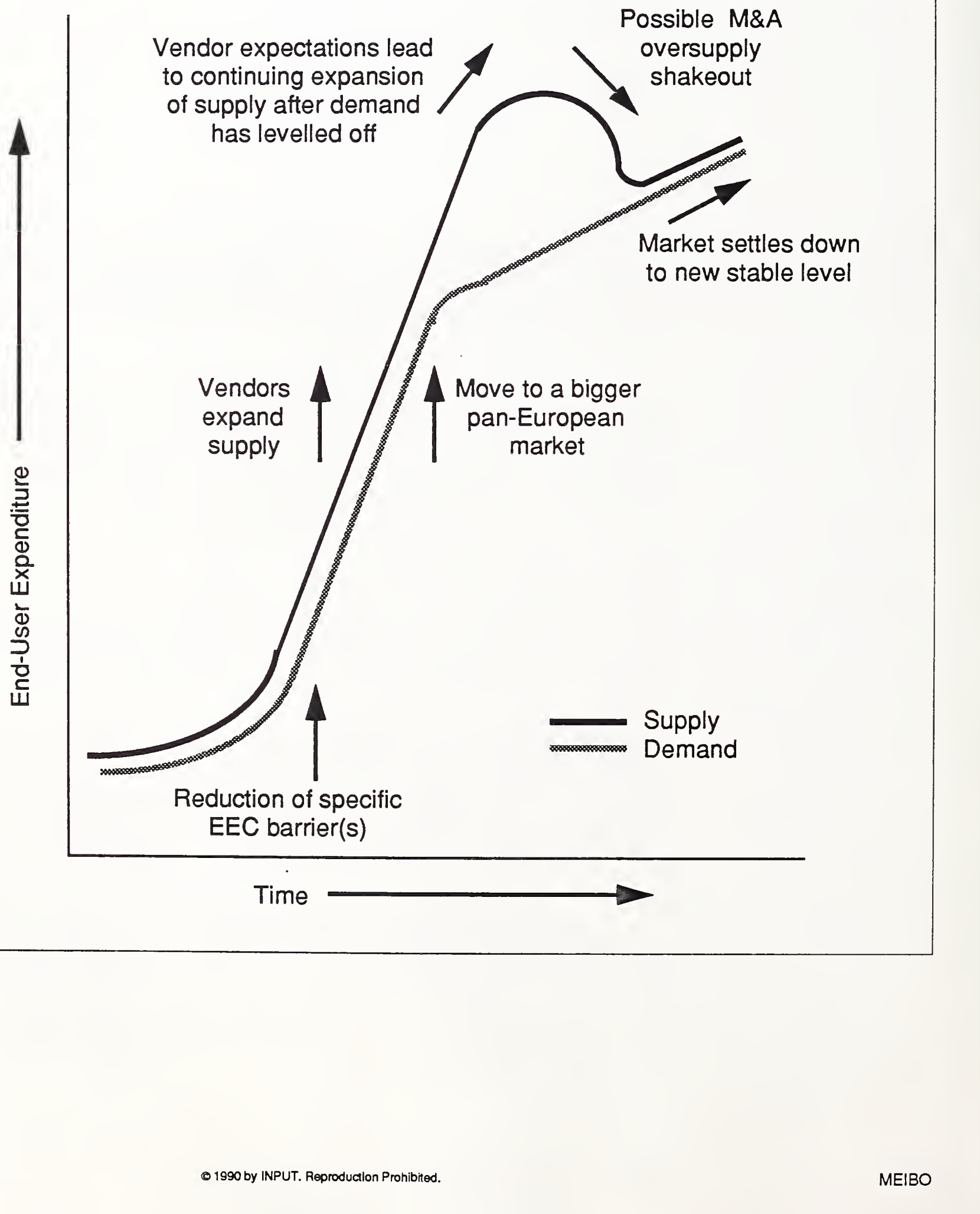
In the banking and finance market of the 1990s, any player—whether a financial institution, or a software and services vendor—must recognize the volatility of the market and that it is very likely to go through a classic development cycle.

