FINANCIAL NETWORK SERVICES

WESTERN EUROPE

1990 - 1995

INPUT

About INPUT

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

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

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

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

INPUT OFFICES

North America

San Francisco
1280 Villa Street
Mountain View, CA 94041-1194
Tel. (415) 961-3300
Fax (415) 961-3966

New York
Atrium at Glenpointe
400 Frank W. Burr Boulevard
Teaneck, NJ 07666
Tel. (201) 801-0050
Fax (201) 801-0441

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

International

London
Piccadilly House
33/37 Regent Street
London SW1Y 4NF, England
Tel. (071) 493-9335 Fax (071) 629-0179

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

Frankfurt
Sudetenstrasse 9
D-6306 Langgöns-Niederkleen, Germany
Tel. (0) 6447-7229 Fax (0) 6447-7327

Tokyo
Saida Building
4-6, Kanda Sakuma-cho
Chiyoda-ku, Tokyo 101, Japan
Tel. (03) 3864-0531 Fax (03) 3864-4114

MARCH 1991

FINANCIAL NETWORK SERVICES WESTERN EUROPE

1990-1995

INPUT®

Piccadilly House 33/37 Regent Street, London SW1Y 4NF 071-493-9335

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

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

Network Services Programe (NSP)

Financial Network Services—Western Europe, 1990-1995

NEFNO • 519 • 1990

Abstract

This report analyses the financial network services sector for Western Europe and its growth potential over the period 1990-1995.

INPUT defines the network services sector as network applications and electronic information services (EIS):

- Network applications is segmented into managed network services (MNS), messaging services, electronic data interchange (EDI) services and other application services;

- EIS is segmented into on-line databases and news services.

Financial network services range from security and performance management services in the MNS area to network applications services used in support of automatic teller machine and international payments networks. The challenge for vendors is to offer a service which handles all classes of network service on an end-to-end basis.

This report reviews the third-party vendors selling financial network services, including those software and services companies owned by groups of financial institutions, airline companies or other large organisations. The report identifies leading vendors in the Western European market in the two subsectors of network applications and EIS as applied to the financial services industry. Three vendor profiles illustrate different marketing and service strategies.

This report contains 142 pages, including 52 exhibits.

Table of Contents

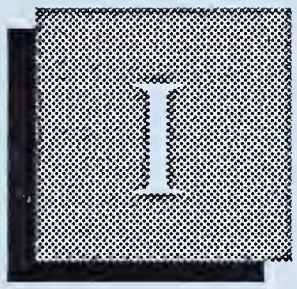
Table of Contents (Continued)

Table of Contents (Continued)

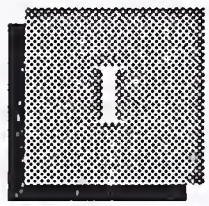
Table of Contents (Continued)

Exhibits

Exhibits (Continued)



Introduction



Introduction

A

Objectives

This report is produced as part of INPUT's Network Services Programme - Europe.
The objectives of this report are to:

- Create a clear picture of the current structure of the Western European financial network services market,
- 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 financial network services vendors as a result of these forces and the resulting changes to the competitive environment over the next few years,
- Estimate the size of the market for financial network services for Western Europe and its growth potential to 1995,
- Assess possible major new opportunity areas for network services vendors.

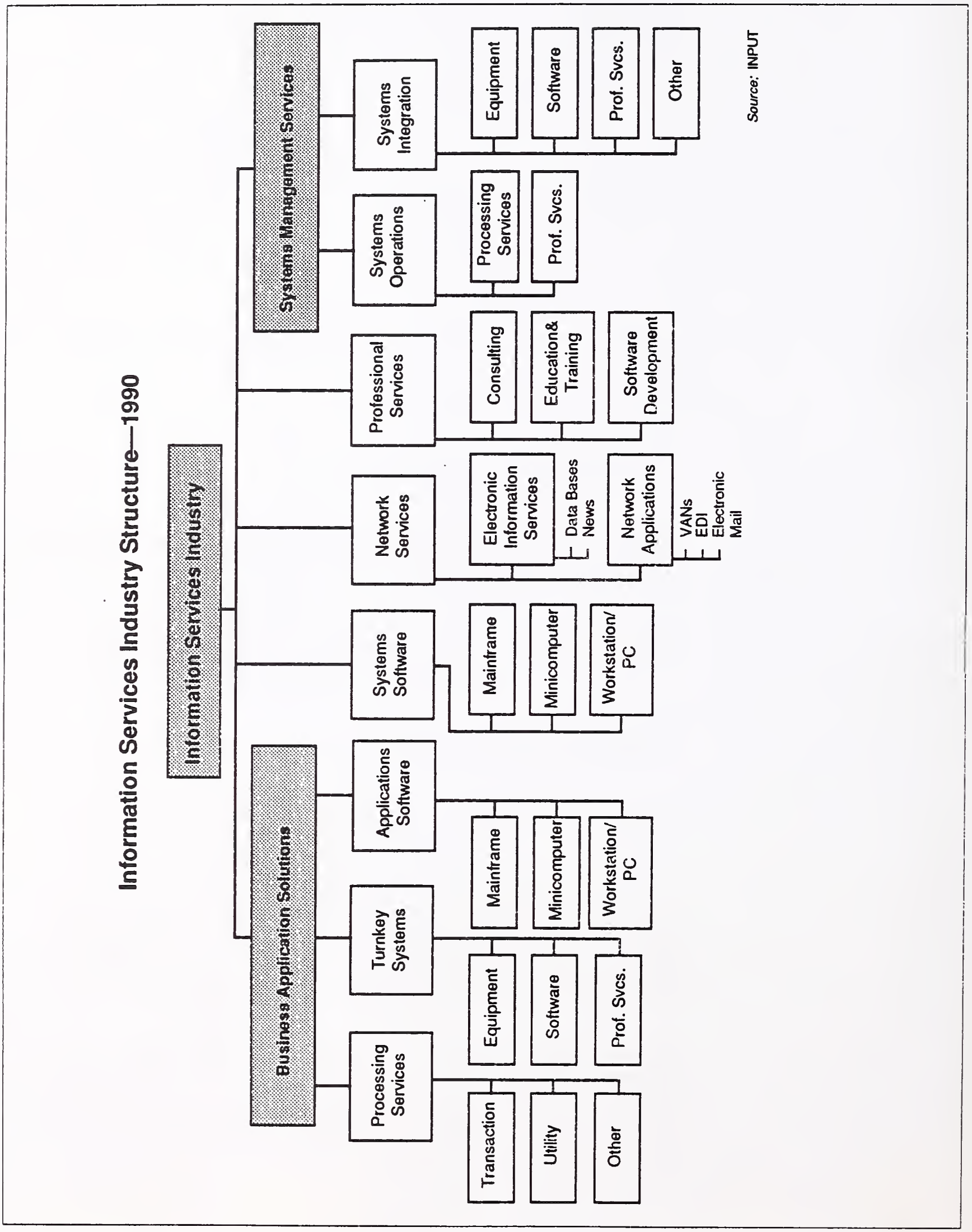
B

Scope

The Western European financial network services market has been analysed by reviewing the activities and types of services required by different kinds of financial institutions. There are several different types of financial network services, but the functional requirements of user organisations served are similar.

This report covers the financial segment of the network services market for Western Europe, for the period 1990 to 1995. The report covers both financial network applications and electronic information services (EIS). The report covers both independent vendors and equipment vendors selling financial network services.

EXHIBIT I-1



In forecasting the size of the Western European financial services market, INPUT includes only end user revenues gained by third party vendors and excludes those revenues gained from parent organisations which can be defined as captive revenues.

Exhibit I-1 details the structure of the information services as defined by INPUT, including the structure of the network services market. The network services market is divided into two major segments:

- The first, Network Applications, includes managed network services, messaging services and electronic data interchange (EDI) services;

- The second, Electronic Information Services, includes on-line databases and news databases. The fundamental criterion for services in this category is that the network itself must play an important enabling function, i.e., without the network the service could not be provided.

Geographically, this report divides Western Europe into the following main countries and regions (groups of countries):

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

C

Methodology

INPUT conducts an on-going programme of research into the Western European software and services market which includes the collection of revenue and product information from over 300 vendors annually. In addition to these, in order to obtain an in-depth appreciation of the industry structures, issues and opportunities relevant to this study, INPUT carried out a further:

- Ten in-depth, formal interviews using the vendor questionnaire set out in Appendix C,

- An additional 10 informal interviews with vendors, concentrating on specific niche products, services and issues,

- Fifteen interviews with key network services users using the user questionnaire set out in Appendix D.

This approach has allowed INPUT to interview a representative cross-section of both vendors and users in the financial network services market.

Market forecasts are based on non-captive end-user expenditures. These are defined by INPUT as those expenditures made externally by any organisation with some third-party vendor, rather than those made within the organisation itself.

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

D

Report Contents

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

Chapter II is an Executive Overview of the complete report. It is designed for the executive or individual who needs to quickly identify the salient points of the report.

Chapter III reviews the dynamics of the financial network services market in Western Europe.

Chapter IV assesses the structure of the market and forecasts the size of the Western European financial network services market for the period 1990 to 1995, both in overall terms and by major geographic region.

Chapter V describes the role of the banks as service providers in competition to the established network services companies and includes three vendor profiles.

Chapter VI reviews the user environment and assesses the network strategy of some leading European financial institutions.

Chapter VII summarises the prime challenges for vendors in the 1990s in addressing the network service needs of financial institutions.

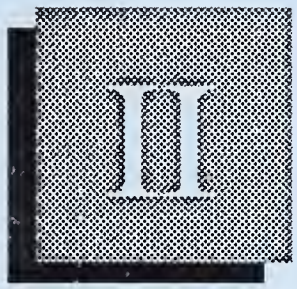
Appendix A gives INPUT's definition of terms.

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

Appendix C contains the vendor questionnaire used in this research.

Appendix D contains the user questionnaire used in this research.

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



Executive Overview

II

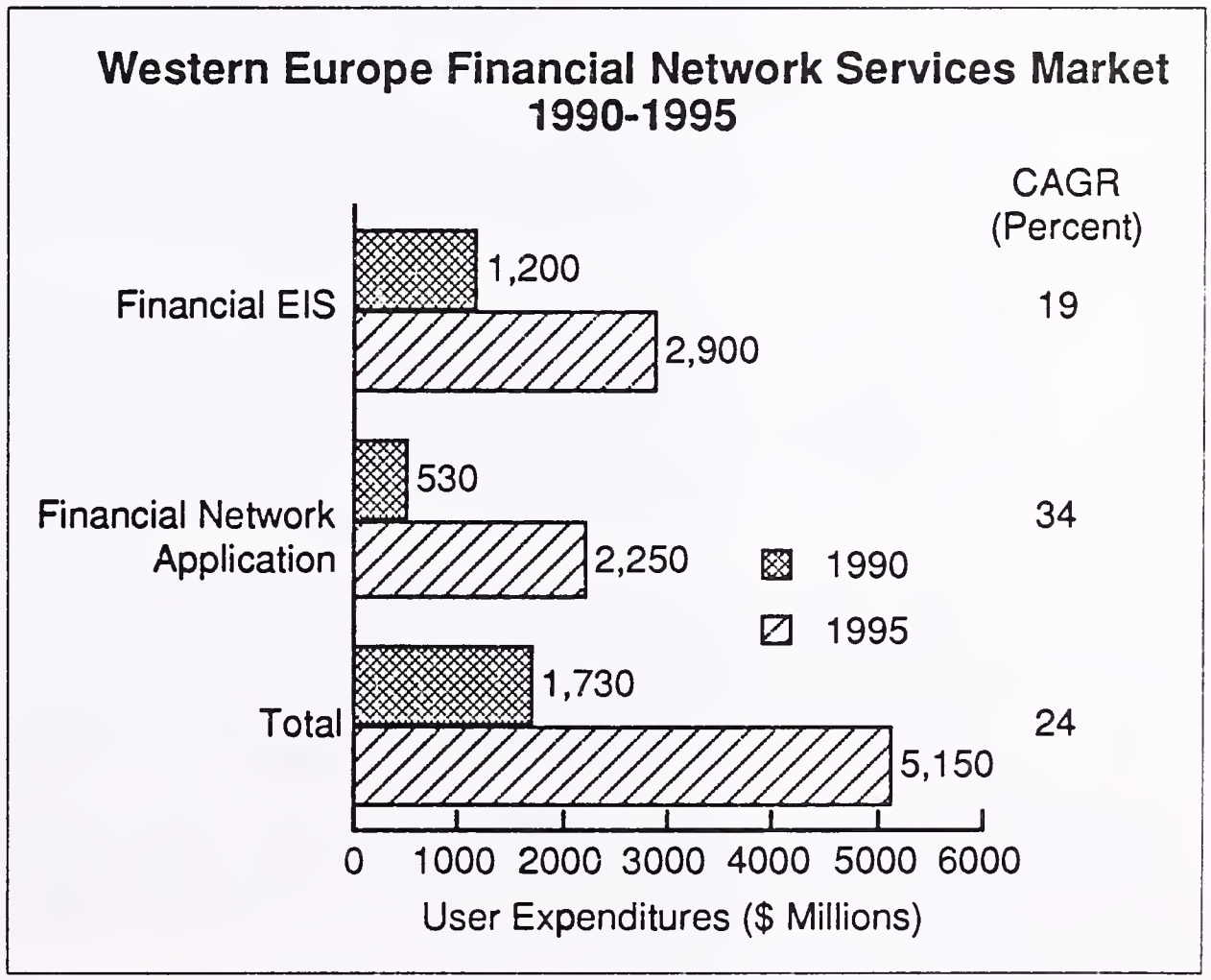
Executive Overview

A

Financial Network Services - Dramatic Increase in Demand

The requirements for financial network services and a rapidly developing technological capability are presenting banks and financial institutions with a major issue—to develop the capabilities themselves or to work with a third party service provider or to manage with a combination of these two. INPUT forecasts a highly competitive market scenario as banks, service providers and network operators all look to increase their share of a market which will grow at a compound annual growth rate of 24% to over $5 billion by 1995, as shown in Exhibit II-1.

EXHIBIT II-1



The movement in Europe towards the deregulation of basic telecommunications carriage will result in the opportunity for resale by large users. The large international financial institutions will have the opportunity to become leading suppliers, as Citicorp has done in the U.S. As a result of this enlarged competitive scenario, vendors require network expertise, coupled with sophisticated application products and services in order to win significant business over the forecast period, 1990-1995.

The price of basic European telecommunications services is forecast to fall to 50% of its current (1990) level over the next five years. With a trend towards tariffs being aligned more closely to the real cost of providing the service, network services vendors are being forced to reevaluate their supply strategy to provide both connectivity and network application services. Each segment of the banking and financial services industry has particular needs, each of which can individually represent a challenge to network services vendors. For example one set of users may need the capability to interact with a range of network services supplied by different vendors such as Reuters, GEIS and SWIFT. Whereas currently there is no one point of supply, this situation is likely to change rapidly over the forecast period, rendering discrete the distinctions between "basic" and "value-added" services.

Network operators such as British Telecom (through BT Tymnet), France Telecom and Deutsche Telekom (through Infonet) are all well positioned to gain significant market share in an increasingly liberal international market. To fight off competition from these suppliers the independent network services vendors will be forced to offer a more comprehensive range of network services. Vendors will also need to service an increased range of network communities since all trading communities will need to interchange information with each other, e.g., during financial transactions.

Payments, risk information, trading data and settlement instructions will become common transactions. Furthermore, the developers of financial networks (whether in-house or external) will have to make available a high degree of security to the networks they provide for the interchange of high volume electronic transactions to user groups of differing types.

The plans by the European Commission to deregulate financial markets by the 1st January 1993 are affecting the world financial markets fundamentally, and not just those of the 12 member states of the E. E. Banks and finance institutions everywhere are being forced to restructure whilst at the same time having to develop new products and services in order to remain competitive. This represents a significant opportunity for network services vendors to assist them in developing their sophisticated international networks, and the network applications to ride on them during the 1990s.

INPUT forecasts that the European financial network services market will grow from $1.73 billion in 1990 to over $5 billion in 1995, a compound annual growth rate of 24% over the next five years. The financial network services sector represents some 48% of the total West European network services market, and is dominated by a small number of key vendors such as Reuters, GEIS and SWIFT.

B

Strategic Challenges

Vendors must move from a strategy based on the provision of generic network facilities, equipment and software units to one based on the delivery of specific network services to specific user communities. This requirement is a result of the gradual move which will take place over the next five years towards the deregulation of voice, image and data services.

Vendors have been delivering specialised and incompatible network products and services without addressing the need for a catalogue of "complementary" network services which meet the needs of specific user communities. The regulatory changes in Europe are, however, now forcing vendors to address the following issues which are summarised in Exhibit II-2.

EXHIBIT II-2

Network Services Vendors
Strategic Challenges

- Marketing to needs of disparate users
- Provision of full-service support
- Pricing
- International coverage
- Development of application services

- Delivering services to a multiplicity of user communities.
- Providing integrated solutions including voice, data and image services at the basic transport and the network applications levels.
- Improving the cost/benefit ratio of their service offerings. The whole issue of pricing of network services must become much more transparent to the user.
- Providing credible, international coverage.

- Offering a range of compatible, interactive application services, such as financial data interchange, electronic messaging and information services, all of which may be required for the successful completion of a financial transaction.

As banks and other financial institutions expand out of their traditionally protected national market niches in the 1990s, major new opportunities are evolving, driven by the demand for pan-European systems. The European financial network services market is the furthest advanced in its use of electronic techniques of any industry sector and is, therefore, a natural focus for the major independent service providers, equipment vendors and the network operators.

As listed in Exhibit II-3 there are three key opportunity areas for network services vendors:

EXHIBIT II-3

Key Vendor Opportunities

- Managed data networks
- Electronic stock exchange
- Customer terminal systems

- The requirement for managed data networks delivering applications, network management and operations.

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

- The demand by banks to be able to deliver new products and services to their customers through new terminal systems, in order to gain competitive advantage.

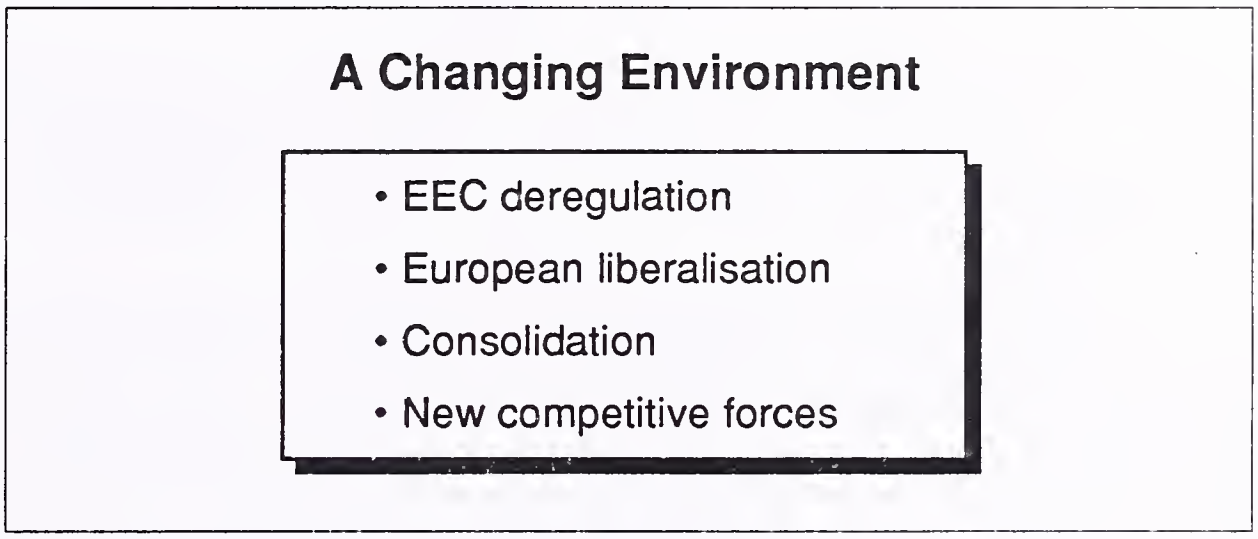
As a result of the restructuring of the European financial markets through national and international mergers and acquisitions, the number of financial institutions within Europe is declining, their size is increasing and they are becoming more pan-European. For network services vendors this changing market place means opportunities to assist financial institutions to restructure and adjust.

C

A Changing Environment

The key driving force behind the restructuring of the financial markets of Europe is the Single European Act legislation of the European Commission. The principal effects of this act on the market place are listed in Exhibit II-4. New competitive forces are now working to reshape the whole of the Western European financial network services market. For example, all the major securities markets are introducing or upgrading electronic systems to offer full "electronic stock exchanges" to their securities houses and other members. 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 other words, they in their turn see a need both to upgrade their current infrastructure and to offer brand image services to differentiate them from their rivals.

EXHIBIT II-4



This is an exact replica of the challenges facing, and response required from, the network services vendors. As a result these developments will offer major opportunities to network services vendors.

Mergers and acquisitions between and amongst financial institutions will mean that incompatible systems will have to be rationalised at the same time as their managers are trying to redesign them individually to meet the new demands of the 1990s.

Financial institutions are a key market for network services vendors since they require a communications infrastructure to deliver specific application services both to their internal operations and to their customers. In the past, banks and financial institutions have used the public networks provided by the PTTs or operated their own private networks over leased lines. In the future, European banks will be, and already are, looking to use managed data networks over leased lines offered by the third party service providers such as GEIS and Infonet. Developments of networking technologies such as ISDN, virtual private networks and fibre optics are further increasing the options available to these leading-edge institutions.