This cycle was discussed in detail in INPUT's report *The Challenge of the Single European Market - 1992 and Beyond* (published in December 1989). Exhibit V-1 illustrates this cycle, showing how an oversupply of products and services can all too easily occur as vendor expectations lead to continuing expansion of supply when demand for products and services has levelled off.

Many vendors are looking at the banking and finance sector as a major opportunity area. Some of these are vendors that have been in this sector for some years; many are vendors that wish to expand into it. The possibility of an oversupply developing in certain subsectors is high; any vendor planning to be in banking and finance in the 1990s must be aware of the likely volatility of this sector.

EXHIBIT V-1

Effect on Supply of Software and Services as a Specific Market Moves to Become More Pan-European



In the banking and finance sector, restructuring following deregulation will create many new opportunities for vendors. However, not all of these opportunities will be ongoing and long-term, and will instead be related only to assisting financial institutions manage the restructuring in the short term. As soon as the restructuring of a specific financial institution or local financial market has been completed, these short-term opportunities may disappear.

In planning which products and services to target in the 1990s, vendors must differentiate between short-term restructuring demand and genuine long-term demand for ongoing products and services. Both can be profitable opportunities if managed according to their individual life cycles.

Any investment in developing products and services for the short-term restructuring demand must be recouped quickly, within one to two years, so that profits can be made before this short-term market comes to an end. Vendors should also look to see if they cannot transfer their expertise between local or national banking and finance markets as they start and complete their development cycles at different times.

To ensure that any profits made from these short-term restructuring markets are retained, vendors must have contingency plans to reallocate resources into other product and service activities when these markets level off. The failure of U.K. vendors NMW and Quotient to anticipate the possibility of Big Crash in 1987 resulted in their suffering major financial crises.

2. Highly Competitive Sector

Although there are many opportunities in the banking and finance sector, there is growing competition between new and old vendors for market share in this area of the European software and services market.

Banking and finance is seen as the one sector most likely to be significantly affected by the Single European Act and to become more pan-European. Banking and finance has, therefore, become a target for the larger vendors that are looking for pan-European market sectors to exploit. These are major independent and equipment vendors, as well as European and U.S.-owned vendors.

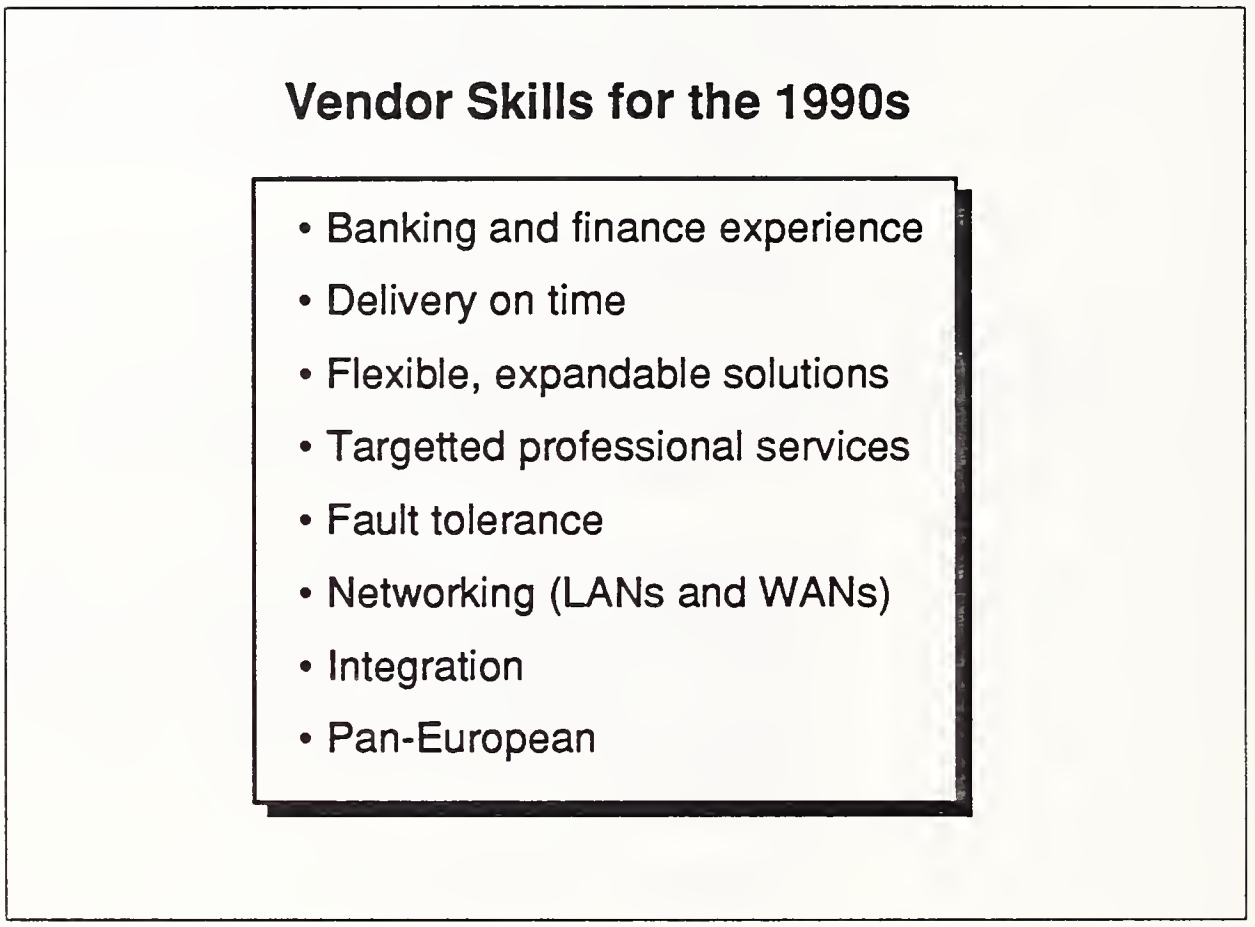
INPUT sees that many of the successful smaller vendors will be taken over by the major vendors. Sema has already acquired interests in a number of companies in the banking and finance sector around Europe. Andersen is moving more into selling software products in this sector alongside professional services and systems integration. Fault-tolerant equipment vendors—such as Tandem, Stratus and Digital—are all targetting this sector, as are mainframe vendors, such as IBM and Unisys.

This market sector is likely to stay under the control of a limited number of key vendors. It is probable that importance of a small number of these key venodrs will increase in the next few years through acquisition.

3. Skills for the 1990s

Exhibit V-2 lists the key skills that INPUT sees vendors need to service the banking and finance sector in the 1990s.

EXHIBIT V-2



In the past, the major difference between the way independent and equipment vendors marketed software and services has been in the type of sales and marketing staffs they employed. Independents have recruited experts from specific industry sectors, whereas equipment vendors have redeployed internal staff.

As a result, independents have gained competitive advantage by understanding specific industry markets better than do equipment vendors. In the 1990s, equipment vendors cannot afford the luxury of following their traditional practice and have to change. Unisys already recruits local banking and finance experts rather than redeploying internal staff from other areas of expertise.

It is essential that vendors in the banking and finance sector can guarantee delivery of their products and services on time. Major banks have had many costly development problems in the past through failing to control

and deliver key developments on time. Vendors that can show past records of guaranteed delivery times will be able to exploit these guarantees positively in marketing services in the 1990s.

The 1990s need flexible and expandable solutions for the banking and finance market. Clients do not know whether they will be involved in mergers and acquisitions and be forced to expand into new products and services through competitive pressures. Clients, therefore, must have flexibility.