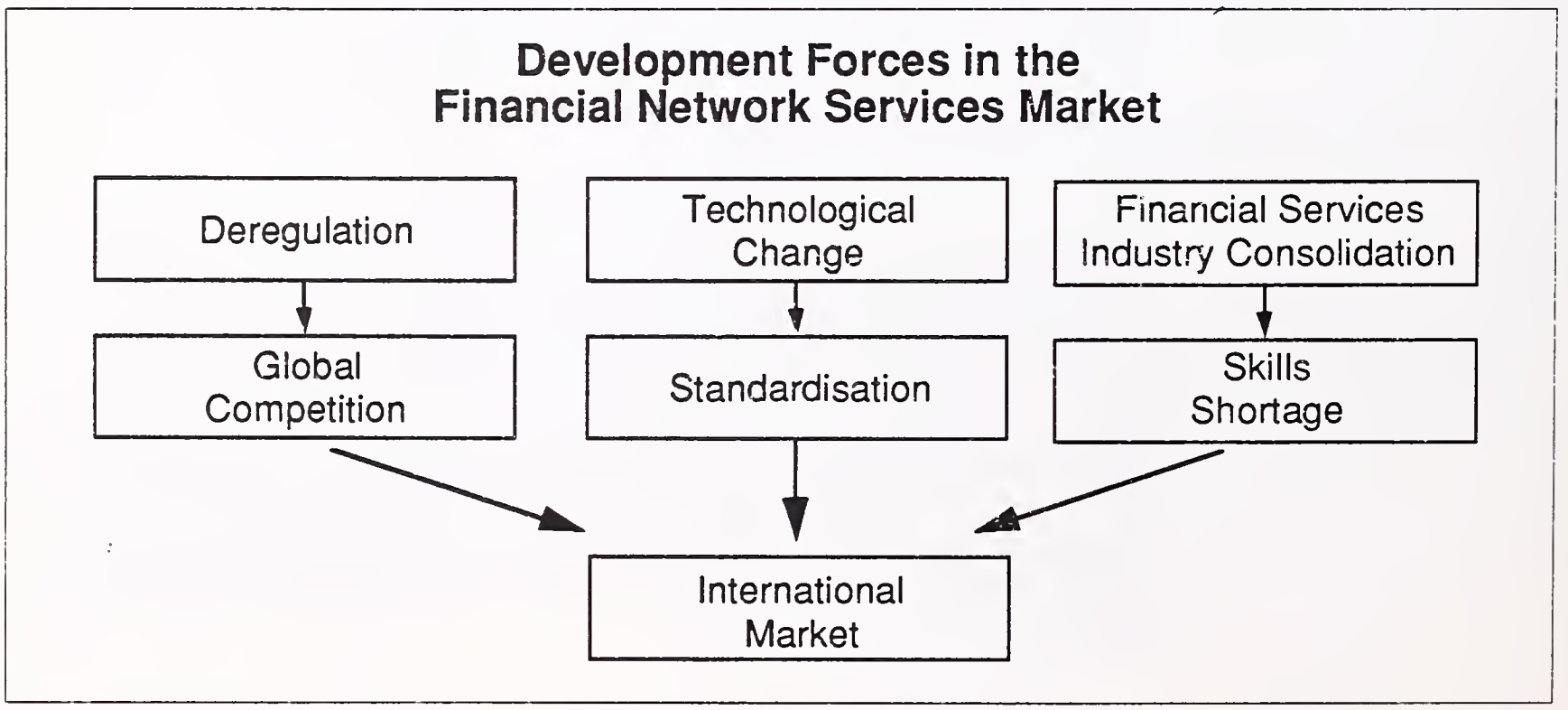
Financial institutions attempting to link their computer systems and to connect to those of other organisations are coming up against the problem of interconnecting systems and equipment from different suppliers. As a result, many European users are using an X.25 packet switched network to interconnect different computer systems and to provide flexibility for the future. The existence of fast packet-switching and voice compression techniques offers the leading players in each market sector an opportunity to gain competitive advantage. Suppliers to these institutions need to reevaluate their strategy for a sector which has the most complex set of user requirements in the network applications area. In addition, vendors are having to cope with:

- The changes being brought about by deregulation;
- The development of standards;
- The skills shortage.

However, the restructuring of the supply and demand balance in the network services market represents significant opportunities for those suppliers and financial institutions prepared to exploit this change and to shape developments to their own advantage.

Exhibit II-5 illustrates the interplay of the development forces at work in the financial network services market. Managed network services are increasingly the central focus for vendors as they strive to provide the platform from which advanced communications and applications services can be offered. However, it is the type of application services and products being delivered to the banking and finance community which will have to be changed radically as the market becomes increasingly global.

EXHIBIT II-5



D

A Market Definition

Exhibit II-6 illustrates the positioning of network applications in the overall network services market with the leading vendors listed for each major segment. INPUT research indicates that each sector will develop in different ways:

EXHIBIT II-6

Network Services Market
Western Europe

Segment	Key Vendors	Key Elements
Financial EIS	Reuters Telerate Telekurs	Video (page-based) Digital feed
Network Messaging Services	SWIFT GEIS Infonet BT-Tymnet	Global EDI/E-mail Risk Management
Managed Network Services	EDS Andersen Consulting Infonet IBM	Design Operations Facilities

1. Network Applications

a. Managed Network Services

Managed Network Services represents the most fundamental offerings of the international network services suppliers and consists of protocol conversion services, security and performance management services. This segment offers a major area of opportunity for companies such as Infonet, BT Tymnet, Plessey-Telenet and GEIS to exploit the need for access to different incompatible computer systems by offering protocol, message and document conversion services. Managed network services support other international network services and range from the overall facilities such as those offered by EDS to one-stop shopping services such as those offered by IBM. As a result of the need for a high degree of interconnection between users and the need for high security, the financial sector is a target market for such services. They can, for example, be used in support of automatic teller machine and international payments networks. The challenge for vendors is to offer a service which handles all classes of network service on an end-to-end basis.

b. Network Messaging Services

These services are not specific to the financial services sector. Currently, electronic messaging and transaction-based services (e.g., dealing in securities and money markets) have to compete with the telephone and fax services. Because financial institutions are major consumers of these services, the financial sector represents a significant portion of the overall European market for messaging.

The financial services sector is also a major consumer of network services offered by third-party vendors such as Reuters, GEIS and IBM. These services include EDI, balance netting services, cash management, global limits management and overall risk control services. The common thread is the matching and processing of transactions in a series of "clearing-house" operations run by the network services vendor. There will be significant revenue opportunities in this sector as leading international financial institutions seek to control risk and the use of assets more closely in an increasingly global environment.

2. Electronic Information Services

This group of services is key to the promotion of other services:

- Generic Services such as EDI and electronic messaging.
- Transaction Services for dealing and trading in money, paper instruments and commodities.

The most profitable segment is dominated by a few vendors who supply the real-time quote services, such as Reuters, Quick, Telerate, the International Stock Exchange and Telekurs, to the large dealing rooms of Frankfurt, London, New York, Tokyo and Zurich. The financial services community also uses other network information services for historical information on companies and markets, from vendors such as Datastream, Dafsa and Dun & Bradstreet, and for news information from Reuters and Dow Jones. Pressure from the financial services sector is forcing these leading vendors to deliver the service in digital record format capable of being processed, mixed and integrated with other information services. Developments in this sector, as a result of advances in information storage and delivery, will have considerable benefits for the other categories of network services by providing more opportunities for vendors to add value:

- By tailoring a mix of transactional and information services elements to niche sector requirements.
- By even marketing to the level of specificity required by individual organisations.

E

Large Vendor Dominance

As Exhibit II-7 illustrates, the financial network services sector represents almost half of the total Western European network services market. Exhibit II-8 shows the market forecast for the subsectors of the financial network services sector.

EXHIBIT II-7

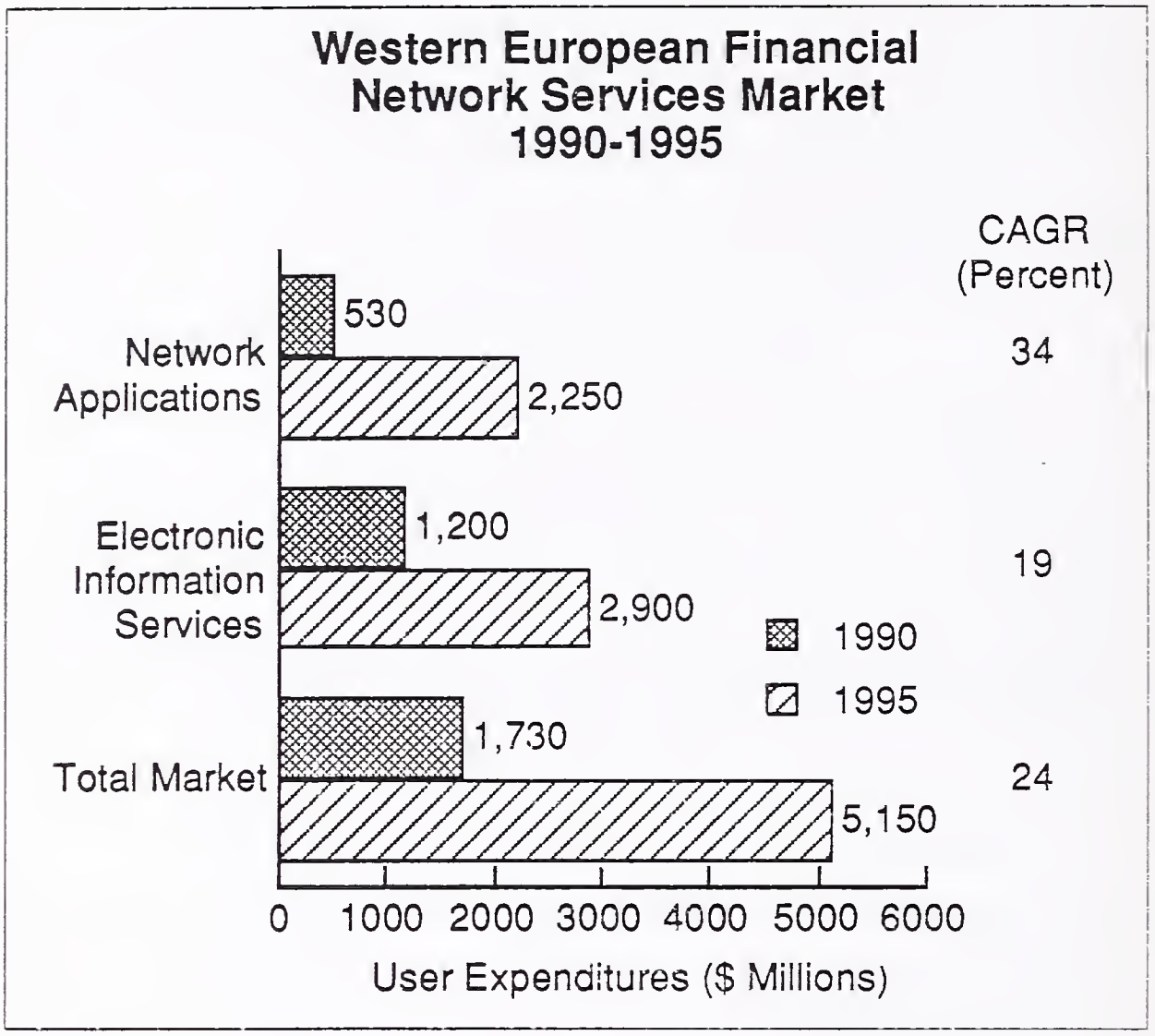
Western European Network Services Market 1990-1995

Industry Sector	Market Value				CAGR 1990-95 (Percent)
	1990		1995		
	$ Millions	Share (Percent)	$ Millions	Share (Percent)	
Financial Services	1,730	47	5,150	47	24
Manufacturing	470	13	1,210	11	21
Distribution	700	19	2,600	24	30
Utilities	90	2	210	2	19
Government and Public Service	180	5	620	6	28
Other	510	14	1,250	10	20
All Sectors	3,680	100	11,040	100	25

The higher growth rate for the network applications sector is attributed to the increasing demand for the more complex industry specific services expected to be offered by vendors.

The financial sector was one of the first to benefit significantly from inter-company trading and electronic services when banks started to make their information services decisions centrally, creating an ideal opportunity for large vendors wishing to serve them. The market covered by the very few major vendors offering electronic information services (EIS) to the securities market is now mature and, therefore only capable of relatively lower growth. Vendors such as Reuters, Telerate, Quotron and Telekurs act as electronic publishers, delivering their information directly to the electronic trading desks of market makers in the new electronic stock exchanges, or, in a more produced form, as digital feeds to front-office systems for distribution to trading desks via LANs.

EXHIBIT II-8



F

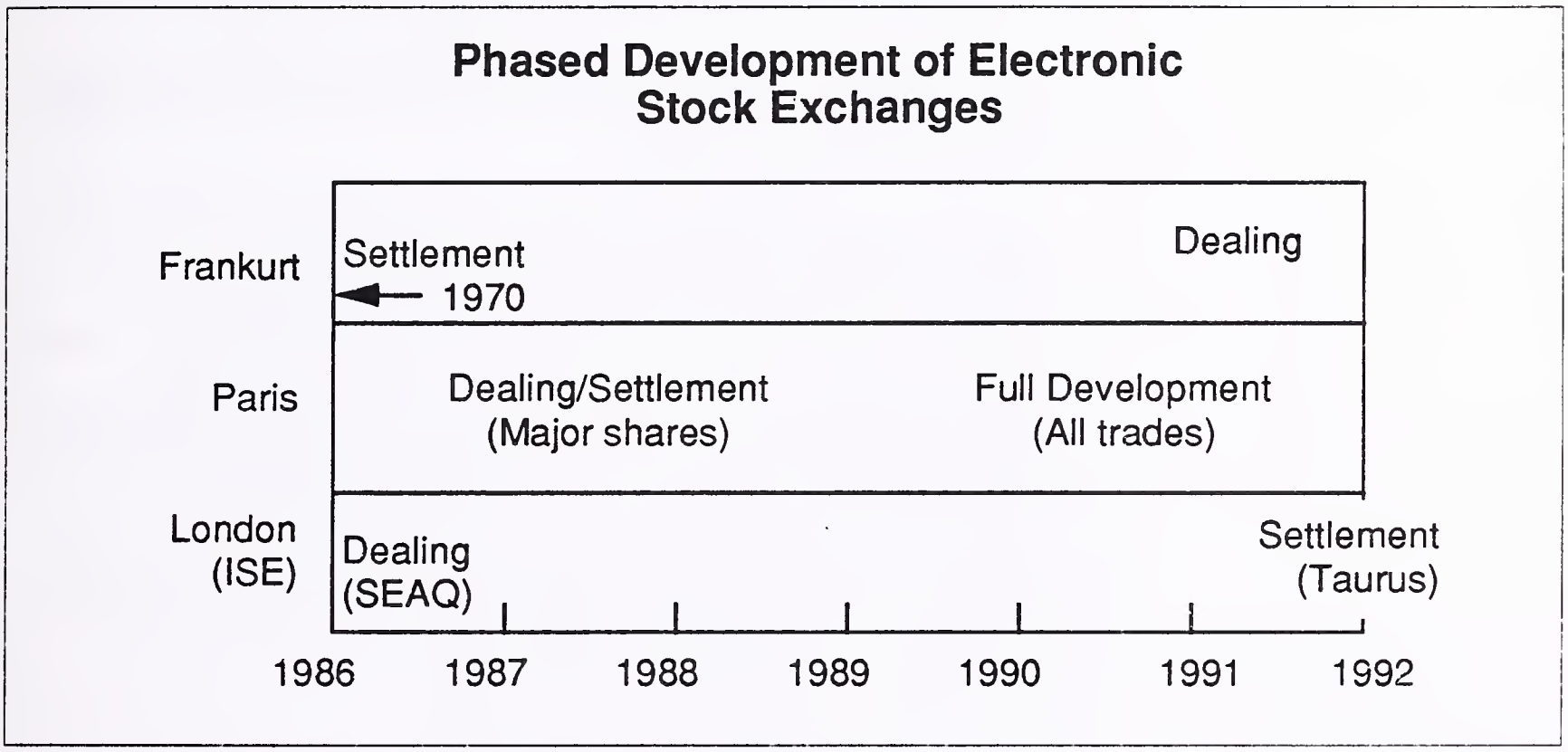
The Pan-European Electronic Securities Market

The stock exchanges in Europe are at very different phases of development towards the objective of becoming fully "electronic shops". Exhibit II-9 identifies some of the major developments. London introduced electronic dealing in 1986, but has yet to launch its electronic share registry system TAURUS, which is not planned for completion until 1992. Frankfurt has had electronic settlement since 1970, but only plans to introduce electronic dealing in late 1990. Paris started to introduce its full electronic settlement system, RELIT, in March 1990. As a result of these differing stages of development, the opportunities for network services vendors in Europe vary significantly from exchange to exchange, particularly since individual exchanges specialise in different financial instruments: London in international equities and Frankfurt in bonds, for example. Specialisation among European exchanges means that vendors will need to provide network integration and harmonisation as well as the traditional generic services.

The move to link exchanges, which have up to now operated completely separately, into a pan-European electronic information and dealing system, such as PIPE for international equities, is forcing the securities houses to update their internal electronic trading and settlement systems. In general, they are looking to external vendors to manage, install and

support these systems, thus offering considerable opportunities to network services vendors to launch new services in tandem with the upgrade of the offerings being built for the benefit of the securities houses' clients.

EXHIBIT II-9



G

Leading-Edge Banking

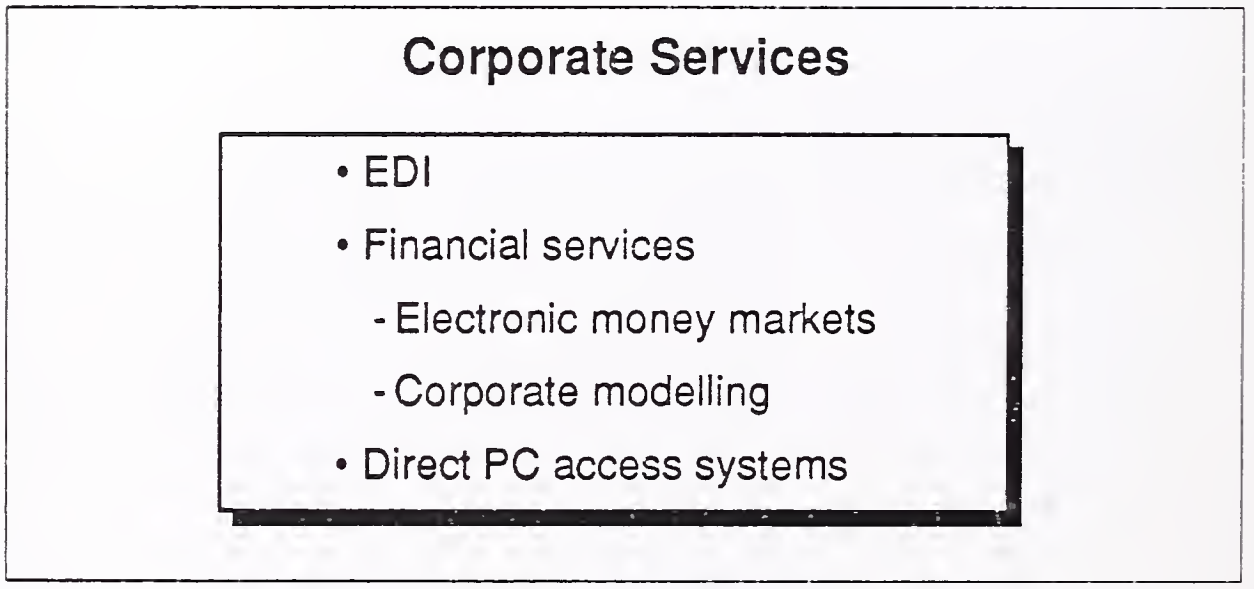
Financial institutions are primarily concerned about developing the right competitive strategy, and as a result, expenditure is being increased on information services in order to ensure that the competitive position is maintained. Information managers in banking are however concerned about maintaining development schedules on time and within budgets. There is pressure to maintain competitive edge by adopting the latest technologies. Banks are being forced to offer more on-line products and services if only to help externalise their labour costs. This represents an opportunity for vendors to develop new customer systems so that banks can deliver new sophisticated products and services to their customers. These new products and services may not necessarily demand new equipment, but will certainly require new systems to run them and will require the sort of level of network integration, which can only be offered in totality by network services vendors.

1. Corporate Customer Services

Exhibit II-10 lists the types of services that corporate banking customers will be offered in the 1990s, with the growing availability of financial services from a wider range of sources. Corporate finance managers will link straight into electronic money markets, foreign exchange markets and electronic credit checking services. Independent vendors are already offering corporate financial modelling packages to help banks retain control over corporate customers by providing them with fully integrated solutions. As a result, banking customers can channel all their financial dealings through a single interface.

Many banks are developing PC-based access systems to sit on the desk of corporate financial managers. In some countries, local videotex access systems are being used, as in France and West Germany. In addition to person-to-computer access by corporate personnel, the 1990s will see a rapid growth in corporate computer-to-computer access to banks via EDI technology. The demands of just-in-time (JIT) manufacturing can increase the number of invoices by a factor of 60 over traditional methods and can 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.

EXHIBIT II-10



2. EFTPoS

EFTPoS represents a significant opportunity for private client services. There are major moves by both retailers and banks to move from credit to debit 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, particularly if the debit card operates on the same time-scale as the cheque-clearing cycle for the UK's Switch. Banks envisage

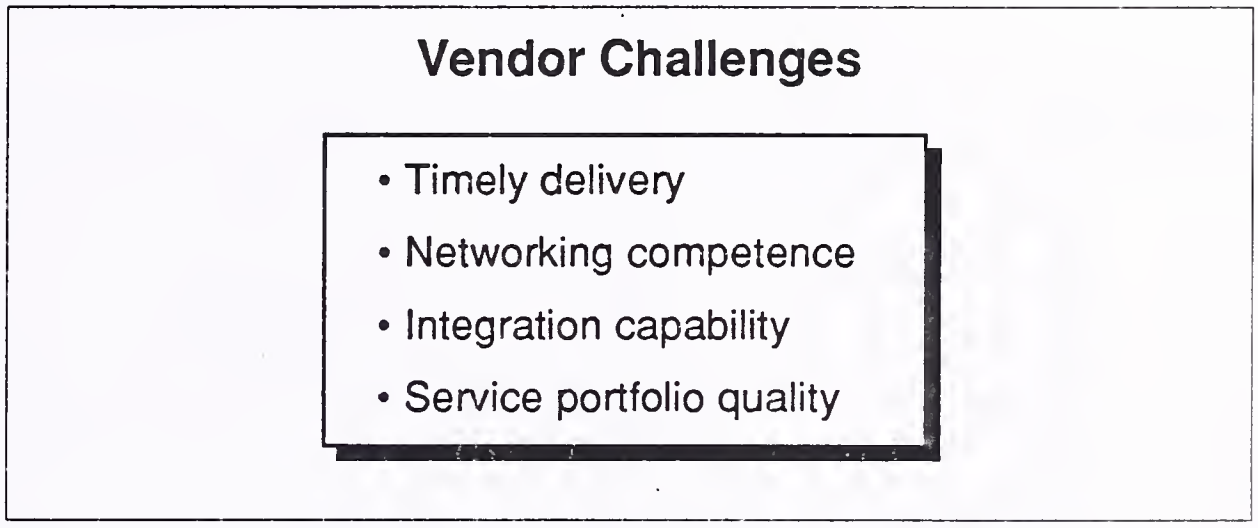
that a new boom could occur with debit cards fuelling an exponential growth in cards and EFTPoS services. There are major opportunities for vendors to offer not only EFTPoS software solutions, but complete EFTPoS systems and operational services.

H

Organisational Issues

The challenges facing network services vendors in the banking and finance markets in the 1990s are summarised in Exhibit II-11.

EXHIBIT II-11

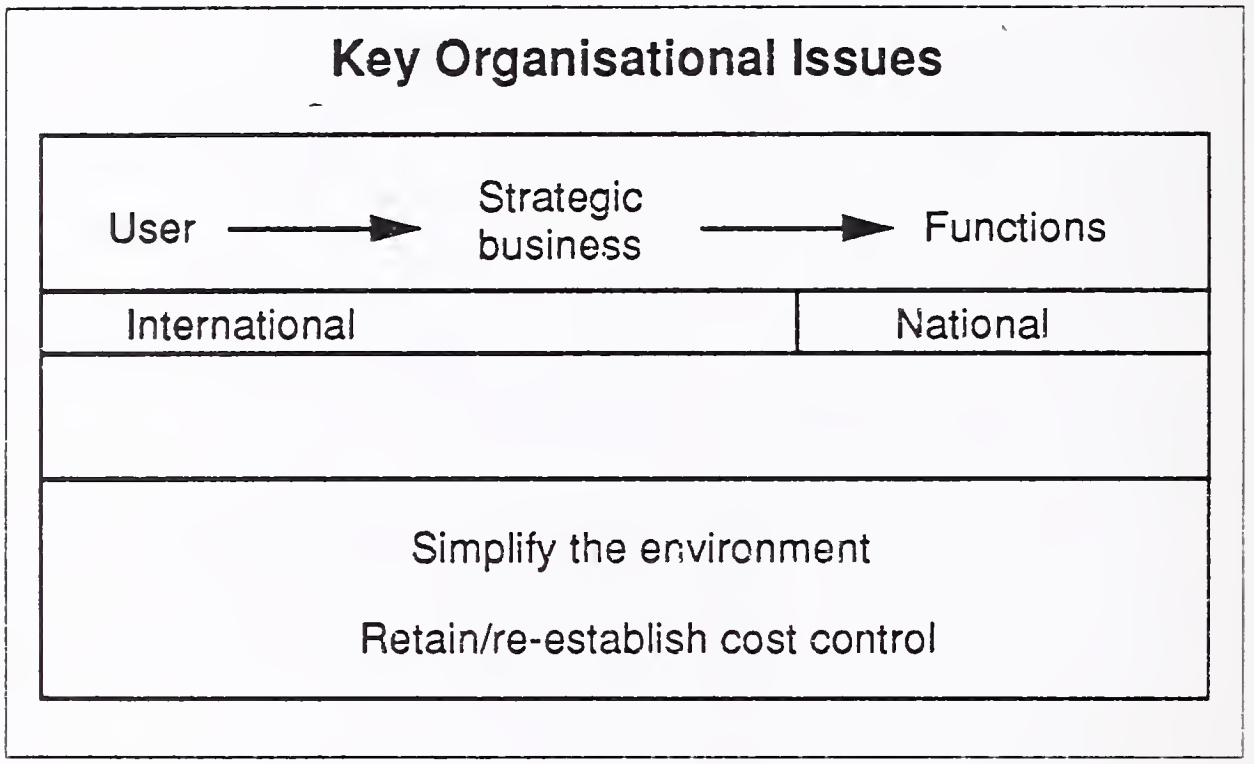


Banks demand that products and services are delivered on time. As the pressures on IS managers to improve services and to stay in budget increase during the 1990s, the challenge to deliver on time will remain key to the success of vendors in this market. The advantage for network services vendors is that one of the key requirements of the market-place is going to remain the ability to deliver competent networking skills. This will have to include competence both in LANs for branch offices and trading rooms, and in WANs for inter-enterprise communication and messaging. The most successful vendors will be those with pan-European networking and network system integration capabilities. The differentiation for banks will be the quality of their customer service levels, rather than the number of services available.

With the problems inherent in managing integrated networks for themselves, financial institutions are investigating options that will be cost-effective and enable more emphasis to be placed on the strategic and business functions. The lack of skilled personnel is becoming increasingly significant. The skills, expertise and procedures used for managing a traditional voice network are not de facto transferable to the management of an international network handling multiple information types. As a result, corporate management in the financial services sector is increasingly looking for IT professionals who are more strategically and less technically focussed.

With the increasing internationalisation of the financial community and with the technology developments and regulatory changes taking place in Europe in preparation for the 1993 Single European Market, there is an environment of increasing complexity, increasing cost and increasing uncertainty, making decisions difficult. Organisations are in need of a simplified environment, not an environment that requires increased amounts of corporate resources to manage. To outsource to a viable organisation, retaining very high-quality strategic level management in-house is one attractive option now being considered by more banks. The key organisational issues are summarised in Exhibit II-12.

EXHIBIT II-12



I

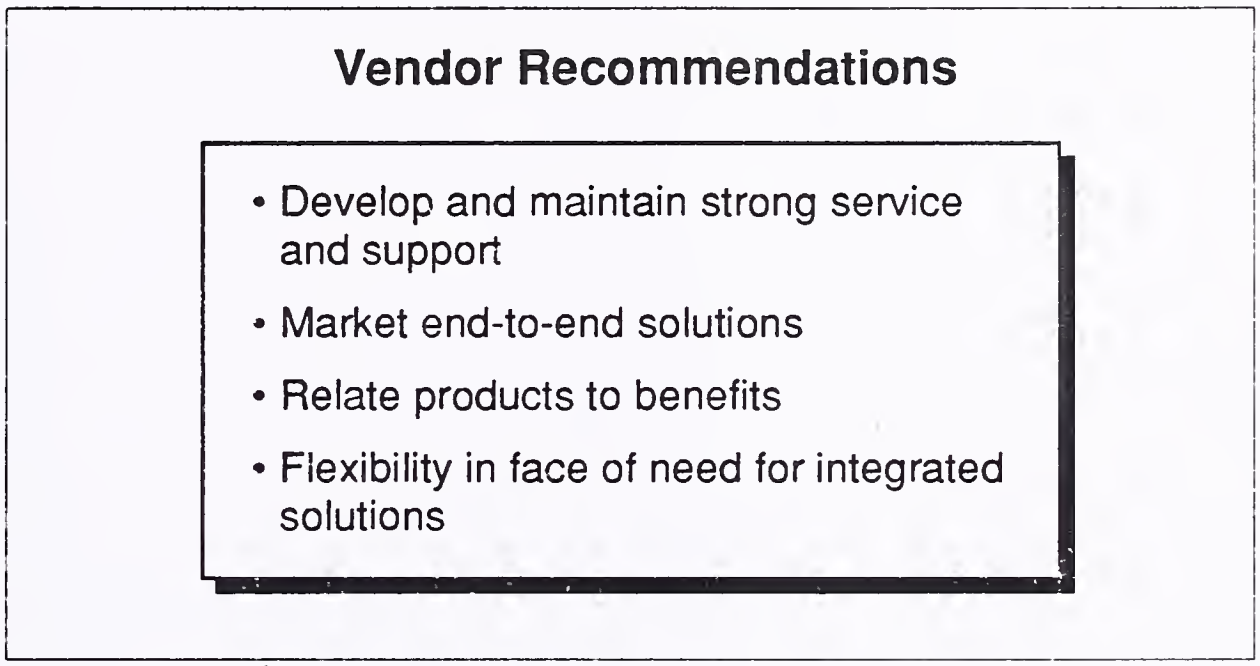
Recommendations

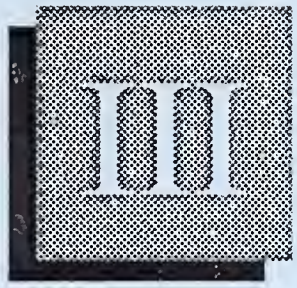
The market for financial network services is undergoing a period of fundamental change. Financial institutions are increasingly aware of the strategic importance of network services and are increasingly prepared to make investments in new services. To assist them in making the necessary transition, many are looking to strong end-to-end network vendors. Banks in particular are extremely conscious of the need to service their corporate clients, to whose information processing requirements they know they must respond. A noticeable indicator of this trend is the number of trade payments services currently being developed by the major European banks.

As a result of the restructuring of the financial services industry, vendors need to develop and maintain a strong service and support focus whilst marketing end-to-end solutions. Banks and financial services organisations will in many cases continue to run their core private networks themselves, but increasingly use a network services vendor for the ever-growing peripheral network. Once this situation becomes prevalent,

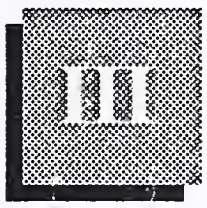
the banks and financial services organisations will be in a position to provide specific applications to their own corporate clients resold over a managed data network platform, tailored to their requirements. With this increasing awareness among user organisations of the options available, vendors need to retain maximum flexibility, if they are going to be able to help financial services organisations exploit the savings and gains offered by the rapidly developing technology. Not to do so will result in significant loss of market share. The recommendations for vendors are summarised in Exhibit II-13.

EXHIBIT II-13





Market Dynamics



Market Dynamics

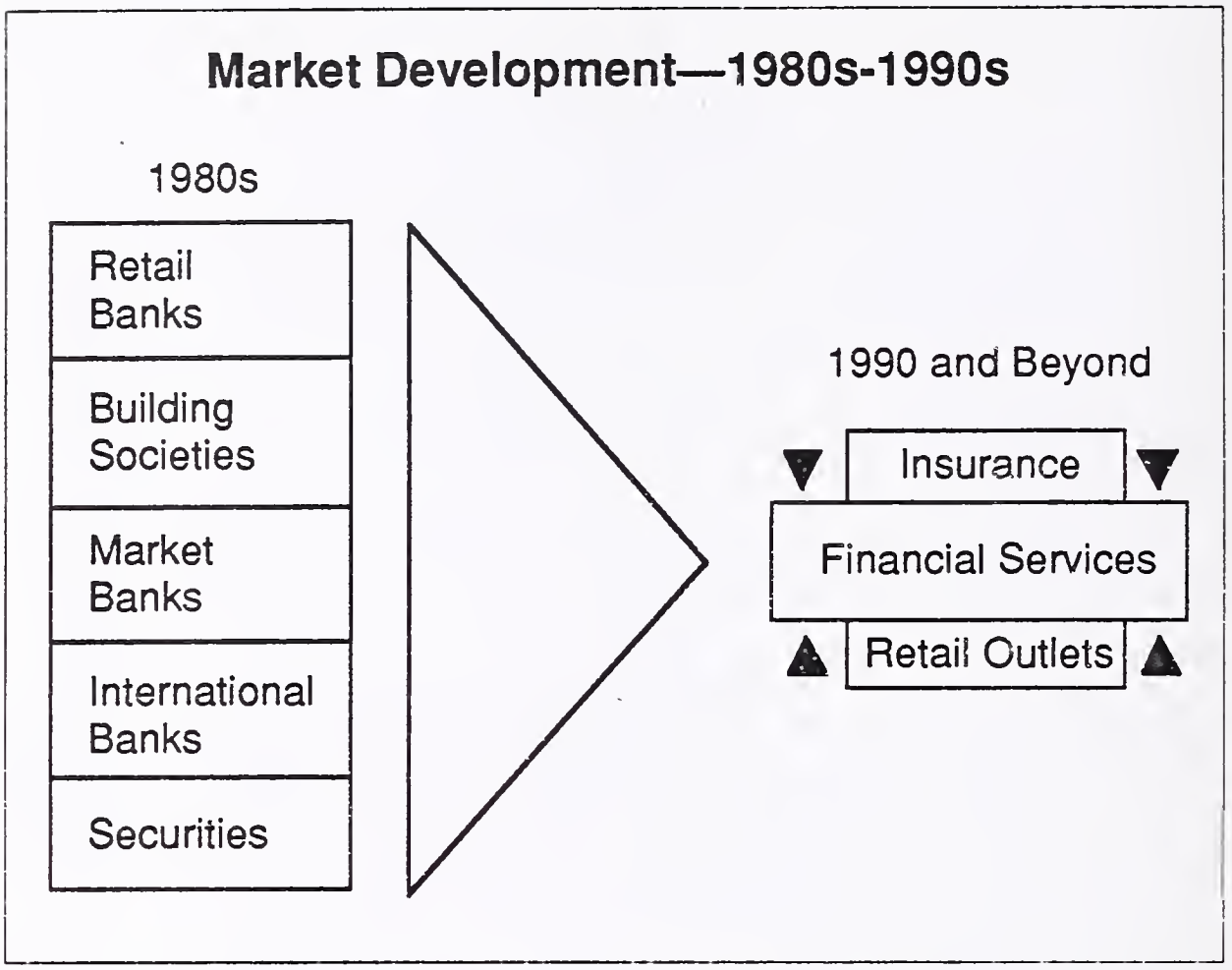
A large proportion of financial network services revenue is derived from the banking and finance market. This chapter presents a review of the market structure of the banking and securities markets and highlights the opportunities available to network services providers. A review of the corporate market can be found in Chapter V.

A Overview

The European Commission's Single European Act legislation has set the scene for all financial markets throughout the E. E. to be deregulated by 1993. As a result, financial institutions are faced with the prospect of direct competition from other financial institutions traditionally limited to their own sectors. For example, the major European retail shopping chains are improving the capture of customer information through better computer systems and the use of their own credit cards. As Exhibit III-1 illustrates, the traditional boundaries between the different types of banking and securities trading, and the traditionally unrelated sectors of both insurance and retail shopping have started to blur over the past decade.

Exhibit III-2 lists the key developments within the EEC. 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). With the Single European Act, the European Commission has moved to develop specific liberalising legislation for all financial services. The First Banking Directive, agreed in June 1988, sets out the principles of liberalising capital movements throughout the E.E. This allows for the liberalisation of current and deposit account transactions, financial loans and investments.

EXHIBIT III-1



The Second Banking Directive sets out the concept of minimum harmonisation of supervisory standards for financial institutions and of the single "passport" for a financial institution in any member state to operate across its borders in any other member state. Through this, 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 automatically to sell its financial products and services in any other member state. This legislation covers commercial, investment, co-operative, mortgage and other specialist banks as well as building societies.

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	Signature of the Single European Act
June 1988	1st Banking Directive agreed by the Council of Ministers (agreement to free capital movements)
December 1989	2nd Banking Directive agreed by EEC finance ministers (agreement on minimum supervisory standards and concept of the "single passport")
October 1990	United Kingdom joins the other 11 member countries in the Exchange Rate Mechanism (ERM)
January 1st 1993	Day 1 of new liberalised regime for goods and services

Exhibit III-3 sets out the main principles behind the European Commission's legislation for the banking and finance sector. The effect of liberalising the movement of capital between member states and the minimum harmonisation of standards will be to create an environment which enables financial institutions to expand throughout the EEC and to compete with one another. The invocation of the "single passport" rule—i.e., a financial institution in one member state has the automatic freedom to establish itself also in any other member state—will remove the traditional national barriers stopping financial institutions moving into neighbouring member states.

EXHIBIT III-3

Key Principles 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

B

The Financial Sector

There are some 10,000 financial institutions in Western Europe, of which some 500 are large European owned banks. The top ten banks in the EEC are listed in Exhibit III-4. This total number of 10,000 will be substantially reduced in a deregulated market. Already there has been the creation of new regional banking groups and a merging of the larger banks in the smaller European countries. Furthermore, this merging of national banks is likely to be only a first phase. The restructuring at a national level will be followed by an international acquisition phase with the larger national banks expanding throughout Europe by buying up smaller banks in other European countries.

The critical issue for network services vendors is that the average size of banks will increase, thus creating opportunities for supplying network services to the new larger banks.

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

These new and larger financial institutions will offer a broad base of international financial services. Since it will be impractical for banks to develop all the in-house expertise to develop and manage the more complex networks needed for a new generation of international products and services, they may consider spinning off their IT departments as separate companies to benefit from the new opportunities that deregulation will bring. Many of the larger banks are already exploiting their internal networks—Midland, Barclays, Banque Nationale de Paris and Banque Paribas, for example. Exhibit III-5 summarises the key features of the new market-place for financial network services.

There will be two significant effects resulting from this new environment:

- There will be opportunities for vendors to assist financial institutions to:

  - Develop, operate and manage complex hybrid networks,
  - Integrate the multi-functional networks and systems needed for corporate and private customers,
  - Become more international.

EXHIBIT III-5

Repercussions of the EEC Restructuring of 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 competitive scenario will be more complex.
  - US and Japanese vendors will expand into Europe as their clients become more international,
  - Non-traditional network vendors will enter the financial sector either by themselves or through their traditional clients moving into the financial sector,
  - Traditional banking vendors owned by groups of banks will look to sell their services on the open market rather than just to their shareholders or internal captive markets,
- Banks will consider:
  - Setting up joint ventures with independent vendors to exploit their network services capability,
  - Spinning off their networking subsidiaries as separate independent vendors.

1. The Electronic Stock Exchange

Exhibit III-6 illustrates the different development phases of the major Western European stock exchanges as they move from the old traditional floor based trading, and manual settlement and clearing systems to new electronic systems. Most exchanges have opted for a step-by-step development path, introducing electronic systems first for the major securities or equities—i.e., the ones most frequently traded on their exchanges. In most cases, the plan to introduce the full electronic stock exchange will not be completed until 1991 to 1992. The breakdown of the total securities trading volume for Western Europe in 1989 by major geographic region is given in Exhibit III-7. London is by far the most important exchange accounting for some 40% of the total trading volume.

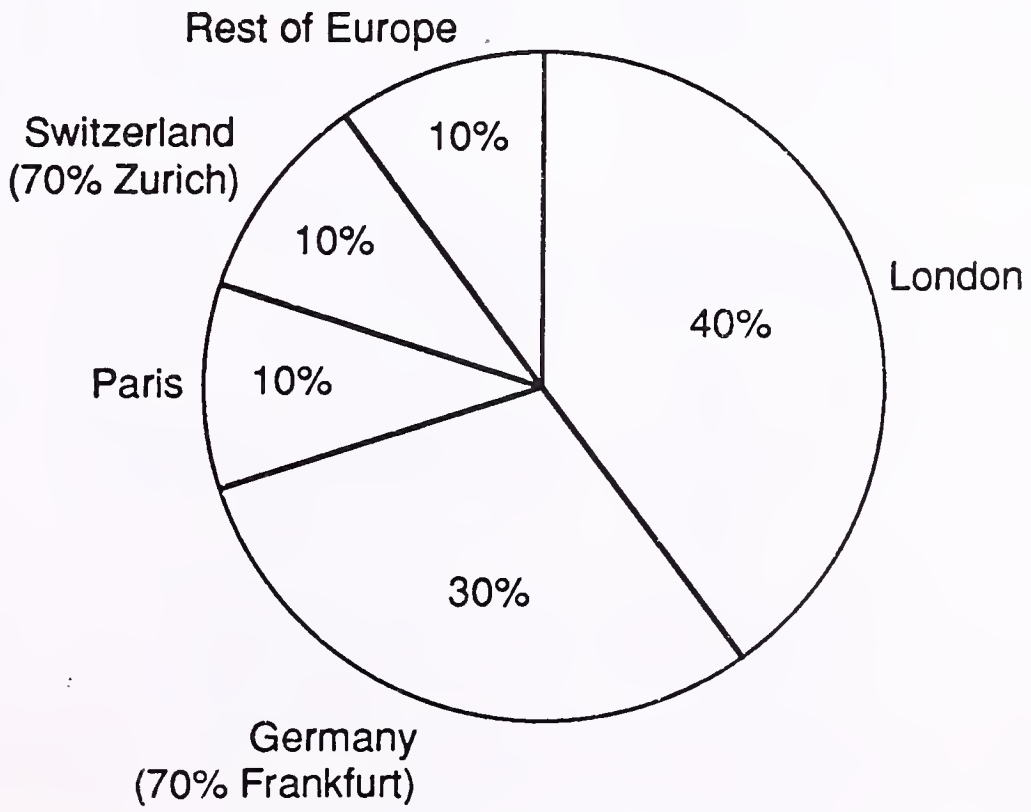
EXHIBIT III-6

Development of Leading European Electronic Stock Exchanges

• London	- Dealing 1986 (SEAQ) - Settlement 1992 (TAURUS)
• Paris	- Dealing/Settlement for 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