As financial institutions become larger and more concentrated in the 1990s, professional services supplied from third-party vendors should become more targetted. The larger financial institutions will want to manage and develop as much as possible in-house. However, large institutions will need specific external advice and skills. Vendors should clearly identify such areas and look to selling niche services, rather than generalised professional services. Areas that should be targetted are:

- IS consultancy
  - CASE tools
  - 4GLs
  - Fault-tolerant processing
  - Security
  - Networking
- Custom software development
  - Database migration services from account number to customer name record structures for banks
  - Fault-tolerant systems development
  - Security gateway development for on-line customer systems
  - Dealing room front-office systems for securities houses
  - Customizing settlement and dealing systems for electronic exchanges
  - Interlinking different electronic exchanges

Fault-tolerant skills will be increasingly needed in most areas of banking and finance, not just in professional services. End-user services in banking and securities need to be on-line (corporate and private banking clients; equity, bonds, futures and options dealers in the securities market). Following the success of fault-tolerant systems in the front office, securities houses and banks are looking to move fault-tolerant processing into the back office.

Another theme running through the whole of the banking and finance market is network skills—both LANs and wide-area networks (WANs). As financial institutions become more pan-European in the 1990s, they will need external vendors to assist them in unravelling the complexity of European network standards and network interconnectivity in and between European countries.

Similarly, as banking and finance systems become more complex through wider geographic coverage, more products and services, or mergers and acquisitions, vendors will be able to sell integration skills. In many cases these skills will not be total project integration skills, as are sold via the systems integration delivery mode, but specific integration skills sold as professional services, either on their own, or as an adjunct to installing specific software products or turnkey solutions.

As financial institutions become more pan-European, they will be looking to external vendors that can support them in all countries, not just a limited number of countries, that the institution operates in. Control over the banking and finance sector will to move to vendors with the best pan-European coverage.

Many major European independent vendors do not have comprehensive coverage. Cap Gemini Sogeti is weak in the U.K. SD-Scicon is strong in only the three leading markets—the U.K., France and West Germany. Sema is strong in the U.K., France, the Benelux countries and West Germany—but not in Italy or Scandinavia. Most French vendors are strong in just the Mediterranean countries—France, Spain and Italy.

U.S. vendors such as Andersen, GEIS, IBM and Unisys have the best pan-European coverage. For European vendors to compete strongly in the banking and finance sector in the 1990s, they must improve their pan-European coverage. Only Sema seems to be taking positive steps to acquire the necessary local bases from which to offer a truly pan-European banking and finance service.

B

Recommendations

Exhibit V-3 lists the INPUT recommendations for banking and finance vendors for the 1990s.

INPUT sees that vendors should monitor deregulation and its likely effects very closely. This means following these trends centrally via Brussels (DG XV for banking and finance, DG III for computing and standards). It also means monitoring at a local level in each country and market sector that might be targetted in the 1990s. The effect of deregulation will not be uniform across different European country markets; the timing of changes brought about through deregulation will be very different from country to country.

EXHIBIT V-3

Vendor Recommendations

- Monitor deregulation
  - Brussels
  - Locally
- Define competitive strategy
  - Local vs. pan-European
  - Products vs. services
  - Batch vs. fault-tolerant
  - UNIX vs. proprietary
- Target specific market sectors
  - Front-/back-office migration
  - Banking vs. securities
  - Improve back-office efficiency
  - New customer terminal systems
- Develop specific skills
  - Banking and finance expertise
  - Integration and networking capabilities

INPUT recommends that vendors define their competitive strategies very clearly, especially following the comments that have been made in the previous section on the likelihood of major vendors' looking to acquire successful smaller vendors as a way to increase their pan-European coverage.

Vendors should expand out of their local or national market only as a well-planned development. All too frequently, expansions into other countries are not the expected success, and can lead to a reduction in profitability and hence leave the company open to being acquired.

In the banking and finance sector, INPUT sees that vendors should target niche products and services. Vendors should decide whether they will concentrate on selling products (securities market, departmental/branch/customer terminal banking systems) or services (dealing systems, electronic exchange systems, major banking developments).

INPUT strongly believes that vendors should gain fault-tolerant skills. These skills are different from the traditional batch-processing skills. Vendors should make a positive decision whether to gain these fault-tolerant skills and develop specific products and services around them.

INPUT does not see that UNIX will be a major force in most areas of the banking and finance sector during the next few years. However, vendors may decide to develop UNIX products and services for other industrial sectors (government, manufacturing). In this case, vendors should look to niche areas of the banking and finance sector, such as specific department back-office systems (image processing) or branch systems for retail banks.

In this report, INPUT has identified a number of opportunity areas:

Securities market

- Development of electronic exchange systems
- Interlinking electronic exchanges
- Back-office software product solutions for securities houses
- Fault-tolerant processing
- Disaster recovery services
- Front-office custom dealing room systems

Banking market

- Development of the prime customer database for banks—from account number to customer name structures
- Ensuring that systems can handle the transition to 1 January 2000
- Development of flexible, expandable banking solutions
- Banking security
- Fault-tolerant processing
- Niche professional services

- Customer terminal systems development:

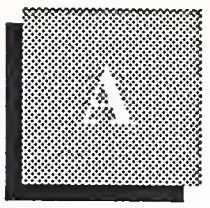
  - Corporate manager systems (PC or videotex-based)
  - Corporate computer systems (EDI)
  - Private systems (EFTPoS, ATMs)

Although banks are prepared to consider any new technology, they have learnt from bitter experience that they have to put such new technology through extensive market trials before they can have the confidence to implement it fully. For the software and services vendor considering developing new customer-related services, a careful search of Europe, if not the world, should be made because in all likelihood a bank is already undertaking a trial of the new service in some form; free market research can be gained from accessing the results of such trials.

The same advice can be given for EDI. The development of EDI in banking is being hampered by the time it is taking to agree to EDIFACT standards for key banking documents. Vendors should move carefully into EDI whilst these standards are being finalised over the next year or two.

INPUT sees that it is essential that vendors ensure that they have good banking and finance skills from each local market they are targetting in the 1990s. These skills can often be obtained only by recruiting personnel from banking and securities firms. Vendors should also ensure that they have the right integration and networking skills for their range of products and services and geographic coverage. Again, if necessary, vendors should recruit specialists skilled in these areas, such as in fault-tolerant processing or local networks in specific countries.

Appendixes



Appendix: Definition of Terms

A

Revenue

- *Captive Computer Services Revenue* - Revenue received from users who are part of the same parent corporation as the vendors.
- *Noncaptive Computer Services Revenue* - Revenue received for computer services provided from users who are not part of the same parent corporation as the vendor.
- *Other Revenue* - Revenue derived from lines of business other than those defined above.
- *Total Company Revenue* - Revenue received from total computer services and other sources of revenue.
- *Total Computer Software and Services Revenue* - Revenue received from services provided by vendors that perform data processing using the vendors' computers (processing services), assist users to perform such functions on their own computers (software products and/or professional services), provide a combination of hardware and software integrated into a total system (turnkey systems), include consulting, education and training, programming analysis, and facilities management (professional services), provide for systems design, integration and installation (systems integration), or offer network, enhanced management services, electronic mail, electronic data interchange, or electronic information services (network services).

B

Service Modes

- *Processing Services*
  - Transaction Services: uses vendor equipment and software at vendor site or customer site, may be interactive or remote-batch-oriented.

- Utility Services: access to basic software tools enabling users to develop their own problem solutions (language compilers,assemblers, DBMS, sorts, scientific library routines, etc).

- Other Services: carry-in batch processing, computer output microfilm services (COM), data entry services, disaster recovery/backup services.

- Facilities Management (Systems Operations): vendor provides a complete operating information system for customer including equipment, software, personnel and facilities.