EXHIBIT III-7

Western European Equities and Bonds Trading Volumes, 1989



2. Networked Systems

a. SEAQ

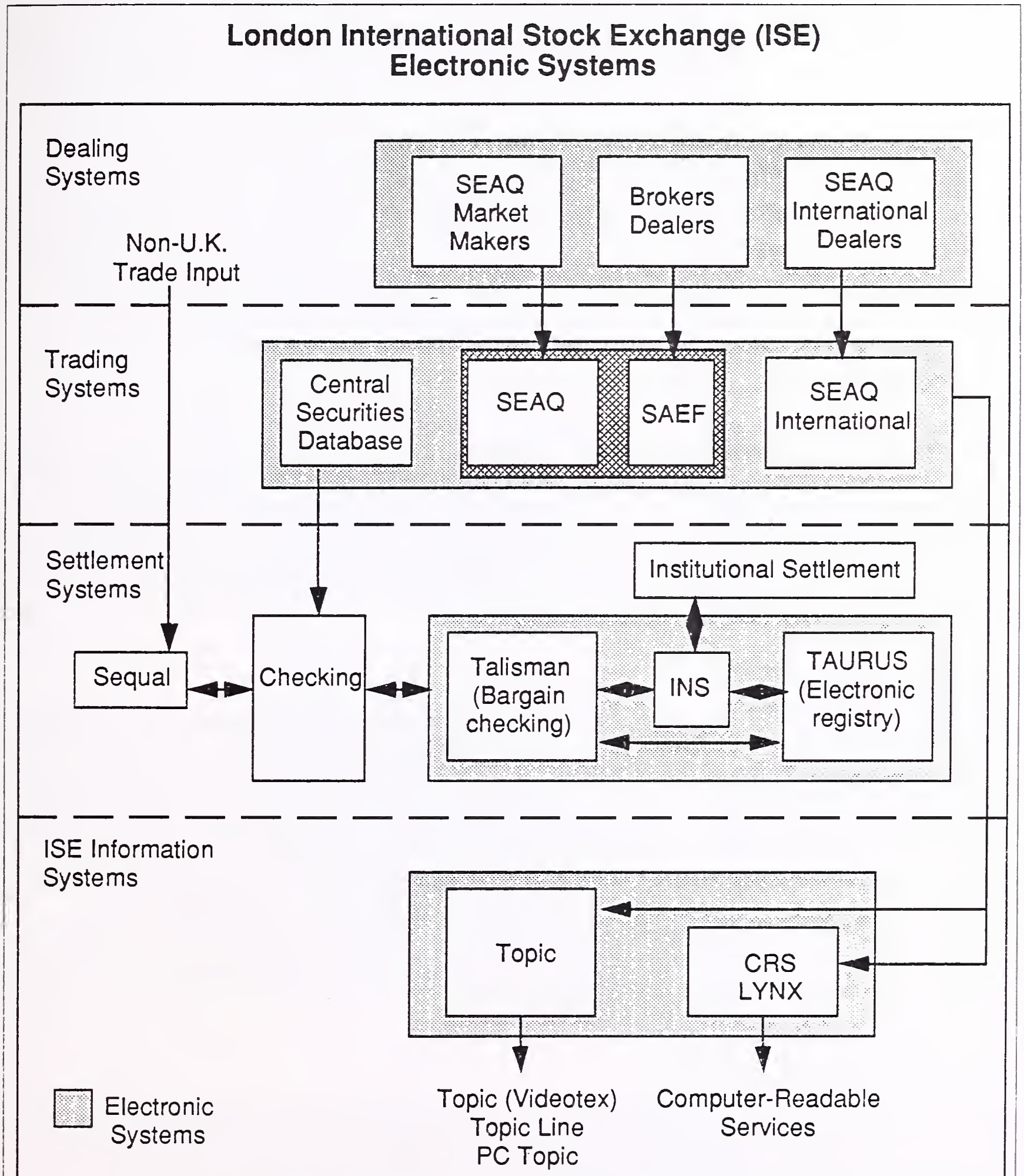
The so called "Big Bang" occurred in October 1986 on the London stock exchange which was at the same time relaunched as the International Stock Exchange (ISE). Big Bang involved:

- The dismantling of the two tiered system of jobbers (market makers) and brokers.
- The ending of the system of fixed commissions
- The introduction of the electronic trading system for domestic equities, SEAQ, and for international equities, SEAQ INTERNATIONAL. Both these systems had the effect of almost overnight moving trading from the exchange floor to screen based systems.

Exhibit III-8 illustrates the main systems, both implemented and planned, 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.

EXHIBIT III-8

London International Stock Exchange (ISE) Electronic Systems



b. TOPIC

These trading systems are backed up by the exchange's price and news information system TOPIC, developed around 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 either via videotex onto a modified TV set or in PC format. It can also be supplied as a direct data stream into a user's in-house computer system, where it can be dispatched to all linked terminals or PCs. SEAQ and SEAQ INTERNATIONAL information is fed directly into TOPIC via the CRS LYNX system, which acts as a distributor of trading information to a variety of end users. TOPIC is currently being upgraded to increase its capacity, to eliminate the five to 10 minute downtime after any failure and the 50 second delay in updating prices.

c. Talisman

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 complete "dematerialisation" of shares (i.e., the elimination of the paper share certificate) to be completed by end-1993. The total development cost of TAURUS is estimated to be between £45 million and £50 million.

d. TRAX

In January 1989, the Association of International Bond Dealers (AIBD) launched TRAX (Transaction Exchange System) for Eurobonds. This 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 a settlement system, called ACE, jointly developed by the two Eurobond clearing and settlement organisations, Cedel and Euroclear. There are proposals to merge TRAX and ACE together into a joint service, to be called TRACE. Network links would have to be established between the two currently separate systems and GEIS, the network services supplier for ACE, is working on a proposal for this. Non-U.K. Eurobond dealers can already link into TRAX in the U.K.

e. DTB

In August 1989, an electronic futures and options exchange, Deutsche TerminBourse (DTB), began trading. This 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 Consulting was awarded the contract to modify the Swiss software for DTB. Bonds and stock futures are planned to be added to the system by August 1990. The DTB host system runs on Digital equipment and traders can link in via either Digital or IBM equipment.

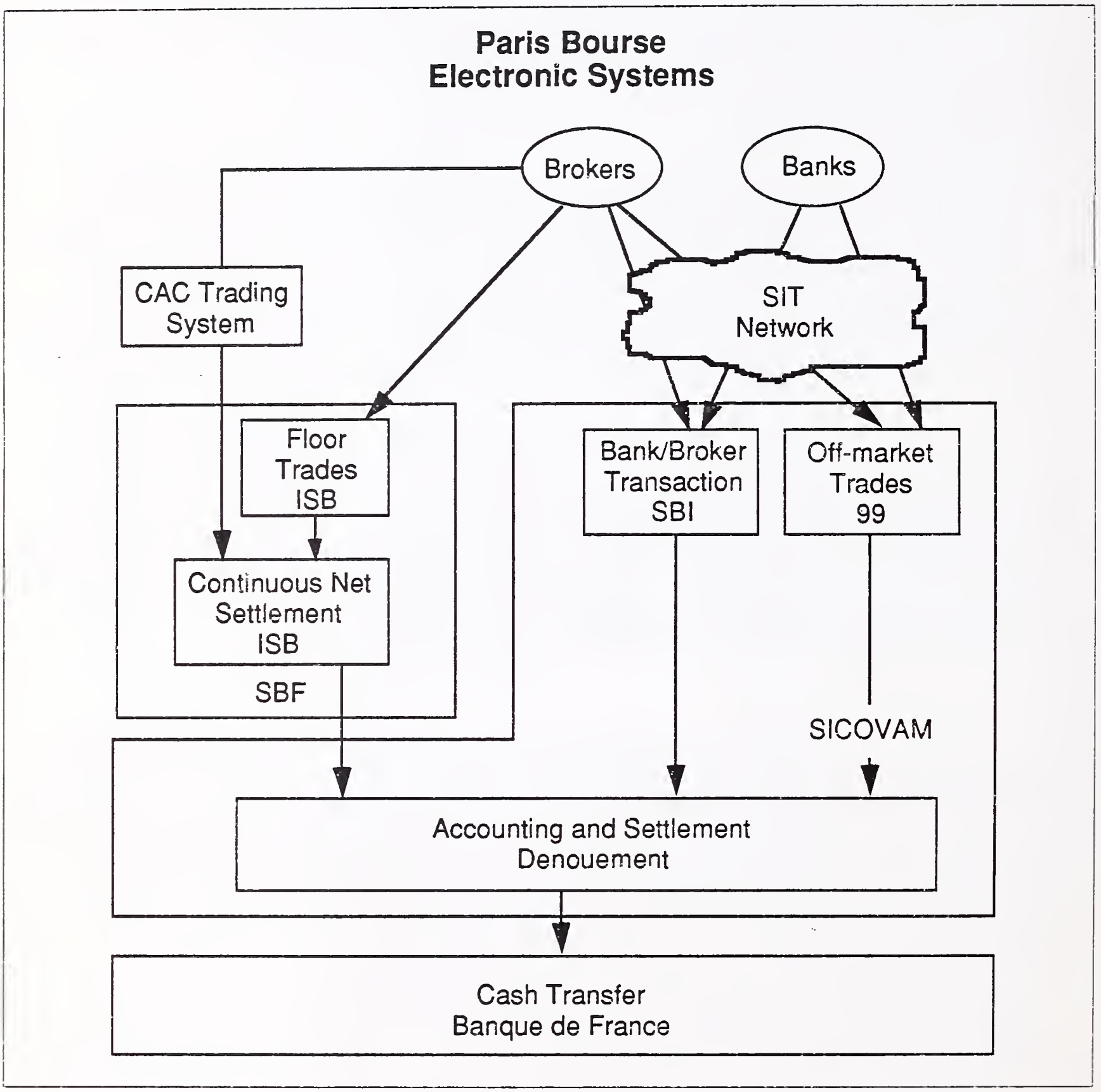
f. IBIS

In December 1989 the Deutsche Wertpapierdaten-Zentrale (DWZ) launched Inter-Bank-Information-System (IBIS) for all eight German regional stock exchanges. DWZ, ultimately owned by the major German banks, has developed IBIS in-house with some initial assistance from IBM. All future developments will be handled in-house, rather than using external vendors. Participating banks are either German-owned, or branches of foreign banks. They link into IBIS through the IBM communications protocol and standard IBIS message formats. As with DWZ, the majority of them will also 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 the autumn 1990. Phase 2 which should be launched by the end of 1990 will also include electronic dealing. IBIS is having to compete with the Makler-Tele-Information-System (MATIS), owned by brokers and delivered through the Reuters network. Added to this Quotron has planned to launch its competitive system, MIDAS, in mid-1990.

g. CAC

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

EXHIBIT III-9



h. RELIT

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

- ISB (inter-societes de bourse) - the clearing function for brokers,
- SBI (societes de bourse-intermediaires) - the clearing function between banks and brokers,
- G/G (Gre a Gre) - 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 is a remodelled version of the cash clearing network used by the French banks.

RELIT is planned to be launched in early 1991. Andersen Consulting has been the project manager for the first three stages which have involved some 350 banks and 45 stock brokers. For the fourth and final stage, Andersen Consulting 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 believes that, with the completion of RELIT, Paris will have a significant advantage over London. Until TAURUS is fully operational Paris will be able to capture business from London.

i. Other

Other European stock exchanges are gradually developing into full electronic exchanges. Most are moving step-by-step, introducing electronic systems for only the major shares to begin with.

Italy has yet to agree plans for electronic systems for its ten exchanges. In mid-1989, the first steps were taken with the creation of the Generale Telematica per la Borse Valori Italiane (GTB). This joint venture company between the Italian banks and the association of stock brokers is charged with developing electronic systems for and between the individual 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.

Brussels has followed Paris and installed the Toronto developed CATS system. Andersen Consulting was again involved in the development and electronic trading first started in January 1989. By mid-1990, all 500 Belgium and foreign shares were to be up 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 (translated this means 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. It will run on Digital equipment.

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 the trading volume between Scandinavia and the EEC. Already other Scandinavian financial institutions have joined forces with Danish broking firms to form alliances.

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 have been made for the development of a central clearing system.

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 is stimulating other exchanges, in particular Barcelona, to fight back and has given birth to the concept of an Iberian peninsula-wide system, linking together the four Spanish and the two Portuguese exchanges in Lisbon and Oporto into a single dealing system.

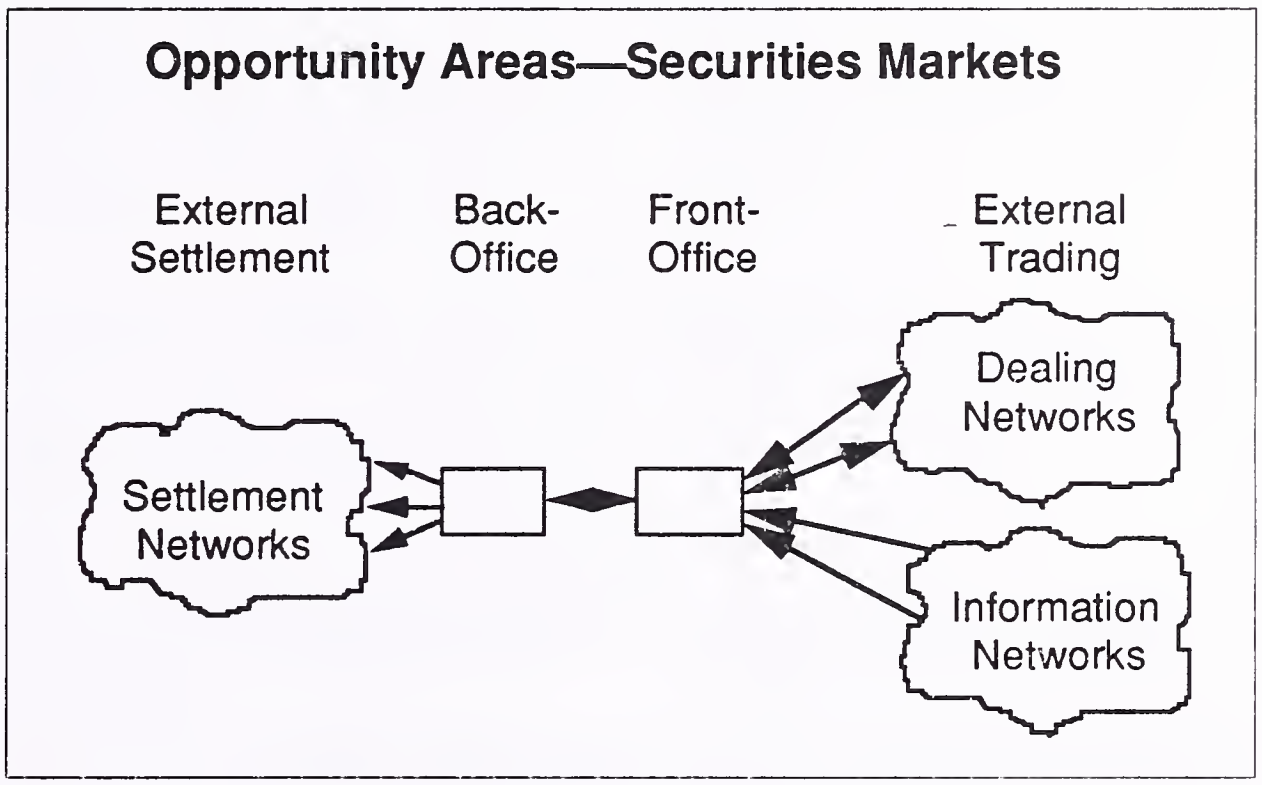
3. Vendor Opportunities Among the Securities Houses and Stock Exchanges

As competition between European stock exchanges gains momentum, there will be large contracts for network services vendors to assist both exchanges and securities houses to link into other exchange systems. Exhibit III-10 illustrates the different opportunity areas within a single securities house and Exhibit III-11, the opportunity areas within an individual exchange. As opportunities develop for securities houses to link into neighbouring exchange systems, vendors will have to have the capability to offer pan-European networking and integration skills. It is these skills which will prove the key differentiator for banks when awarding these contracts. Vendors must also be able to offer network systems integration on an international level.

As Exhibit III-10 indicates, front-office systems for securities houses have to be highly complex, linking into a variety of electronic information services (EIS) vendors - Reuters, Telerate, Extel, Quotron - as well as logging into and out of different trading systems for specific trading activities. Vendors such as Reuters and Telerate also supply turnkey systems for dealing systems. They can supply their proprietary systems and can support both equipment and software. For the smaller firms,

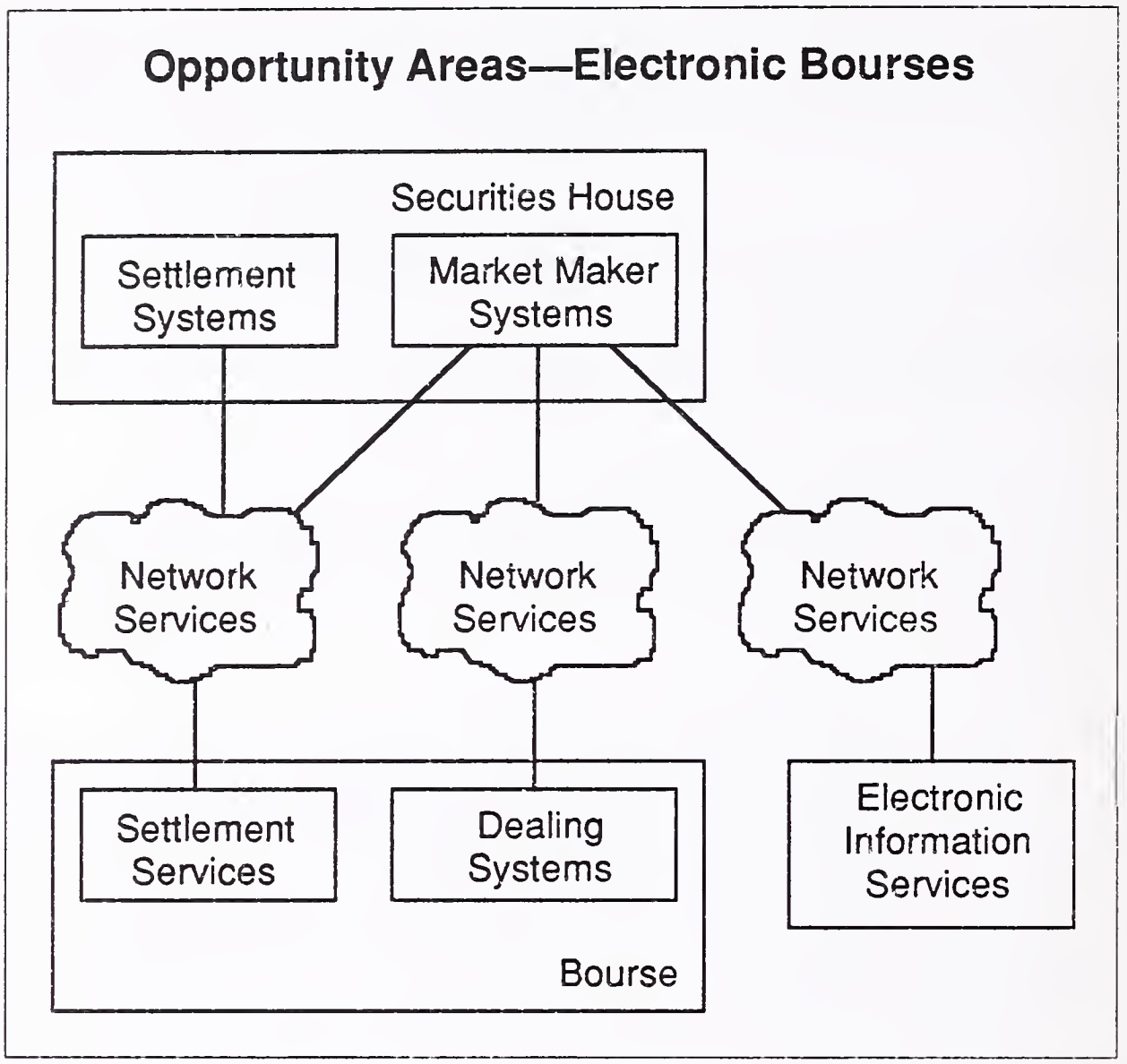
individual trading positions have their own Reuters, or Telerate terminals. For the larger firms, it becomes preferable to acquire the different information services digital streams and to manage these via a custom-built front-office system. This can be tailored to a firm's own requirements, e.g., be designed to ensure that regularly used screens are constantly refreshed, and made available more easily to traders than the less frequently used information screens.

EXHIBIT III-10



Networking and integration skills are essential in order to assist exchanges and bourses in developing their local systems and for the planned inter-linking of systems between different exchanges. Andersen Consulting has been involved in many of these projects to date for the Paris, Brussels and Madrid exchanges. Similarly the major French vendor SG2, which is wholly owned by the major French bank Societe Generale, is involved in developing the RELIT system for the Paris Bourse.

EXHIBIT III-11



4. Banking Market Opportunities

The first repercussions of the Single European Act legislation on the European banking market are being seen as a restructuring of national banks through mergers.

As these waves of national restructuring move through all types of national banking, a second wave of international mergers and acquisitions will occur. In addition, thrift organisations, building societies, insurance companies and retail organisations will move into banking, either through mergers and acquisitions, or internal developments.

The effect of these developments for the network services industry will be very significant. Banks will become bigger, with wider portfolios of products and services, and more international. They will carry out rationalisation of internal systems and development of links with external systems. Linking new systems acquired through mergers and acquisitions with existing systems will only exacerbate the problems of rationalising different systems for the IS manager. The communications challenges are enormous, the opportunities for vendors considerable.

a. EDI

Electronic Data Interchange (EDI) is a potential major stimulus for fault-tolerant processing in banks. If banks have clients practising just-in-time (JIT) manufacturing, they 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 time lag between ordering and dispatch from weeks to one or two days. If the bank cannot guarantee efficient documentation processing for such clients, they will undoubtedly go elsewhere. 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.

Banks will be attracted to the notion of developing direct on-line customer services as a means of externalising their labour costs. This means allowing their customers access into some version of their prime data base. What is lacking in the current state of technology are:

- On the systems side, cost effective security gateways.

- For applications development, a full corporate database, permitting interdivisional product and service structuring.

INPUT sees tremendous opportunities for third party vendors to develop a number of services based around the wider introduction of fault-tolerant processing, and corporate database development.

EDIFACT standards are in the process of being set for all the relevant documents needed 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 they hold their customers' funds, and hence to reduce their profits. Unlike the U.S. where major customers such as General Motors have forced banks to work together and to agree standards, in Europe banks have not shown this co-operative spirit. Until EDIFACT standards are agreed for banking documents, there is likely to be little pressure on banks to make more than token moves into EDI.