• *Professional Services* - Management consulting activity related to EDP systems consulting, production of custom software, education and training, and systems operations of client-owned computers (formerly identified as facilities management) where the vendor provides human resources to operate and manage the client facility.

• *Systems Integration* - delivery of large, multidisciplinary, multivendor systems, incorporating some or all of these functions: systems design, programming, integration, equipment, networks, installation and acceptance. Systems can encompass multiple product delivery modes.

• *Software Products*

- Systems software and/or applications software packages purchased by users.

· Systems Software Products

Systems Control Software: operating systems, communications monitors, network control, library control, windowing, access control, security, etc.

Data Center Management Software: capacity management, scheduling, job accounting, performance monitors, tape management, utilities, downtime repair monitoring management, etc.

Application Development Tools Software: application generators, assemblers, compilers, 4GLs, automated documentation, languages, translators, database management systems, data dictionaries.

· Applications Software Products

Cross-Industry Applications Software: used by clients in many or all vertical markets (i.e., payroll, word processing, spreadsheets, accounts receivable).

Industry-Specific Applications Software: unique to a specific vertical market and sold into that market only (i.e., demand deposit accounting, MRP II, hospital patient tracking).

- *Network Services*

  - Network Management and Enhanced Services: network management functions, network transmission facilities, augmented with computerized switching and features such as packet switching, electronic mail, store-and-forward message switching, terminal interface and error detection and correction.

  - Network Applications

    · Electronic Data Interchange (EDI): application-to-application electronic communication, based on established business document standards.

    · E-Mail: a range of services that transmits documents consisting of text and graphic material to be read by a person—with the quality of document being high.

    · All other application services in which the network is the principal part of the service, e.g., electronic funds transfer and some videotex services.

- *Electronic Information Services*

  - Databases that provide specific information via terminal-based inquiry such as stock prices, legal precedents, economic indicators, airline schedules, etc.

  - News services that offer current information, either general or for a specific category; i.e., financial or political

  - Other services that provide interactive access to data bases and offer the inquirer the capability to send as well as receive information for such purposes as home shopping, home banking, travel reservations, etc.

- *Turnkey Systems* - an integration of systems software, packaged or customized applications software, CPU, equipment, and peripherals. These systems are developed to meet a specific set of user requirements. The value added by the vendor is primarily in the software, either packaged or custom developed. Most CAD/CAM systems and many small business systems are turnkey systems. This does not include specialized hardware systems such as word processors, cash registers, and process control systems.

C

Other Considerations

When questions arise about the proper place to count certain user expenditures, INPUT addresses them from the user viewpoint. Expenditures are then categorised according to what users perceive they are buying.

B

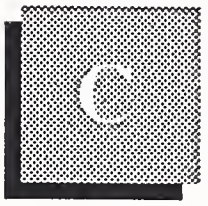
Appendix: U.S. Dollar Average Exchange Rates and Inflation Assumptions

EXHIBIT B-1

U.S. Dollar Average Exchange Rates and Inflation Assumptions

Country	Currency	Dollar Exchange Rate	Inflation Assumptions
Austria	Sch	12.77	3.0
Belgium	BF	38.06	3.2
Denmark	DK	7.05	4.5
Finland	FM	4.21	6.5
France	FF	6.17	3.5
Germany	DM	1.81	3.3
Italy	LR	1,336.00	5.8
Netherlands	DFI	2.05	1.8
Norway	NK	6.85	4.5
Spain	Pta	115.8	6.6
Sweden	SK	6.39	8.0
Switzerland	SF	1.61	4.5
U.K.	£	0.631	7.0

Source: Exchange rates—IMF (average rates for fourth quarter 1989)
Inflation—Barclays Bank (1989)



Appendix: Vendor Questionnaire

Background Information

Q1: Types of banking and finance organisations served (circle as appropriate):

		PRIMARY/SECONDARY ACTIVITY	
a. Commercial Banks			
Retail Bank	A	P	S
Building Society	B	P	S
Merchant Bank	C	P	S
International Bank	D	P	S
b. Brokers			
Finance House	E	P	S
Securities Broker	F	P	S
c. Others			
Card Company	G	P	S
Credit Database	H	P	S
Other	I		

Please describe _____

P S

Could you also indicate the size of your organisation:

Total annual turnover _____

Proportion from banking and finance _____ %

Current growth rate _____ % per annum

Expected future growth rate _____ % per annum

Main West European market _____

Other West European markets _____

Percent breakdown of West European revenues by country markets:

_____

Rough range of typical contract value _____

General Information Services Date

Q2: What are your principal products/services for the banking and finance market:

1. _____

2. _____

3. _____

and on what equipment:

1. _____

2. _____

3. _____

comments

_____

_____

Q3: What do you see as the three most important issues/challenges facing you over the next few years:

1. _____

2. _____

3. _____

Could you please rank between 1 and 5 (1 being low, 5 high) the importance of the following factors according to how important they are for you:

Ranking (1 to 5)

a. moving away from centralised data processing products/services to decentralised products/services _____

comments

_____

_____

b. the 1992 initiative of the European Commission in gradually developing a single European market during the 1990s _____

comments

_____

_____

c. open international standards (e.g. OSI, UNIX, EDIFACT) _____

comments

_____

_____

d. staff/skills shortages _____

comments

_____

_____

e. providing links between front- and back-office systems _____

comments

_____

_____

f. increasing OLTP offerings _____

comments

_____

_____

g. improving the ability of your clients to access your products/ services via more sophisticated terminals _____

comments

_____

_____

Specific IS Questions

I would now like to ask some questions on your attitudes towards specific issues that we at INPUT believe will affect you over the next few years.

Cost

Q4: The banking and finance sector spend on software and services per $1 (or local currency unit) of revenue is around twice that of other sectors (some 5 to 10% of revenues). Banks and financial institutions have told INPUT that they are very concerned over the cost of information services. Have you had the same experience?

comments

_____

_____

Q5: Could you please rank between 1 and 5 (1 being low, 5 high) the importance of the following factors that you see as possibly being important for the banking and finance sector, to maintain or reduce information services costs:

		Ranking (1 to 5)
a.	maximise the use of external vendors for	
	- processing services	_____
	- disaster recovery	_____
	- systems operations (facilities management)	_____
	- developing new integrated systems	_____
b.	minimise the use of third-party networks	_____

c. maximise the use of CASE tools _____

d. maximise the use of software products, rather than develop bespoke software specifically for your organisation _____

e. maximise the use of UNIX _____

f. obtain and keep skilled staff _____

g. be able to meet development deadlines _____

h. other factors _____

comments

_____

_____

Security

Q6: Security is also a key issue for any financial institution and is a factor that constantly puts pressure to increase the complexity of systems and hence costs. Do you have any views on this?

comments

_____

_____

Q7: How do you rank (1 to 5) the importance for the future developments of your products/services of:

	Ranking (1 to 5)
a. EDI	_____
b. other network services (EFT, EIS)	_____
c. more sophisticated end-user terminals	_____
d. others	_____

comments

_____

_____

Q8: The issue of how financial institutions can link their front- and back-office systems to offer more sophisticated customer services has been well publicised. With regards to this:

a. do you offer products/ services on OLTP equipment — Yes ___ No ___

If yes, whois the supplier? _____

b. do you, or are you planning to offer, products/services linking back- and front-office systems? — Yes ___ No ___

comments

_____

_____

c. what do you see as the three major issues in making this link successful?

1. _____

2. _____

3. _____

d. do you consider the design of databases as being critical in this context?

comments

_____

_____

What are your view on using relational databases?

comments

_____

_____

e. do you see that leading back-office equipment vendors, such as IBM and Unisys, are under threat from front-office equipment vendors, such as Tandem and Digital?