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

- Draft document,
- Agreed proposal for participants,
- Draft standards for formal trial,
- Recommendation as a standard.

Exhibit III-12 lists the different banking documents that have to be developed for EDI. By the 4th quarter of 1990, all except the letter of credit were planned to be on status level 3—i.e., a draft message standard ready for formal trial. The banking documents that are under trial, or planned for later trial are shown in Exhibit III-13:

EXHIBIT III-12

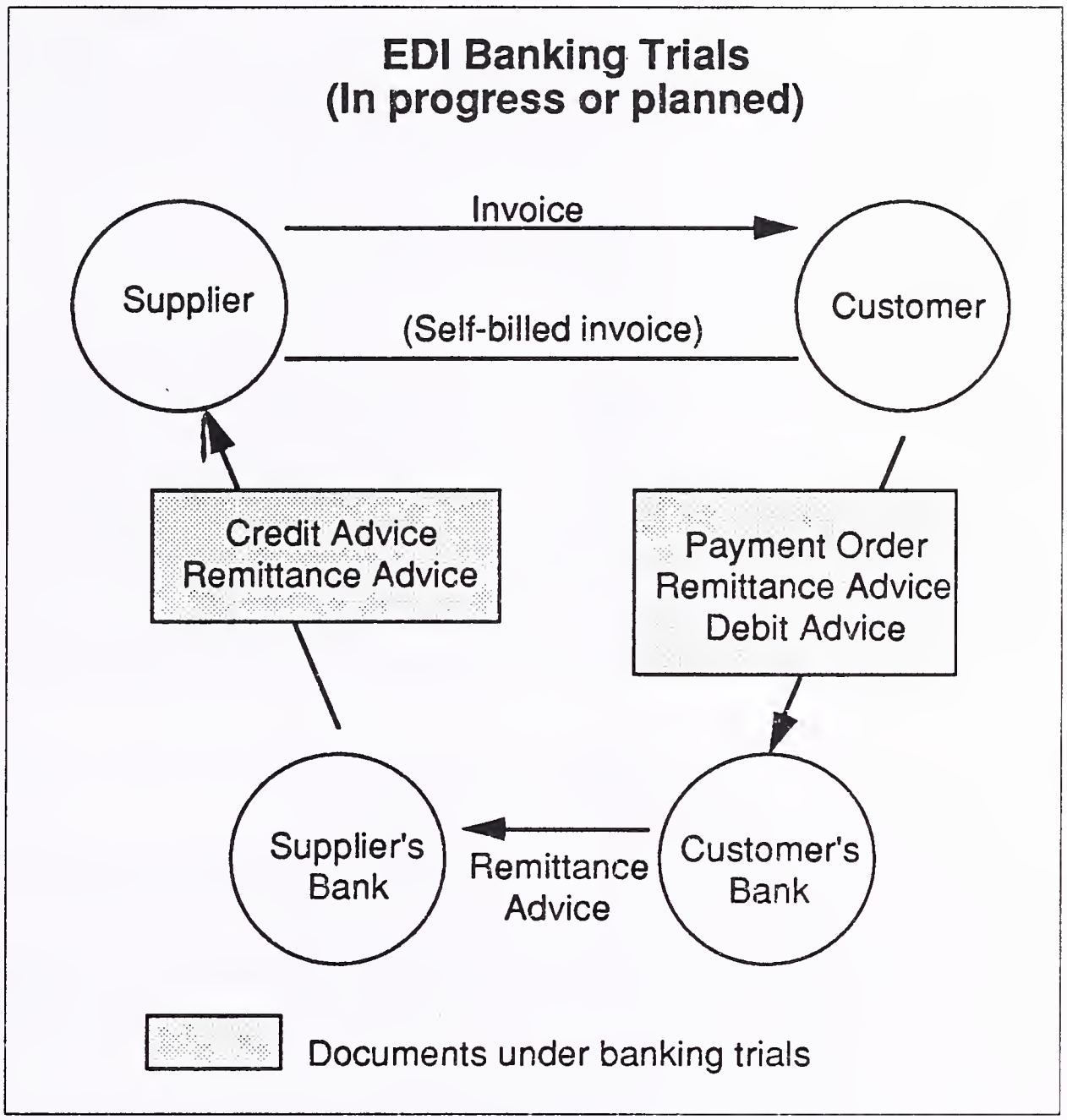
Banking Documents Being Developed for EDI

- Remittance advance
- Payment order
- Payment order/remittance advice
- Debit advice
- Credit advice
- Extended credit advice
- Letter of credit

As in other areas of EDI, the U.K. is considerably further advanced in banking EDI than are the other European nations. Barclays Bank is currently participating in an EDI trial with Peugeot Talbot Motor Company and one of their main parts suppliers. The Bank of England is very keen to see the major U.K. banks develop into EDI, but will not get involved itself. The National Westminster Bank has announced that it will offer a combined electronic trading and payment service via the joint ICL and GEIS owned INS network in the UK.

In Denmark some banks are already operating "EDI-like" banking products for funds transfer, as is also true for Italy. Other banks in Italy have been using the Ri-Ba (Ricevuta Bancaria) systems for electronic payment by installment since 1985. This system replaces promissory notes. Around some 200,000 Ri-Ba items are processed by the Italian clearing banks each day, and that volume represents some 40% of the total paper bills in Italy. Consideration is being given to converting the Ri-Ba to EDIFACT standards.

EXHIBIT III-13



Recently, the Philips EDI group in Brussels warned that cross-border EDI will be much harder to implement in proprietary, rather than in open standards, since each country in Europe has its own banking regulations, its own currency and different instruments. Adding the incompatibilities of the ("physical") networking standards to the existing ("logical") application incompatibilities will obviously compound the difficulties of EDI banking implementation.

A key banking document that is still creating problems for the developers of EDI is that of documentary credit. Legally this has had to be a physical document that can be handed between parties, in particular a bank giving the seller its conditional undertaking to pay once certain stipulated documents are physically handed over. EDI only transmits information, not the document, and cannot, therefore with current technology and the current legal requirements, transmit the legal characteristic of "negotiability" possessed by certain paper documents.

In addition to agreeing 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 levels at which networking problems need to be resolved:

- Interbank transfers
- Client/bank transfers

It is likely that interbank transfers will be handled by the national and international interbank network services, the "vertical" services such as BACS in the U.K., and SWIFT internationally. These services have been set by banks, cooperating agreements from within their own industries. The cost differences between using these joint bank-owned networks and third party value added networks is very considerable. However, there are opportunities for third party vendors and for the banks themselves to offer to run these interbank networks for the member banks under systems operations contracts. Societe Generale is one of the European banks actively pursuing this option.

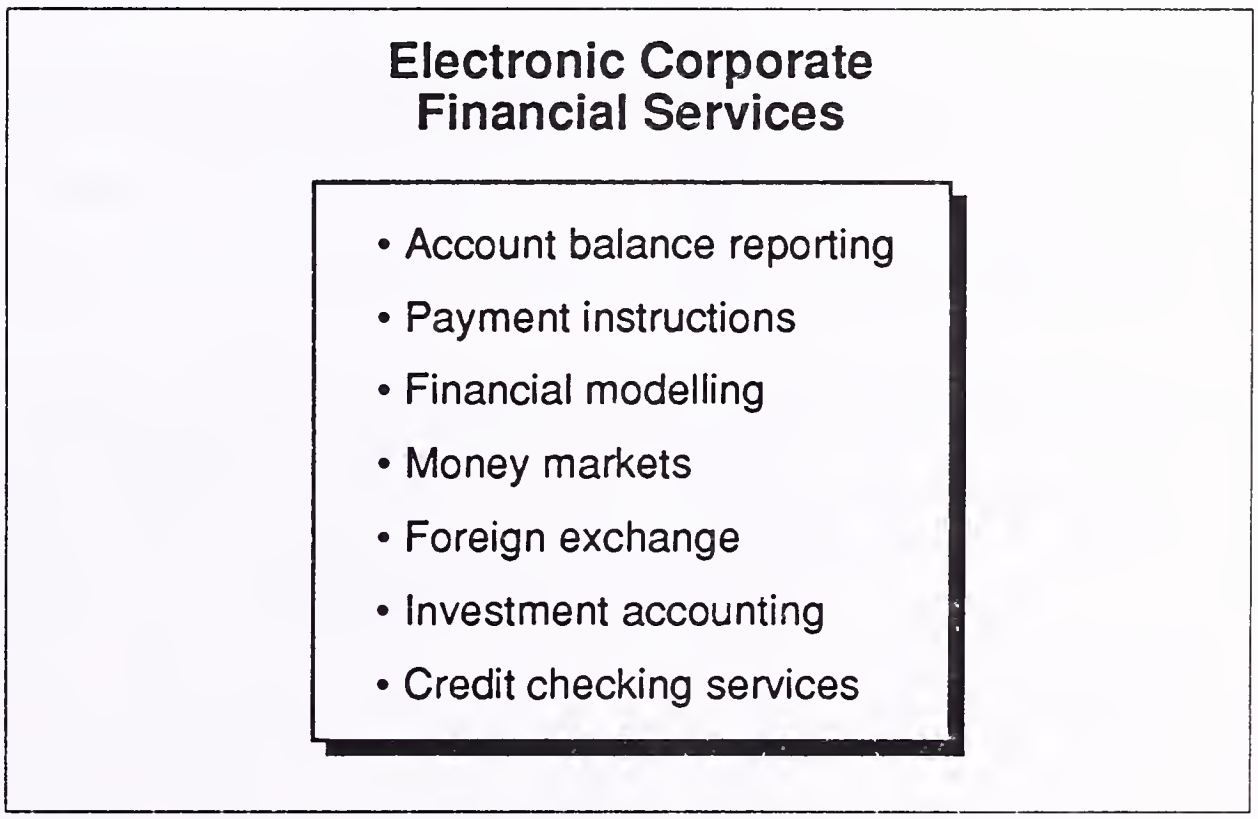
Different banks are considering different solutions to the client/bank transfers:

- Banks with their own networks will try to channel their clients and any other external EDI partners to use these.
  - The U.K.-owned Midland Bank owns the third-party, value-added network, MidNet, 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 value added networks (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 Information Network;
  - Similarly, Barclays and Lloyds in the U.K. are looking to open systems solutions.

b. Corporate Customer Terminal Systems

Corporate finance managers are being offered a growing range of electronic services from a wide range of third-party vendors, to cover the applications illustrated in Exhibit III-14. 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-shopping catalogue, whereby the corporate customer can obtain all the financial services needed via a single terminal supplied by the bank, with either a "PC" or "videotex" level of functionality. For example: in the U.K., the largest retail bank, the National Westminster Bank, launched a trial of electronic banking for small business in 1987. Called BankLine, it is accessed via an IBM compatible PC. The software licence costs around £100, plus a monthly charge of under £10 for maintenance. Modems and cabling are an extra upfront charge at around £300. At the end of 1989, all 650,000 small business customers of the National Westminster bank had access to the service.

EXHIBIT III-14



GEIS has developed an on-line corporate client service for banks. Using software which GEIS has itself developed, the service allows corporate banking customers to access on-line services such as balance reporting and payment instructions. Banks using this service can relabel it under their own logo. French banks have developed videotex services via minitel. West German banks are developing similar services, using the German CEPT standard for videotex.

c. ATMs

Considerable advances are being made in different areas of Europe in developing the concept of the automatic teller machine (ATM) to be a multi-functional customer facility. Many of the developments have been made in Scandinavia. The original ATM was just for 24-hour cash collection. Many also allowed day-time enquiry on current accounts, by down-loading the state of each customer's account each night to a local or branch-held file that can be accessed on-line via the ATM. Authorisation for access to the account is given through the personal identification numbers (PIN) that is keyed in at the ATM.

Scandinavia has started trials of a system called miniBank which offers extended ATM facilities. In Norway, Fellesdata which has its own X.25 network with 17,000 terminals throughout the country has developed the miniBank. Fellesdata has set up a trial of four miniBank ATMs with the intention of expanding the trail from 100 to 200 in 1991. MiniBank ATMs have the following functionality:

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

d. EFTPoS

The initial development of EFTPoS was by using credit cards—regional/ national cards such as Barclay Card, Access, Carte Blue, or International cards like American Express and Diners. Authorisation was generally via signature, although in smaller European markets like Belgium, Denmark and Norway, the PIN mechanism has been used for some time. Although the use of the PIN might appear to be a simpler route for all electronic transactions, in those markets, such as France and the U.K., where the plastic card is commonly issued through banks, retail and petrol outlets, it is not practical for the man-in-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 they give and so making signature the more secure authorisation method.

The latest state-of-the-art EFTPoS terminals keep a "hot card" file of stolen or lost card numbers in the terminal. This is updated every night. Any payment below a set floor limit is not checked with the card company, but automatically guaranteed if it is not for a "hot" card. 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 them via interbank transfers. When a new card is issued and the bank is uncertain over the credit rating of the individual, then the bank will check worthiness of this individual with a national credit database. It is reported that out of the 50 million individuals in Italy, credit databases in Italy hold the names of some 20 million bad debtors.

There are considerable opportunities for vendors to deliver not only EFTPoS software, but a complete EFTPoS service - central processing software at central network and retail terminal levels. The operation of an EFTPoS network is with 1990s experience relatively standard, but individual networks only need to be customised to link into the different banking networks which are relevant. This is done via the central switching system. Vendors should therefore be able to develop and sell turnkey EFTPoS systems, and even to mount a complete EFTPoS service using their own or sub-contracted third-party networks.

e. Debit/Credit Cards

The U.K. is the largest market for electronic payment cards. The penetration of electronic payment cards in the major European markets is as follows:

- U.K. - 37 million issued - a number which is growing strongly due to the increasing use of debit cards.
- France - 10 million issued.
- Germany - no electronic payment cards, only cheque guarantee cards, but the potential is of course very large.
- Spain - nearly 10 million issued and experiencing very strong growth.
- Scandinavia - a small market, but already very advanced.
- Benelux - a small market, but growing strongly.

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:

- The transaction cost for the retailer.
- The spending patterns of consumers.

In the U.K., the cost of a customer using a credit card for a retailer is between 1.5% to 2.0% of the transaction. The cost for using a debit card has been forced down by the retailer and equates roughly to that of using a cheque, or $0.08 per transaction. For a bill of $100 the saving to the retailer of a debit versus a credit card is therefore between $1.42 and $1.92.

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

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. Switch operates on the same three-day payment cycle as a cheque. In fact its sponsors call it an automated cheque system.

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. This will not take place, however, until:

- Retailers, especially small and medium sized retailers, have overcome their bad experience of the credit card levy.

- Proposals for surcharge pricing on credit card purchase to differentiate them from true cash purchases have been resolved between the banks, retailers and regulatory authorities.

f. Smart Cards

France has been the most advanced nation in developing and trialing 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 first 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 up with sticky tape ensuring that their terminals would only read the magnetic strips and not the chips.

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

The advantage of smart cards, in the words of one bank interviewed by INPUT, is that "they allow us to exploit our creativity". Since banks are desperately looking for competitive advantage in the 1990s, smart cards seem extremely appealing. However, there are currently some technical weaknesses in the product:

- International standards need to be set,
- Sufficient memory needs to be available on the chip, which the latest generation of cards would seem to offer.

For the general introduction of smart cards, EFTPoS terminals throughout Europe and certainly in a number of countries, will have to be changed, as virtually all existing terminals cannot read smart cards. The new generation of hand-held EFTPoS terminals is being designed to accept smart cards. Most major retailers change their terminals every two years. Therefore, allowing for a delay in initiating the introduction of smart cards, the earliest that the smart card could be commercially launched on a European scale is 1995.

g. Home Banking

As with smart cards, home banking is only likely to become a commercial service on a European scale in the second half of the 1990s. The market already has French extensive home banking via Minitel. Finland has had home banking for some years, but more due to the necessity caused by the rigour of its climate than through any special technology drive. Attempts to launch home banking in the U.K. have not been successful due to the limited penetration of videotex in the consumer market.

Trials for telephone banking are in progress in the U.K. using the Nexus Payment Systems' ATM service. This form of home banking allows the client to access information on his account via a voice activated computer enquiry service using the push button telephone. The Clydesdale Bank and the Northern Rock Building Society have both launched market trials. It is reported that the response to such services has been relatively low.

Market Structure

IV

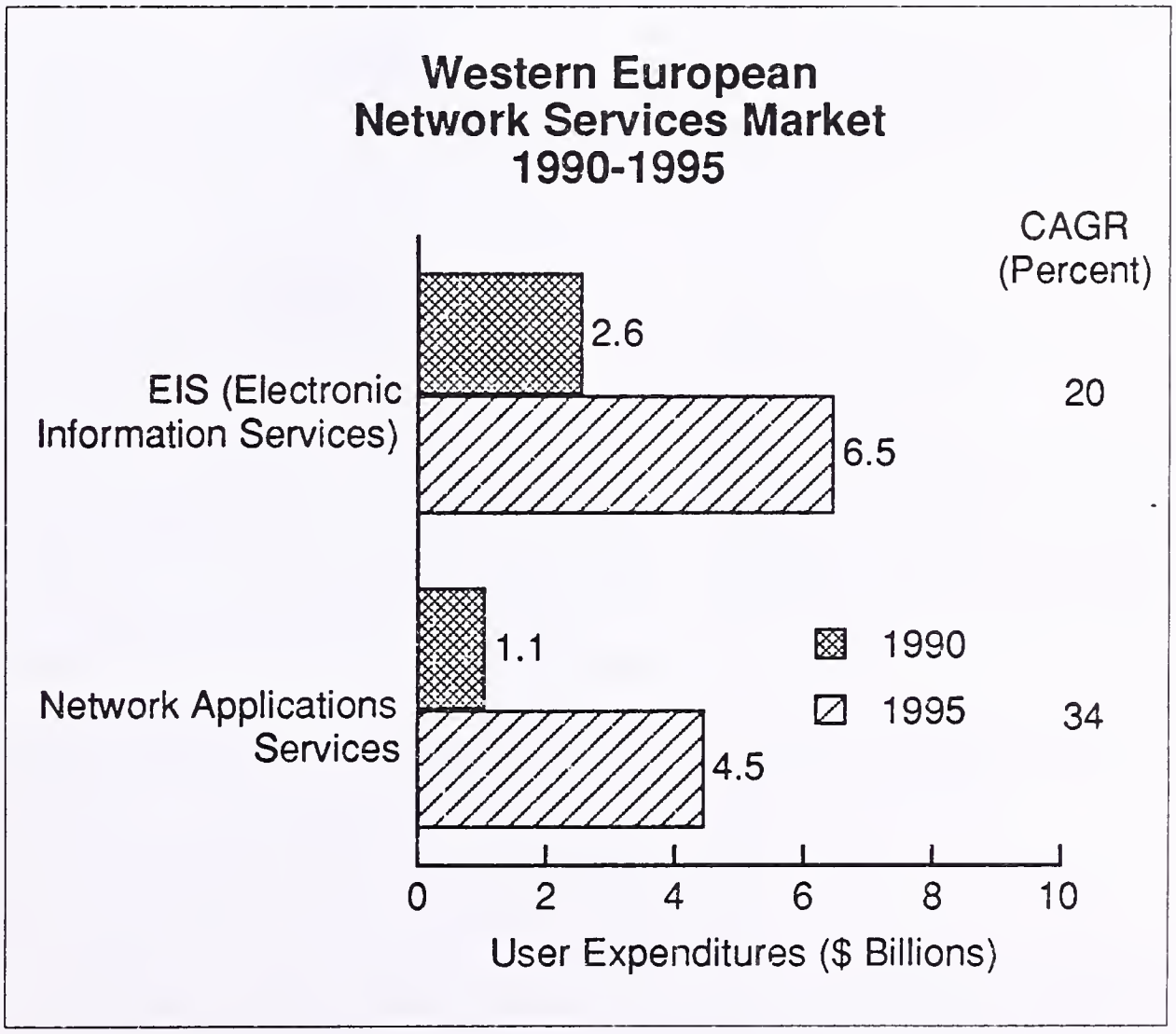
Market Structure

A

Financial Network Services Overview

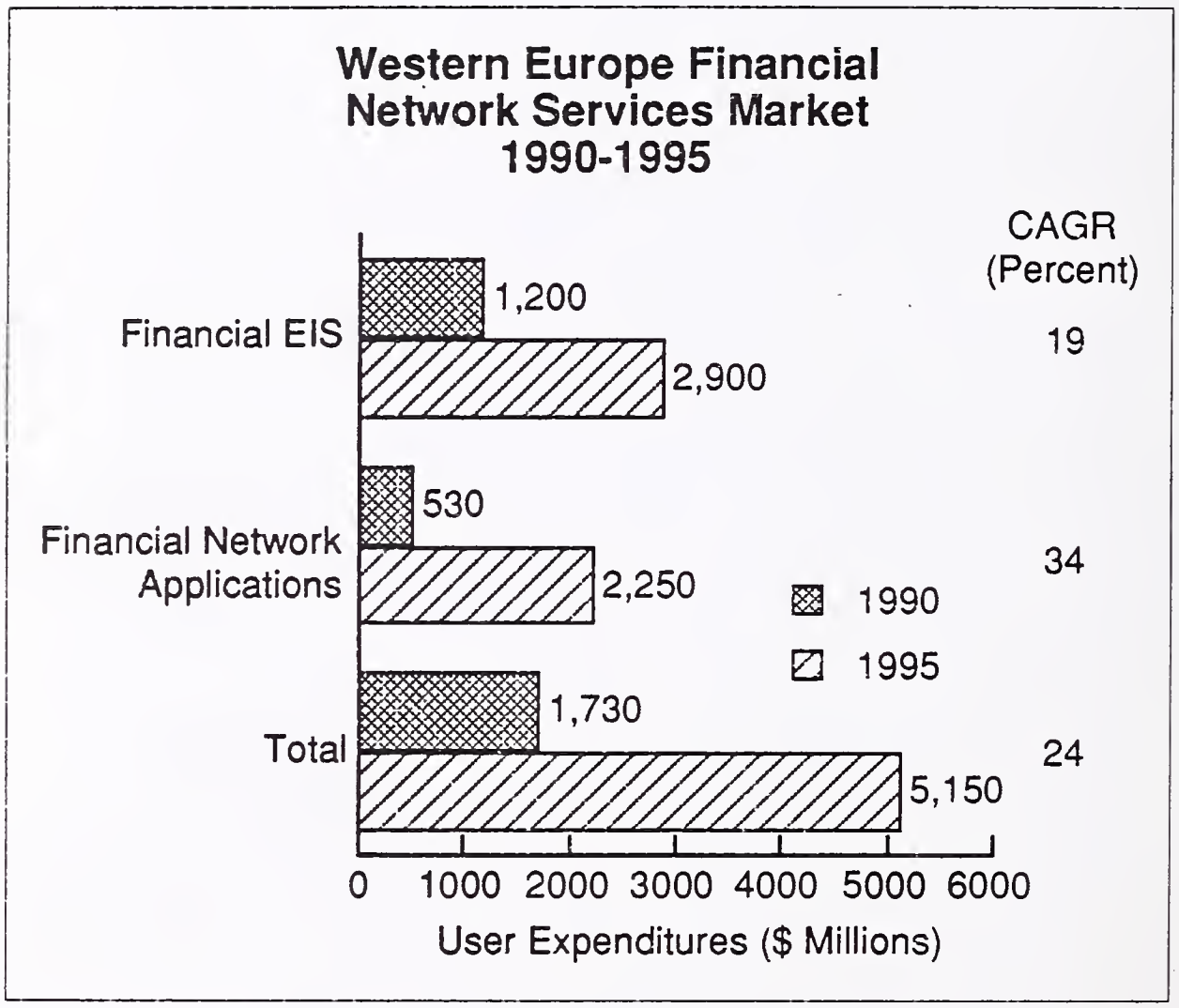
Exhibit IV-1 illustrates the analysis of the Western European network services market. INPUT estimates that the financial network services sector represents just under 47% of the total European market, easily the largest sector. INPUT forecasts the growth of the financial network services sector at 24% per annum on average over the period 1990 to 1995 from $1.73 billion to $5.15 billion, as is illustrated in Exhibit IV-2.