Yes ___ No ___

comments

_____

_____

Q9: Which of the following country markets do you see as leading the development of new banking and finance systems?

a. the U.S. ❑

b. the U.K. ❑

c. some other Western European country ❑

comments

_____

_____

Q10: Who do you see as being the three leading software and services vendors in the banking and finance sector?

1. _____

2. _____

3. _____

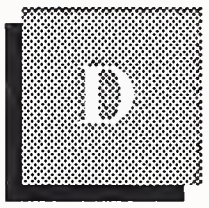
comments

_____

_____

Conclusions

Thank you very much for allowing me to take up so much of your time. Are there any major issues in the next few years for the banking and finance market, either here in _____ (country of interview), or around Europe in general?



Appendix: Forecast Database

Forecast Database
Banking and Finance Sector, 1990-1995

Country	Currency	Units	1990	1991	1992	1993	1994	1995	CAGR 1990-1995 (Percent)
Austria	Sch	Millions	1,150	1,300	1,550	1,900	2,300	2,725	19
Belgium	BF	Millions	12,580	15,550	18,750	23,200	28,200	34,300	22
Denmark	DK	Millions	2,740	3,250	3,950	4,750	5,660	6,840	20
Finland	FM	Millions	660	800	960	1,160	1,430	1,770	22
France	FF	Millions	16,150	19,260	22,550	26,800	31,400	36,900	18
Italy	Lira	Billions	1,250	1,510	1,815	2,180	2,560	2,990	19
Netherlands	DFl	Millions	1,030	1,225	1,460	1,720	2,040	2,400	18
Norway	NK	Millions	2,650	3,225	3,900	4,600	5,420	6,510	20
Spain	Pta	Millions	23,200	29,000	34,700	42,800	53,300	66,000	23
Sweden	SK	Millions	2,210	2,680	3,160	3,820	4,540	5,500	20
Switzerland	SF	Millions	770	900	1,080	1,290	1,530	1,825	19
U.K.	£	Millions	1,690	1,970	2,300	2,720	3,180	3,710	17
West Germany	DM	Millions	4,640	5,510	6,490	7,675	9,060	10,640	18
Rest of Europe	$	Millions	90	110	145	180	215	255	23
Total	$	Millions	11,770	13,990	16,600	19,650	23,230	27,420	18

Report Quality Evaluation

To our clients:
To ensure that the highest standards of report quality are maintained, INPUT would appreciate your assessment of this report. Please take a moment to provide your evaluation of the usefulness and quality of this study. When complete, simply fold, staple, and drop in the post.

Thank You.

1. Report title: ***European Software and Services Market, 1990-1995—Banking and Finance Sector*** (MEIBO)

2. Please indicate your reason for reading this report:
   - ☐ Required reading
   - ☐ Area of high interest
   - ☐ Area of general interest
   - ☐ New product development
   - ☐ Business/market planning
   - ☐ Product planning
   - ☐ Future purchase decision
   - ☐ Systems planning
   - ☐ Other _____

3. Please indicate extent report used and overall usefulness:

	Extent		Usefulness (1=Low, 5=High)				
	Read	Skimmed	1	2	3	4	5
Executive Overview	☐	☐	☐	☐	☐	☐	☐
Complete Report	☐	☐	☐	☐	☐	☐	☐
Part of Report (_____ %)	☐	☐	☐	☐	☐	☐	☐

4. How Useful was:

Data presented	☐	☐	☐	☐	☐
Analyses	☐	☐	☐	☐	☐
Recommendations	☐	☐	☐	☐	☐

5. How useful was the report in these areas:

Alert you to new opportunities or approaches	☐	☐	☐	☐	☐
Cover new areas not covered elsewhere	☐	☐	☐	☐	☐
Confirm existing ideas	☐	☐	☐	☐	☐
Meet Expectations	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐

6. Which topics in the report were the most useful? Why?_____

_____

7. In what ways could the report have been improved? _____

_____

8. Other comments or suggestions: _____

_____

_____
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_____
Department

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Company

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