EXHIBIT IV-1



The financial EIS sub-sector is growing more slowly than the financial network applications sector. The continuing development of electronic stock exchanges throughout European financial centres and the interlinking of electronic exchanges will give stimulus to the EIS sub-sector. Furthermore, with the major redevelopment programmes that many banks are planning or implementing, 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. The demand for third party network services vendors will consequently increase as the internationalisation of the market intensifies.

EXHIBIT IV-2



1. Financial EIS

INPUT's long-term forecasts for the EIS sector should be considered carefully as the EIS market continues to restructure as technology drives it forward. Currently, the most important types of EIS are those involving securities data and foreign exchange. This type of information accounts for over 70% of the financial EIS market with Reuters and Telerate the clear market leaders. The large profits to be made from the provision of financial EIS has led to intense competition with companies looking to introduce innovative products and services. For critical

applications like trading, the provision of a very high level of service to the end user is key; Reuters, for example, provides a high level of maintenance and service support.

There are continuing opportunities for industry-specific and "specialist" services in the textual database field. Much of the overall growth in this area will come from links with transaction-based services, such as EDI, and widened distribution via electronic messaging and gateways; presence in the Managed Network Services (MNS) market will provide a perfect springboard to offer these services. (For further information on the Managed Network Services market, please refer to INPUT's report, *Managed Network and Messaging Services Markets Western Europe 1990-1995*.) Other keys to success in the financial EIS markets are the flexibility and resources to cope with an environment of rapidly changing customers and technology. Deregulation in the UK and other European countries is extending the life cycle for EIS of even the most mature market segments and has created a ripple effect into different, but related markets, such as corporate treasurers. There are opportunities for new services as the move towards 24-hour global trading puts pressure on the requirement for comprehensive integrated international information sources.

The Analysis Corporation provides a specialist information service covering securities and money markets worldwide with the added benefit of interpretation of market movements and company news and what these mean to the investor. This is the type of carefully focussed and highly targeted information service which vendors are recommended to develop. Its key features are:

- Focussed coverage.
- Added value derived from interpretation of information.
- Targeted marketing for fast start-up and long-term profitability.

The key strategic trend is to offer comprehensive services to niche markets. Users' demands for ease of use, modelling, decision support facilities and integration of multiple information sources has led to the development of PC-based packages for interactive trading using basic artificial intelligence and analysis tools interfacing with real-time data. Other key opportunities lies in:

- The development of software which facilitates the customisation of information for specific users.

- Truncated services for infrequent dial-up users.

Product branding and leadership in specific sectors emerged as a key marketing strategy, which owes its effectiveness to the increased flexibility in distribution which it provides. For example, the larger financial

institutions require integrated digital data feeds from global information providers in order to tailor and then to distribute them as a final product as part of their own label client services.

The stock market crash of October 1987 forced the financial institutions to review their fixed costs, part of which comprised the services provided by Reuters, Telerate, Quotron and the rest. All these vendors have bolstered their traditional information provision with the supply of value-added and in some instances, the dealing-room delivery systems themselves. In the case of Quotron, which was acquired by Citicorp for $700 million in 1987, the company has moved quickly to lose its US-equities-only image by offering products in the foreign exchange and money markets. The Quotron foreign exchange service—FX Quote—was launched along with the Global Rate Report System, providing money market rates from 25 banks. Quotron's Q1000 processor, running UNIX, receives video feeds in real-time, enabling the user to build his own indices using spreadsheets and a range of customised application tools.

The relationship between the network providers and the service users is critical for financial communications. It was in the early 1970s that Reuters created its foreign exchange price monitoring system in the wake of the collapse of the Bretton Woods agreement. This agreement had effectively fixed the relationship of world currencies against the US dollar, leaving little room for a traded market in currencies. Reuters effectively brought the market into being by persuading the banks that needed to buy and sell currencies to contribute information on the prices at which deals were being done. The Reuters Monitor Dealing System, which developed from the price system in the mid-1980s, handles around a third of the $300 billion to $450 billion that is traded daily on international foreign exchange markets.

The growth of real-time financial services has been driven by the increasing velocity of financial movements, which in turn has put a high premium on speed (in more ways than one), whilst other kinds of financial networks can function at much slower speeds, since they are dealing with more historical data. The real-time market is dominated by Reuters, Telerate and Telekurs. In the two biggest markets, foreign exchange and money markets, there is still a highly profitable duopoly of Reuters and Telerate. These two companies are at the same time looking to expand into other markets such as futures, equities, commodities and text databases. Reuters is in effect the world's foreign-currency market maker, supplying not only currency quotes and other financial news but also the terminal systems and the screens, and the satellite communications network links. Roughly one-third of the world's foreign-exchange trade is done through Reuters' 10,000 dealing screens with another third carried out over the telephone after consulting a Reuters prices screen. With a global telecommunications network in place, profits from the rental of screens, services and software products go straight to the bottom

line. The foreign exchange and money markets account for 55% of Reuters' revenues and about 70% of its pre-tax profits.

Telerate has also experienced tremendous growth with an operating margin of around 40% and its annual pre-tax profits rising 25-fold during the 1980s. Telerate dominates the market in American Treasury bonds and bills, supplying four-fifths of the prices and dealing screens in this sector (the rest come from Reuters). As a result of their comprehensive network coverage, Reuters and Telerate have been able to maintain their dominant positions in the European financial EIS markets, attracting information providers who have the opportunity to provide products and services that appeal to a large customer base. However, whether Reuters and Telerate can maintain this duopoly remains to be seen. Whilst there is little competitive pressure on price as large financial institutions are more concerned with quality of service than with price, Reuters and Telerate have built their integrated systems around the dealing room "front-office" systems. With the next logical development stage being to tie these systems is to the "back office" (e.g. matching and clearing), they are going to have to face competition in an area which is the domain of the equipment vendors such as IBM and Digital. These vendors will, in their turn, be looking to attack the Reuters and Telerate markets through their entrenched positions in back-office systems. With these large equipment vendors investing heavily in high speed switched networks linking back offices around the world, it will be relatively easy to adapt such technology to the dealing room without the services of Reuters or Telerate. As a result, companies like Digital, IBM and Fujitsu will become significant vendors in this market over the forecast period and will be attempting to push the information providers back into the pure data collection business.

The relationship between market share and profitability in stock markets has been altered by the advent of EIS, because, in such a market, the best source of profit is information that others do not have. EIS has made that information more cheaply available, and crucially, available to everybody. Corporate treasurers and institutional investors can use EIS to help form their decisions. It will be factors such as immediacy, speed and reliability of information which will become the key value added features as technological developments result in other areas adopting features of the present-day real-time financial information market, for example, bringing relevant information (relating to a particular company or service) to the client on the line at the time. ISDN-type applications would be an example, integrating the telephone system with computer applications that hold data about clients as well as with traditional external information feeds. Many of the larger European banks are developing such services.

Reuters' strategy in the real-time information sector is as an indicator of the development of the financial network services market. The company is looking to:

- Add new stock exchanges and traded instruments worldwide
- Add specialist data from third-party sources
- Improve the speed and presentation of market news by defining specialist presentation formats for individual sectors.

Some of these services include:

- The Reuter Equity Graphic Service, (which displays data on some of the world's top 2,500 companies)

- Reuter Chartist, (a real-time data feed to personal computers for comprehensive analysis of cash and futures markets)

- Marketfeed 2000 (a high-speed data feed on world equities, futures, options and energy markets)

In the field of historical information, Reuters concentrate on two main markets: products compatible with the real-time financial services and delivered to the customer base and specialist historical information for analysts who do not use the real-time Reuter service.

Reuters' most recent service is an upgraded financial information service (Money 2000) delivered over Reuters' Integrated Data Network (IDN). It is aimed to gradually replace the Monitor system, Reuters' basic information service introduced from 1973, which is now delivered to 180,000 users at 17,600 locations in 123 countries. The company has consolidated its original 13 location data centres into three (London, Tokyo, New York). The services will be delivered through the IDN digital network as record-based data, rather than the page-based data provided for the Monitor terminals. This will mean that users can work with the Money 2000 data interactively—e.g., calling services up in different windows and extracting data to use in applications running on end-user PCs. Reuters was intending converting users to the new service from July 1990 but encountered difficulties in meeting this deadline. The subscription rate is $1,800 per month for the first station with additional systems at a single site costing around $600 per month each. Three of Reuters' quotations services—Equities 2000, which covers stock prices; Energy 2000, which covers the energies futures markets; and Commodities 2000, which covers commodities—are already provided via the IDN.

Telerate is following a policy of expansion through strategic alliances, acquisitions and internal developments:

- Purchasing a stake in Radiocor, the Italian electronic information services provider,

- Developing the Global Transaction Services joint venture with AT&T, a foreign exchange dealing system that would form the basis for an expansion into other markets.

The company plans to build a new computer site in outer London to boost its processing power and this is indicative of Telerate's commitment to Europe.

The following section describes some of the many services provided by some of the other leading players in the financial network services sector.

- Dialog

  Dialog distributes Trade Plus as Dialog Quotes and Trading, a gateway service delivering stock and options quotes. Up to 75 portfolios can be set up on Dialog Quotes and Trading with the value of the portfolio's securities updated to reflect current market prices as well as the capability to track gains and losses and to project the dividend income of a portfolio.

- Extel

  Extel produces and distributes Earnings Guide, the largest database of forecasting estimates on UK equities, presenting the combined results of the analysis of over 30 leading stockbrokers with information from Extel Financial's share database (Exshare which covers over 100,000 international equities). ESPRIT is its computer system to maintain a real-time data base of prices and related information to supply both snapshots of the data base as intraday prices and continuous feeds of pricing data. The Real-time Feeds (RTF) service provides a digital data feed of real-time information including:

  - International Stock Exchange securities.

  - London traded options.

  - Major financial indices.

  - LIFFE.

  - Foreign exchange rates.

RFT data can be processed by the user for use on in-house computer systems. Extel also offers Exbond, a database of the terms and conditions of over 1300 international bonds and Eurobonds with over 300 items of data per bond. It is reputed to be the most comprehensive and up-to-date database of its kind in the world.

- Finstat

Financial Electronic Publishing produces and distributes Finstat, an electronic UK price service offering a daily electronic feed of statistical data from the Financial Times' Share Information Service. This provides price and yield data for 3000 commonly traded securities and gilts. The company also provides the FT Currency and Share Index Databank which reports the dealing rates in the foreign exchange, money and gold markets as well as movements on the London International Stock Exchange. Information includes:

- The FT30 Share Index.

- The FTSE 100 Share Index.

- The FT Actuaries Share Indices.

- Representative price indices from the major international stock exchanges.

- IP Sharp.

IP Sharp's Commodities contains historic prices, volume and open interest for all major commodities traded on the London, Paris, New York and Tokyo futures market, as well as most of the US and Canadian markets. Containing over 60,000 statistical time series on prices of metals and soft commodities, updated daily, this database is one of the most extensive historical database services offered by any vendor. The company also provides The Daily Currency Exchange Rates Database providing a total of 715 currency exchange rates. Information includes daily spot, buying and selling and forward rates. Reuters, Telerate, Telekurs, Quotron and IP Sharp all compete with extensive offerings for Money Market Services.

- Telekurs

- Telekurs has a number of services, of which two are:

- Investdata, a real-time database inquiry system which allows the user to access the Telekurs database of over 200,000 financial instruments traded worldwide with latest quotations for 78,000 securities and portfolio management for over 130,000 securities.

- Indes is a new investment decision service providing information on securities price data as well as international and national economic news, including facilities for users to compile their own list of quotes and have these automatically updated.

• Datastream

Datastream produces and distributes Datastream Equity Research Services, covering research on market performance (statistics and graphics), company accounts analysis and search facilities. Research data is stored on equities from all West European markets as well as many others. Datastream provides access to nearly 6000 stock indices, interest rates, exchange rates and commodities. Updates are made in real-time for the UK, France, West Germany, Belgium and the Netherlands. The company also provides a series of other services including:

- Datastream Financial Futures Service (a real-time quotations service),

- Datastream Fixed Interest Services, including 3700 issues from the UK, 8500 from West Germany, 2200 from Switzerland, 2000 from Benelux, 300 from France and 150 from Italy, with the stocks updated daily,

- The Datastream Traded Options Service, again a real-time service covering the International Stock Exchange London, the London International Futures Exchange (LIFFE) and the European Options Exchange (EOE).

• Automatic Data Processing

Automatic Data Processing (ADP), despite a huge presence in the US, has a relatively low profile in Europe. Its UK subsidiary, ADP Information Services, which was formed as a result of the merger between ADP Financial Information and ADP Comtrend, is seeking to boost its European presence with its Comtrend, Trendsetter and Marketpulse products:

- Comtrend comprises ten years of data covering commodities, options, financial futures and foreign exchange, and offers analysis and graphic representation as well as updates in realtime,

- Trendsetter offers analytics on real-time data for similar market areas,

- Marketpulse is digital-based and provides real-time coverage of equities, futures and options markets,

The UK Comtrend provides real-time price and trading data from the world's major exchanges relevant to dealers and traders. The major innovative feature provided by ADP is its ability to generate real-time charts and graphs from commodity information, There are other facilities such as Comtrend Plus and Trendsetter II which enable users to design their own trading models and construct a personal database using a mixture of stored real-time and research information. Marketpulse is ADP Comtrend's real-time quotes and trading information database from all the world's major equity, commodity and financial future exchanges on one screen. Sources are Dow Jones, AP-Dow Jones and Extel Examiner News Service. ADP Data Services distributes Futures Database from Commodity Systems Inc., a futures database covering international futures contracts for 90 commodities traded on over 30 major exchanges.

- DAFSA

  DAFSA produces and distributes:

  - Base de Donnees des Obligations Francaises, providing real-time data on 2,000 French bonds with daily market rates, enabling users to carry out portfolio analysis,

  - Gestion des Valeurs Mobilieres, a real-time portfolio management service for transferable securities, and French and foreign stocks and shares. It is geared to the needs of mutual societies, insurance companies and banks.

  - Informatitres, information on over 40,000 securities on French and foreign, quoted and unquoted.

- Affarsdata

  Affarsdata produces and distributes AktieInformation which provides:

  - Current stock prices quoted on the Stockholm Stock Exchange.

  - Company information on listed companies.

  AktieInformation carries 20,000 records and is updated every two minutes.

2. Financial Network Applications

There are only a small number of vendors servicing the total Western European financial network services market and this situation can be ascribed to the fact that banking and finance purchasing decisions are highly centralised, creating an environment that has allowed large ven-

dors to gain significant market shares. As a result, a few key areas of the market are controlled by a small number of large vendors who have developed the technological expertise and network coverage to provide a high level of service. Financial institutions require a communications infrastructure to deliver specific application services both to their internal operations and to their customers.

Whilst in the past, banks and financial institutions have used the public networks provided by the PTTs or operated their own private networks over leased lines, it is becoming increasingly clear that European banks are looking to use managed data networks over leased lines offered by the third party service providers such as GEIS and Infonet. Developments of networking technologies such as ISDN and fibre optics are further increasing the options available to financial institutions. As these financial institutions attempt to link their internal computer systems together as well as to connect to those of other organisations, there is of course the problem of inter-working between systems and equipment from different suppliers. As a result, the "Open Network" approach is being adopted by many European institutions, using a packet switched network based on the international X.25 standard in order to interconnect a variety of existing computer systems as well as providing flexibility for the future. The financial community constitutes the most complex set of user requirements for new and enhanced services of any industry sector.

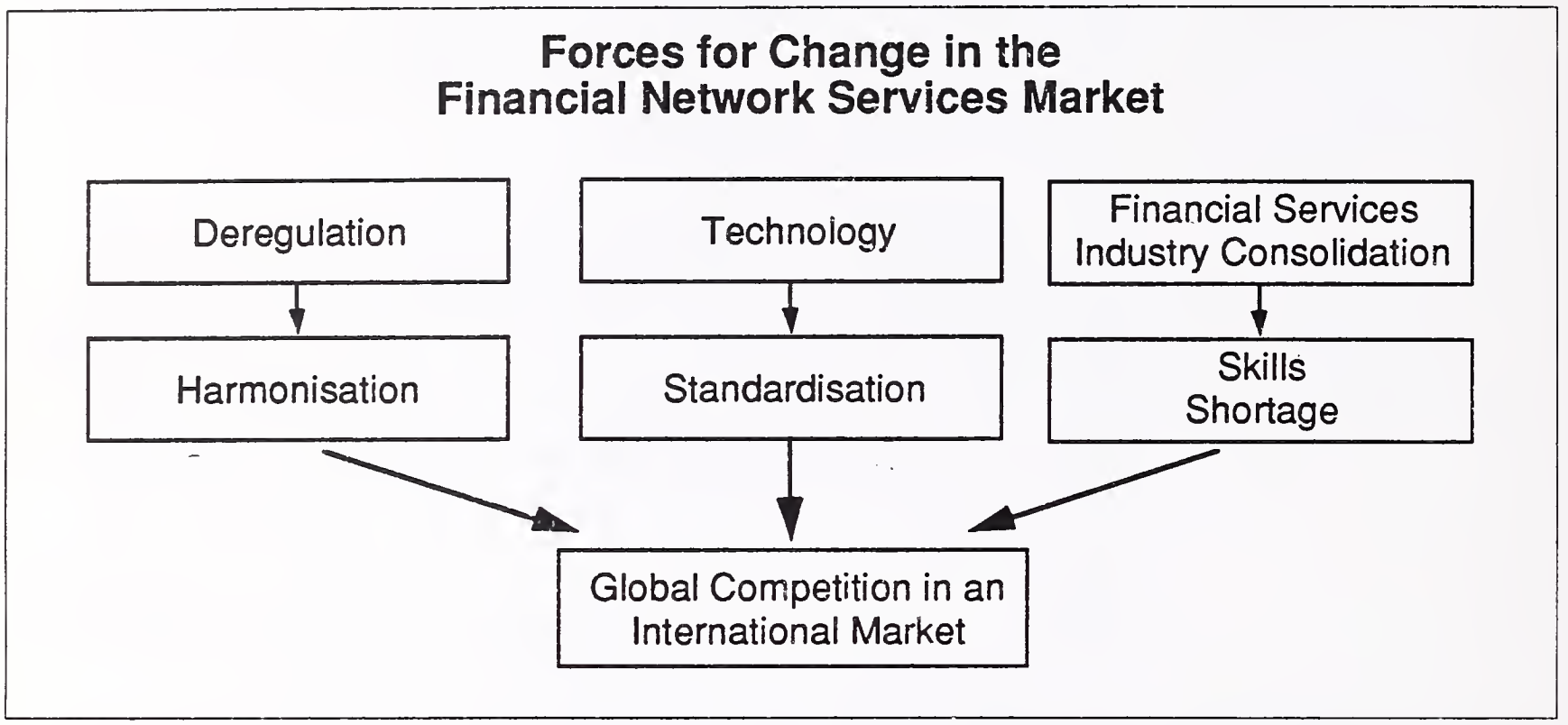
Furthermore, the skills shortage has become more acutely focused within the financial networking sector and this restructuring of the supply and demand balance in the network services market will result in opportunities for both service providers and financial institutions. Successful vendors will be those that are prepared to exploit these changes. INPUT anticipates that banks are likely to encourage their subsidiaries over the forecast period to become specialised financial network services suppliers.

Exhibit IV-3 indicates the forces for change at work in the financial network services market. Managed Network Services (MNS) are becoming the central focus since they provide a platform from which to offer network applications to financial institutions.

This is especially important since basic transmission is likely to remain in the province of the national telecommunications operators. The new delivery technologies such as very small aperture satellite (VSAT) terminals, cellular radio or shared cable TV systems are unlikely to have much impact on the financial sector.

In the MNS area there is considerable activity in an increasingly open and competitive market. MNS describes services where value is added to basic transmission:

EXHIBIT IV-3



- By specialised switching techniques e.g., providing X.25 interfaces,
- By protocol conversion,
- By specialised management facilities e.g., fault recovery, flexible billing etc.

At present, the key differentiator is that the value is added horizontally, in other words it is not specific to the financial services industry sector nor to any specific application. With the European Commission issuing a directive allowing competitive MNS provision throughout Europe by 1991, there is the likelihood of other vendors and the banks themselves attempting to enter a market currently dominated by large vendors such as GEIS and IBM. Infonet and BT Tymnet are two of the most obvious examples of candidates seeking to expand in this area within Europe.

However, the financial community also benefits from a gamut of specialised processing services such as credit card verification, data capture and clearing operations, with all these applications representing an almost totally deregulated market. What is significant is that although the key elements for applications success are fundamentally different from MNS, service providers such as GEIS are offering both the managed network and the applications. Only the largest vendors can go both wide (in horizontal services) and deep (in vertical applications).

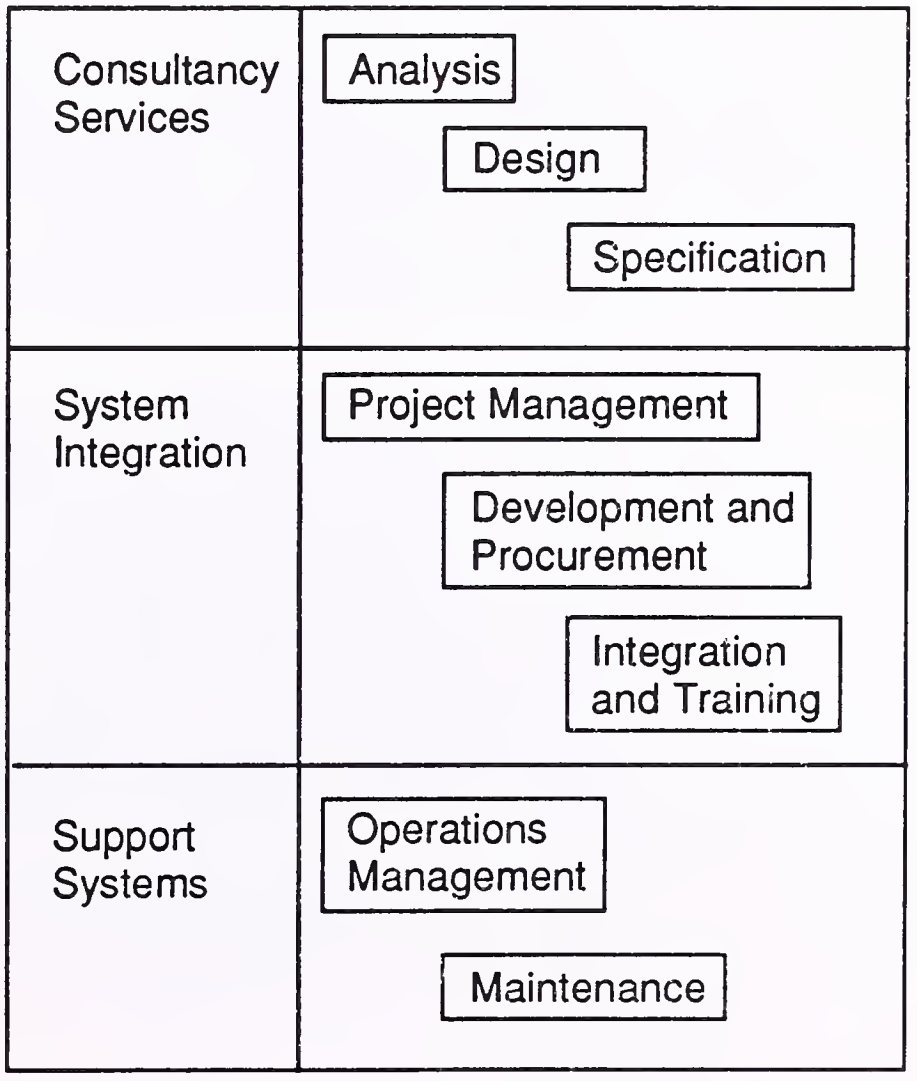
Vendors must look at the specific demands of the financial sector, which, because of its increasing globalisation, has re-awakened demand for intra-company communications services (as well as a strengthening of the existing demand for inter-company services). This renaissance of demand can be split into three distinct types:

- Better use of basic facilities (neither product-critical nor profit-critical) such as leased circuits.
- Improved external infrastructure in order to enable a company to operate more efficiently, (using EDI for example).
- Applications that give a company an advantage over its competition.

With the supply of commodity communication products having become a low margin operation, vendors are moving out of the products business and into services supporting the various stages of the system lifecycle—first consultancy, then into systems integration, systems operations and systems management, covering all stages in the cycle, as shown in Exhibit IV-4. Because individual organisations are having difficulties putting the various components together, vendors have consequently moved into systems integration.

EXHIBIT IV-4

The Services Approach



Rather than purchase directly from an equipment vendor, financial institutions are looking to systems integrators, network operators and network services providers to help them overcome the skills shortage and to simplify the process of implementing complex systems. The major benefit for the vendor is that it provides significant account control over the customer. In addition, it enables the vendor to define the architecture within which the customer's system is built, and it allows the vendor to add value to what is being directly sold.

Whilst organisations have traditionally outsourced some of the initial elements of the typical life cycle of a communications system such as design and analysis, the trend is for the network operation and management to be outsourced as well. One key advantage to the user is that this gives financial organisations the ability to know the future cost, year by year, of processing a transaction. There are several other advantages:

- A fixed price and consequent reduction in risk,
- Insurance against the skills shortage and protection from technological obsolescence,
- Shortening the development lead time inherent in an in-house systems organisation,
- The ability to step back and get the business into focus.

In the US, companies have outsourced the management of financial services systems, both to avoid managing a big network and to release the capital tied up in the network assets. These considerations have driven organisations to outsource large amounts of the critical support systems upon which their business is based. For example, Merrill Lynch in the US is seeking to outsource the operation and management of their network and simply have a service delivered.

With deregulation, hybrid networks, i.e., those which combine public and private services will become prevalent, mirroring the situation in the US where the corporate core of the network is private and the more lightly used periphery is public. The European network operators are likely to offer virtual networking with the consequent demand on the third party managed network operators. As a result, banks are having to make strategic decisions now about which option is best for their business. If it were not for the skills shortage, most would opt for the private option. However, in the current climate, both managed network services and applications services are being actively considered.

In the MNS area there are an increasing number of service providers offering global coverage: GEIS, Infonet, Plessey-Telenet, BT-Tymnet, AT&T Istel and IBM are the major ones. The failure of the MDNS

project sponsored by 22 PTTs indicates the withdrawal for some time of the national PTTS from the pan-European market. Each national administration has an investment in packet-switching, for example, and each of these national investments is fundamentally incompatible. In the UK, the packet-switching network is based on Telenet; the French network is based on Alcatel switches; the German network on Siemens. The fact that they all use variations on the X.25 interface to the user does not make the problems easier to solve. The X.25 implementations are subtly different in each country. While national service quality is good, the quality of service via X.75 gateways is typically poor. Similarly, where a national administration provides a proprietary service locally, such as IBM's SNA 3270 over a packet-switching network, there is no equivalent international service unless a common equipment platform exists, such as that between British Telecom and Telenet in the US.

INPUT has identified four types of network services vendor in a position to respond to the challenge of meeting these financial services user requirements for global data communications.

- The PTTs:

  Their competitive advantages are: Existing customer base, infrastructure and access to substantial resources. However, they do not have a compatible international infrastructure.

- Hybrid telecommunications operators:

  Infonet, for example, is well-positioned, but there is an organisational danger that with the sales force separate from the national administration's account managers, the latter group will support the national service rather than the joint venture within a global scope. The firm's main competitive advantage is that a unified overlay network exists and is available for launching new services.

- Equipment suppliers:

  IBM has had an information network for some years but has operated with a restricted sales effort to inter-company networking in support of applications such as EDI. It has not encouraged intra-company shared networking for intra-company communications because this could displace existing private SNA networks. Only since mid-1987 has IBM firmly advocated its Information Network (IN) service as an alternative to private networking. This changed emphasis is an exercise in damage limitation since private network sales would generate the greatest total revenue, but with its main accounts under threat from plug-compatible shared networking, IBM has needed to compromise.

- Network and Computing Services suppliers:

  GEIS, McDonnell Douglas and Plessey-Telenet have a huge potential sale for their services, being able to create a coherent network around the world or to install links with users existing networks, and develop new applications business. This combination of network and computer services suppliers is currently the group best placed to exploit the change in demand.

In conclusion, hybrid operation is likely to become the norm eventually. Many financial services organisations will continue to run private core networks with the more lightly loaded periphery supplied by an MNS vendor. They will also be tempted to provide specific value added services to their own sector community i.e., by connecting them over the managed network to external bodies, thus becoming suppliers in their own right.

The involvement of U.S. vendors, especially equipment vendors, will increase as E.E. market sectors become more uniform. Both European and U.S. equipment vendors will continue to develop strategic alliances with key services vendors in the area of financial network services although equipment vendors would like exclusive agreements. This will be resisted by the independent software and services vendors and will lead to equipment vendors acquiring some independents. Without any doubt the moves that IBM has made in taking minority shares in many small to medium-sized independent companies in many market sectors has led to other equipment vendors seriously reviewing their acquisition policies.

3. Directions for the 1990s

EIS vendors like Reuters and Telerate are beginning to lose control over the ultimate end users since securities houses have induced them to deliver information as direct digital feeds, rather than as complete information systems via their own proprietary terminals. The development of PIPE will compete directly with these traditional EIS vendors for intra-European 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.

The 1990s will see significant changes, as areas of the market traditionally controlled by a limited number of vendors become more open. As the effects of the Single European Act take hold the large vendors are likely to try to capture and control sectors of it. They expect to reap the benefits from the increased demand for computer systems fuelled by demands from the internal user base. In many instances, the large vendors are the national leaders in customer terminal systems, such as ATMs and EFTPoS system, home banking and EDI. For example, GEIS offers

customer related processing services for banks. It has developed its own generic software allowing corporate customers of banks to access the bank's customer services facilities, such as balance reporting and payment instructions. GEIS runs this service for individual banks that relabel the service under their own logo.

Because networking is an essential element of today's banking systems, network management and enabling software is also an important growth area. This will be particularly true for EDI when standards for banking documents are finalised by the EDIFACT Board. This will generate demand for EDI-enabling software and software linking in-house systems into specific EDI networks.

B

Leading Western European Country Markets

Exhibit IV-5 lists the leading financial network services vendors in Western Europe. Out of these top ten vendors, six are EIS vendors, reflecting the size of that sector in comparison with the nascent network applications sector. All of them sell services other than EIS, in particular Telekurs which provides bank processing services for Swiss banks. The remaining four vendors, SWIFT, GEIS, IBM and Infonet are all well positioned to take advantage of a deregulated market.

EXHIBIT IV-5

Leading Vendors
Financial Network Services
Western Europe, 1990

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	Reuters	26	450
2	Telerate	9	150
3	Extel	9	150
4	Telekurs	8	140
5	SWIFT	5	90
6	GEIS	5	80
7	IBM	4	75
8	Telesystemes	3	55
9	Infonet	3	50
10	Datastream	3	50
	Others	25	440
	Total	100	1,730

Exhibit IV-6 shows the analysis of the European financial network services sector by country. France, U.K. and West Germany together account for some 68% of the total financial network services sector and are each substantially larger than any other country. However, the detailed make-up of the sectors for these three leading countries varies significantly.

EXHIBIT IV-6

Western European Financial Network Services Market Country Breakdown, 1990-1995

	Market Forecast ($ Millions)			
	1989	1990	1990-1995 CAGR (Percent)	1995
France	260	395	25	1,200
Germany	250	375	25	1,150
United Kingdom	280	410	25	1,250
Italy	100	150	22	400
Benelux	60	90	21	230
Scandinavia	140	210	25	650
Rest of Europe	60	100	22	270
Total	1,150	1,730	24	5,150

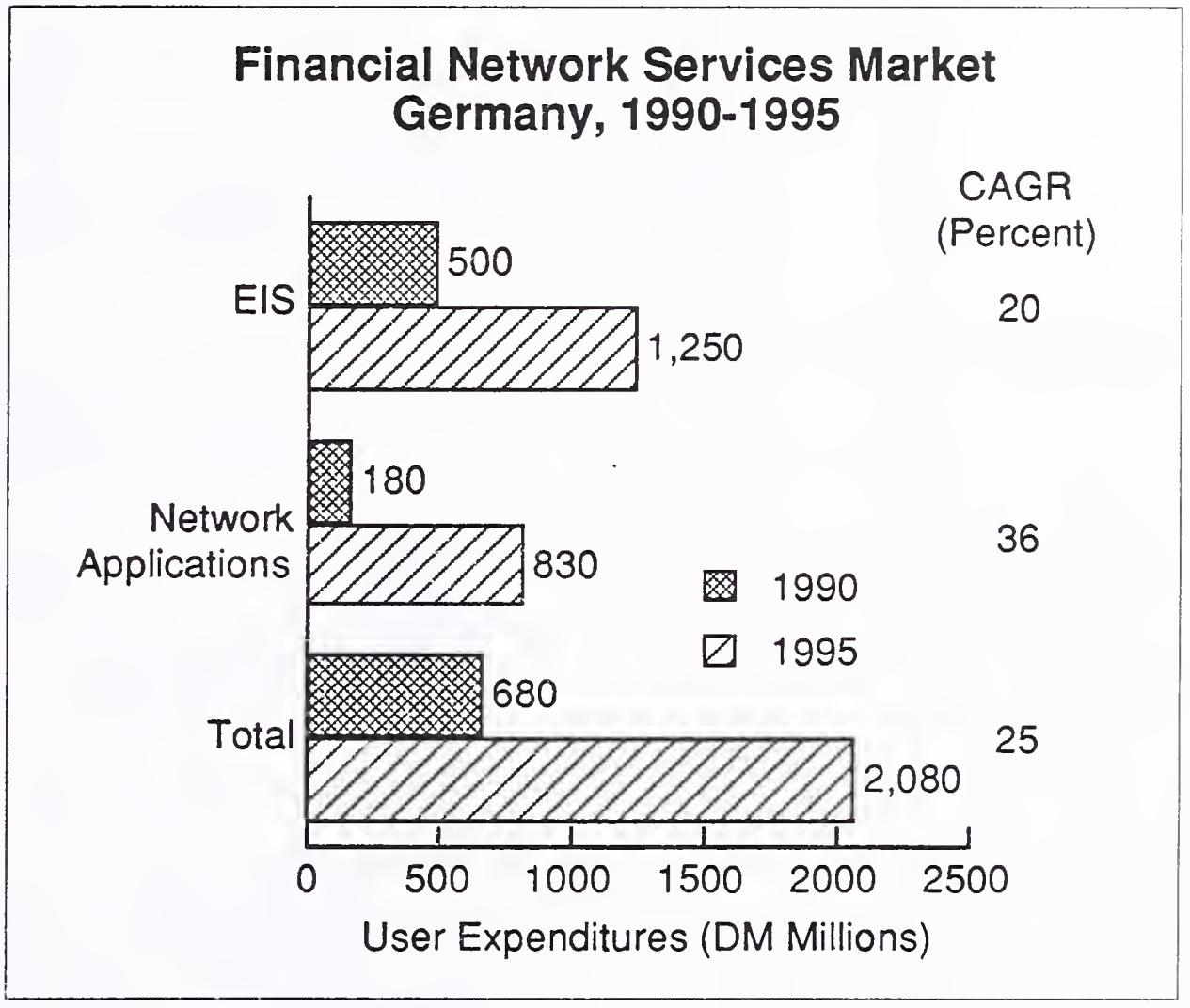
1. Germany

Exhibit IV-7 illustrates the growth of the financial network services market in Germany for the two sub-sectors of network applications and EIS for the period 1990 to 1995.

In Germany the market for EIS accounts for 74% of the total financial network services revenues. Nearly all new developments are being handled either by the German stock exchanges or by the leading banks which control the securities trading. INPUT does not see that this is likely to change significantly over the next few years. The network applications market for the financial sector in Germany will grow at 36% over the forecast period as several projects come to fruition. For example, Deutsche Bundespost Telekom and IBM are developing a joint proposal for a cashless shopping project in Germany called "Elcash".

The pilot began in June 1990 with networking services being provided over Datex-P, Germany's public X.25 network. The application will support automated credit card authorisation services that financial institutions offer to retailers. Although such services already exist in many other European countries, they were authorised by the German Cartel Office only in April 1990 after nine years of discussions between banks and retailers. The Cartel Office has ruled that networks should be open, so that retailers cannot become locked into a single service provider.

EXHIBIT IV-7



Relative to other European markets, the German market for both securities and banking is still very traditional. German stock exchanges started developing into electronic systems some three to four years after other leading European bourses. German banks look to develop their systems internally, or at least through jointly owned CUG (Closed User Group) processing centres. The German market is characterised by its traditional nature which makes it slow to change and is instinctively resistant to the foreign competition which 1993 should eventually bring. Germany can not stay immune from these forces and the CUG processing centres are likely to be forced to look outside for other market areas to which to sell their services and in which to compete as independents. The two largest CUG centres, Fiducia and RRZ, already sell their services outside of their co-operative banking sponsors. If all German CUG processing centres

are forced to change radically by moving into the non-protected external services market, it will radically change the structure of the national market.

2. France

Exhibit IV-8 illustrates the breakdown of the French financial network services market and its growth over the period 1990 to 1995. The network applications sub-sector accounted for some 33% of the total market in 1990 and the EIS sub-sector 67%. The French financial services market 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 vendors. Exhibit IV-9 lists the leading vendors in which French banks are equity shareholders.

EXHIBIT IV-8

Financial Network Services Market
France, 1990-1995

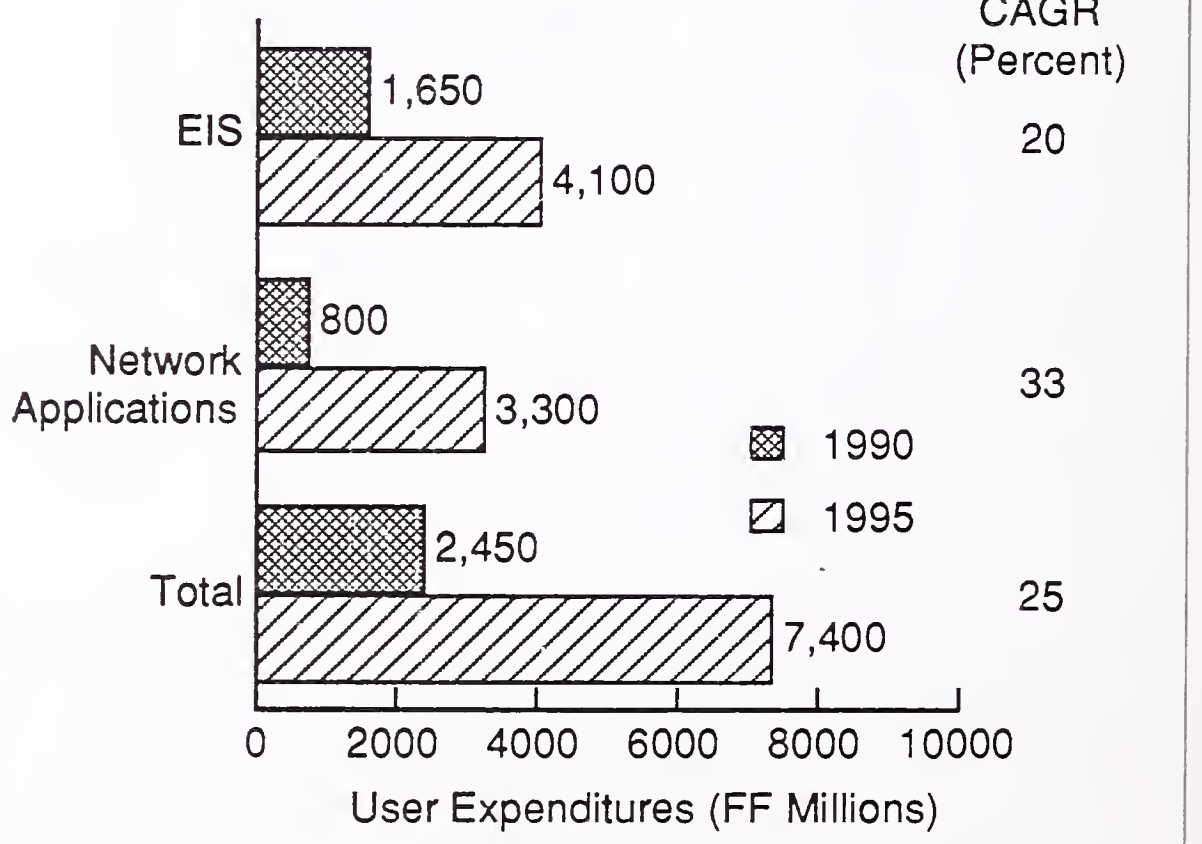


EXHIBIT IV-9

Major French Banking and Finance Vendors with Bank Shareholders

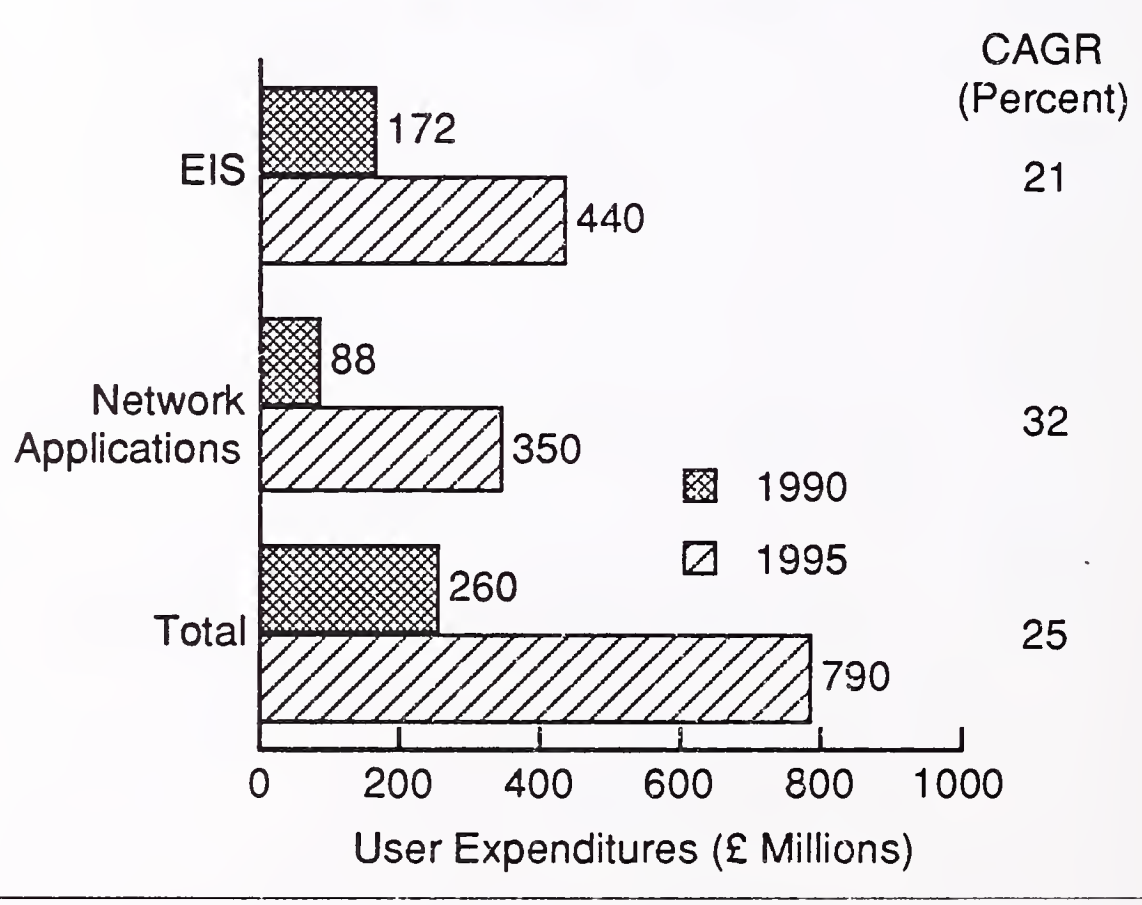
Vendor	Bank Shareholders	Share (Percent)
Axone	IBM	45.0
	Paribas/Credit Agricole/Credit de Nord	35.0
	Sema	20.0
Cerg Finance	Credit Lyonnais	35.0
	Societe Generale	12.0
	Rothschild	1.0
Credintrans	CIC group of banks	100.0
GC21	Banque Populaire	100.0
Inforsud	Credit Agricole	80.0
Logos Conseil	Groupe de la Banque Odier Bungener Courvoisier	34.0
Segin	Credit du Nord	60.2
Sema	Banque Paribas	39.6
SG2	Societe Generale	100.0
Sicorfe	Credit Mutuel	44.0
SIS	SIS employees	55.0
	Compagnie Banquarie	45.0
Sligos	Credit Lyonnais	63.0
Sopra	Investissement Finance et Development (subsidiary of AXA)	3.04
	Compagnie Financiere de Rombas (subsidiary of UAP)	2.14
	Fiord (subsidiary of BUE)	1.18
	Banque de Vizille (subsidiary of Societe Lyonnaise de Banque)	1.15
	Eurodeveloppment (subsidiary of BUE)	0.47
Uniciel	Credit Agricole	100.0

3. U.K.

Exhibit IV-10 illustrates the breakdown of the U.K. financial network services market between the network applications and the EIS subsectors. With the London International Stock Exchange (the ISE) being the largest in Europe and the leading installer in Europe of electronic systems, it is not surprising to see that the EIS market in the U.K. accounts for some 66% of the total financial network services market. Both the U.K. securities and banking markets have undergone major restructuring since the U.K. deregulated its market in 1986 (well before other European countries), and the U.K. is more open to mergers and acquisitions activity than many other European countries. 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. financial network services market has, therefore, already undergone much of the restructuring that other European markets are only now starting to experience.

EXHIBIT IV-10

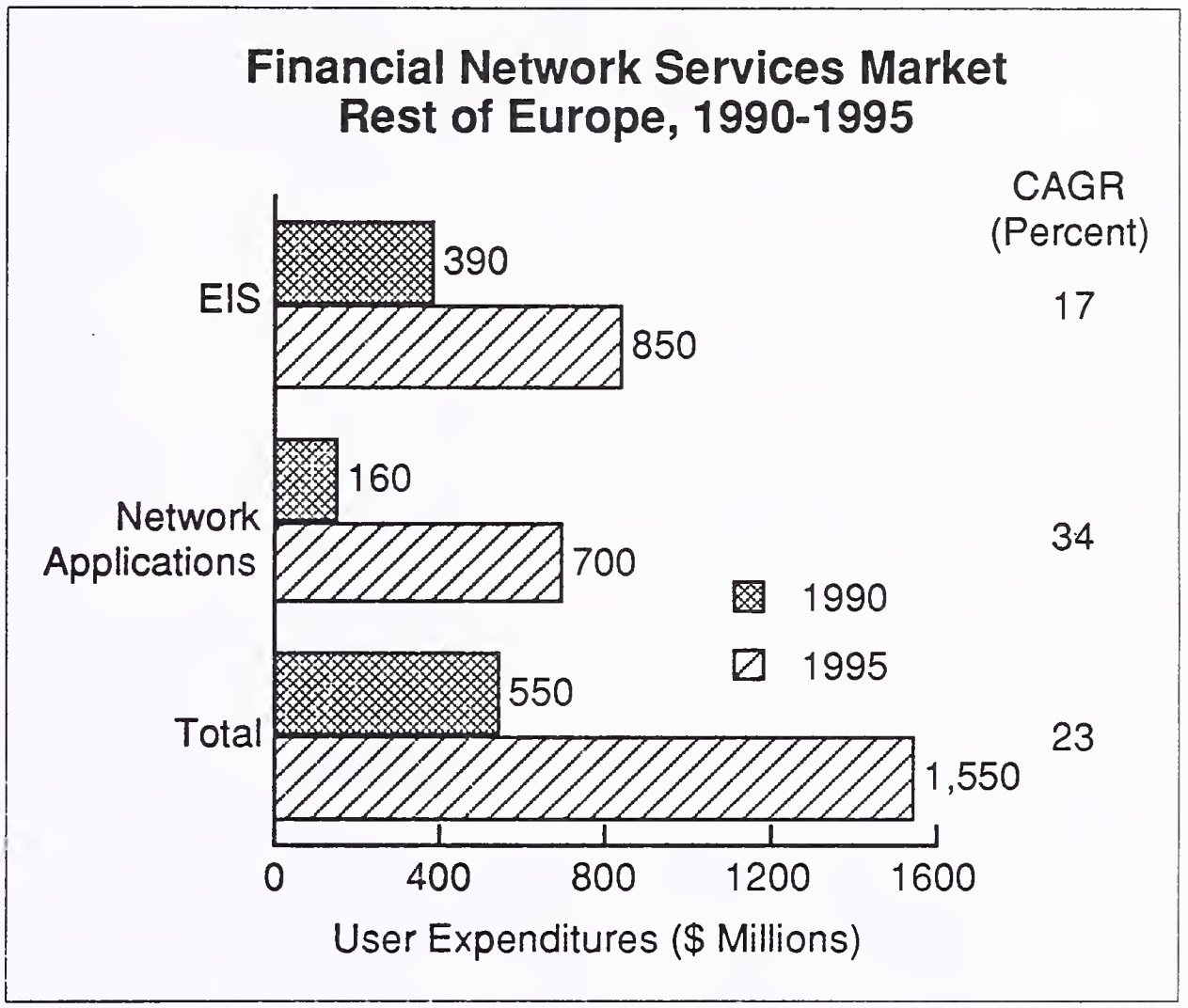
Financial Network Services Market
United Kingdom, 1990-1995



4. Other Countries

Exhibit IV-11 illustrates the breakdown of financial network services market for the rest of Europe, outside the three major country markets. The EIS sub-sector accounts for some 70% and network applications the remaining 30% of this total.

EXHIBIT IV-11



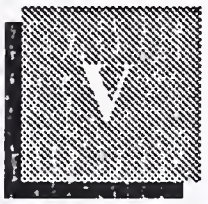
The structure of the other national markets around Europe various significantly from country to country:

- Scandinavia is characterised by a large number of small to medium sized banks serviced by jointly-owned processing centres, similar to those in Germany. Banking in Scandinavia is very advanced, often through the strength and sophistication of these centres.

- 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 their banks must consolidate. The two major bank mergers already reported in 1990 have been in Denmark and the Netherlands. Belgium is also looking to rationalise its financial services.

- In Spain and Portugal, the market has also remained with small banking units. These markets are unsophisticated. The major equipment vendors, like IBM, Digital and NCR, are strong. The network applications sector is very small. Since banks were the first sectors of these economies to computerise, they have attracted many of the scarce IT skills needed to develop their systems in-house. There are as a result very few independent national vendors supplying these markets. In recent years, US and French vendors have established themselves in Spain. Many of these are leading international players and so are in a good position to offer their comprehensive product and services portfolios to the Spanish market, where the main indigenous competition will be from the in-house solution.

Service Providers



Service Providers

A The Role of the Banks

Corporate treasurers have become much more knowledgeable in the management of their groups' accounts. This has led to substantial declines in the balances upon which banks relied to produce the margins which paid for their services to their large corporate clients. However, although this "float" income has declined and is still declining, corporate clients remain important as banking customers and are able to insist that the banking community provide much more efficient payment and account reporting services. For example, the banking system is being perceived by the corporate community:

- As a provider of information.
- As a neutral intermediary between negotiating and transacting parties.
- As a provider of security systems for custody.
- As a processor of information related to the value of the transaction.

Consequently, it is seen less as an evaluator or interpreter of the information specific to each individual corporation.

A noticeable trend is that large corporations and large public bodies are becoming very specific about the types of data which they would like to see carried across the banking system. They are advocating that the banks handle more types of data than the banks themselves have so far proposed handling. This includes, for example, not only remittance advices but invoices, shipping documents and orders. The reason that corporate customers look to the banking system to handle data that would not seem directly related to payments is that they see banks as intermediaries. As corporate trading partners transmit increasing amounts of data, they are becoming aware of the need for intermediaries, and in some ways this awareness cuts right across the size spectrum.

- Small companies do not like having system requirements dictated to them by a number of important clients, each with a different system.

- Large corporations would also prefer a neutral third party to set the standards for data communication so that one company neither gains a brief technical advantage nor has to support a multitude of standards.

The banks' large corporate customers are looking to them to develop those services in which they already have expertise, for example:

- Account reconciliation information is particularly important.

- Transaction reporting and monitoring.

- Information gateway services between the banking sector and other industry sectors.

- Security and authentication.

- Risk exposure control.

A basic but key service which customers are looking to the banks to provide is to match remittance information with associated payments. They would like the matching process to extend earlier into the computer transaction chain which goes to make up a single commercial or trade transaction.

The banking response has taken place on several levels. For example, both the organisational and marketing levels have been involved. Several banks, particularly those in the United States and Scandinavia have reorganised in order to place all those units providing services to corporate customers into one banking unit. Within the last couple of months, several UK banks have made similar moves. These reorganisations have affected the payments divisions, documentary payments divisions, foreign exchange trading areas and securities trading and settlement units. The activities of these units are now being focused on serving the needs of the corporate customer under the concept of a single account relationship.

While European banks have been slower to reorganise, similar co-ordination and, in some cases, reorganisation has taken place. In addition, concerns about the effects of 1992, on the domestic and international operations of European banks have had an inhibiting effect on EDI and on corporate services. It is becoming increasingly difficult to distinguish foreign from domestic operations. This has become evident in the meetings of the various EDIFACT working groups and in meetings with individual banks who are now trying to provide the same services throughout Europe which they formerly provided only on a national level.

Some responses of the banking community have been common to both the US and Europe. For example, international services are being provided only on a pilot basis with selected customers and with only one or two participating banks. These pilot projects are currently involving banks in Scandinavia, England, France and the U.S. with their customers in the automotive, electronics and chemical sectors.

At the infrastructure level, those banks which have a telecommunications network are attempting to get the maximum benefits that they can out of these networks in which they have already invested considerable amounts of money. In many cases they hope to lock in customers or attract new customers, based on selling the benefits of a single electronic gateway to the banking network. A number of banks have focussed on the reconciliation and matching types of services already described. However, INPUT believes that reconciliation services have proven to be more costly than originally projected because of:

- The multiplicity of telecommunications networks being used,
- The growth in transaction volumes as a project moves from an original pilot into full production, which results in an increase in the amount of time needed to resolve discrepancies.

B

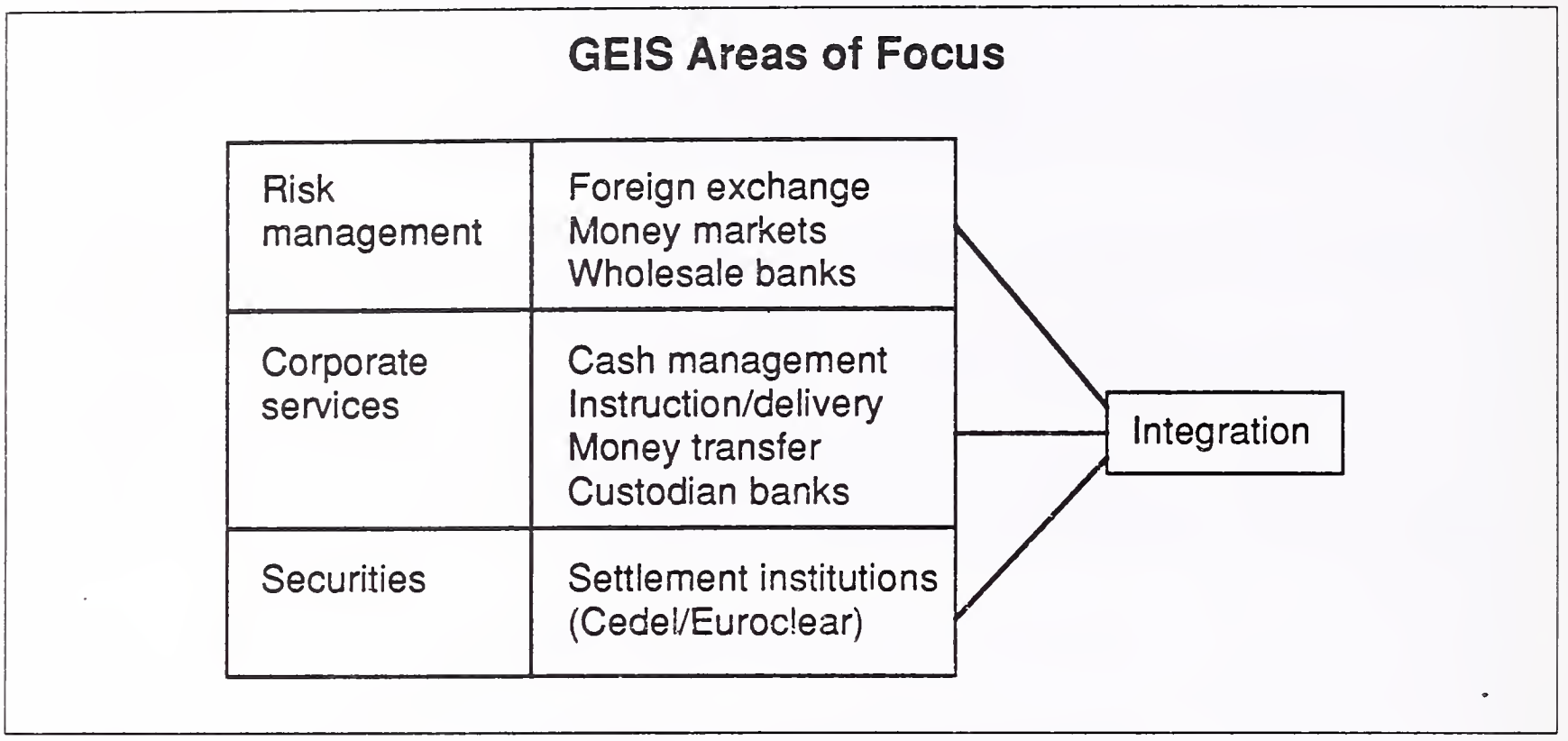
Service Provider Profiles

1. GE Information Services

a. Background

INPUT estimates that GE Information Services derives around 40 percent of its revenue from the banking community. The greatest strength of GE Information Services as an international data carrier is its strong global presences. Such a presence is becoming critical to success in the international network services market. Customers who must manage multinational networks increasingly demand support in, and not just access to and from, the countries where they maintain computer installations. Complementing GEIS' two supercentre teleprocessing centres in the U.S. is a supercentre in Amsterdam. This base helps make the company one of the dominant forces in the managed network services market and a major European vendor of network applications for banking and finance. GEIS' three major areas of focus are summarised in Exhibit V-1.

EXHIBIT V-1



b. Market Position

In the managed network services market, GEIS faces strongest competition from Infonet (owned by MCI Communications Corp and 10 PTTs), Tymnet (owned by British Telecom), and Telenet. The number of network operators providing global network services is growing, and GEIS faces this challenge through cooperative ventures with some of the world's largest manufacturing businesses, and with some of the PTTs as well.

c. The Network

Worldwide, the company claims 99.8 percent average availability in a network that handles up to 4,000 concurrent users during peak hours and over 875,000 user sessions each week, and transmits over 300 million characters per hour. The network consists of approximately 7,000 access ports, over 500 processing and communications computers, with facilities for processing in IBM, Bull/NEC, and Digital Equipment environments and for protocol conversion from a variety of other systems. It operates the world's largest commercially available processing network, which includes 6 satellites (4 trans-Atlantic and 2 trans-Pacific), microwave links, 350,000 miles of terrestrial lines, and undersea cables.

The GEIS network is directly available in 750 cities and 34 countries, and indirectly in 70 countries, and has a client base of over 6,000 corporations and trade associations for its network-based business applica-

tions. GEIS claims that its network is within local reach of 90 percent of the world's business telephones. Connection to the network can be made through leased lines, local dial-up calls, or private or public data networks. Users can access the network 24 hours a day, 7 days a week, regardless of time zone locations. GEIS provides custom software design, development, installation, and consulting to enable users to link minicomputers with hosts. It promotes an ability to custom design network services to individual organization's requirements.

Users are connected to the network through leased lines, local dial-up calls, or private or public data networks. Leased line connectivity to GEIS is available for both synchronous and asynchronous devices. RJE workstations, 3274 clusters, remote host, and asynchronous clusters can all be connected at 4000 to 9600 bps. Speeds higher than 9600 can be accommodated in certain situations. The maximum transmission speed at the periphery of the network for dial-up asynchronous multiplexers is 9600 bps. The network gathers and displays information on both degraded and failed equipment on a real-time basis. Traffic is automatically rerouted if necessary, and operators reconfigure paths in order to balance the load. Maintenance is scheduled during nonprime time and automatic maintenance procedures run continuously through the local manned centers, and the supercentres.

d. Network Services

GEIS has a range of network-based banking and financial services. These include risk management systems; the Money Transfer System, a PC-based automated money transfer system; and Automated Confirmation Matching and Advisory Netting Service; Fundsnet, an automated balance and transaction reporting service; Bancor*Express System, a file transfer and management system; and SureNET Returns Service, which automates ACH (Automated Clearing House) returns processing.

The company's objectives are to control the distribution of software within an organization, transfer data between micros and mainframes, and most significantly, to do this on a global network backbone. GEIS customers can use GEIS's own network-based Bull/NEC computing service, as well as an IBM compatible network-based service operating on IBM 3090, 3081 and 4381 platforms and running under MVS/XA and VM/SP HPO operating systems.

The company markets its international networking services quite differently in Europe from the U.S. In Europe, the company places heavy emphasis on its ability to provide a variety of network services such as QUIK.COMM, and EDI*Express, within an overall global network service framework. In the U.S., GEIS markets its international teleprocessing and business services by dividing services into three basic delivery vehicles: MARK III Service, which uses Bull computers as its deliv-

ery system; MARK 3000 Service, which uses IBM computers as its delivery system; and MARK*NET, a value added network (VAN) service that offers a variety of asynchronous and synchronous protocols.

MARK*NET supports asynchronous communications, IBM synchronous communications, SNA network interconnections, X.25 packet services, Telex/Baudot, and protocol conversion. MARK*NET provides asynchronous protocol support at speeds from 110 to 1200 bps, and asynchronous terminal access through X.3- compatible PADs at a maximum of 9600 bps. Access to MARK*NET's asynchronous services can take place by way of public dial ports, private dial ports, leased lines, or on-site dedicated terminal concentrators. The speeds offered may vary from country to country depending on the structure of the local public data network (PDN), but MARK*NET supports a range of speeds in the 34 countries to which it offers local access. The company also offers 2400 bps service in much of the US. MARK*NET also features asynchronous-to-3270 protocol conversion for CRT terminals, PCs, and 3287 print streams. Microcomputers/host communications can use Xmodem and MNP protocols.

IBM synchronous communications can use IBM 3270 SNA/DLC, 3270 BSC, 3770 SNA/SDLC, and 2780/3780 BSC protocols. Terminal connection for synchronous communications can take place by way of leased lines or public dial ports. Leased line access at up to 9600 bps and public dial-up access at up to 4800 bps is available in the 30 countries that offer local access. Host connections to the network are available in the USA and Europe. GEIS supports a wide variety of hosts, front-ends, and host software. X.25 services offered by MARK*NET support host and PAD interfaces and facilities for switched virtual calls and permanent virtual circuits. Network gateways provide X.25 connection to national PDNs.

The MARK 3000 Service provides IBM-compatible remote job entry, conversational, and computer-to-computer processing using IBM mainframes as its delivery system. The company's MARK III Service, which uses Bull processors as the delivery system, provides remote computing services.

e. Financial Services

GEIS services in the sector include cash management and funds transfer services such as electronic transmission of letters of credit, audit reports, and stop payment notifications. Other network-based financial service capabilities include real-time international trading systems and bond matching services.

FUNDSNET is the GEIS money transfer instruction system. Users are those that deal with a low volume of high value transactions, requiring

very high levels of security and control. The system is multicurrency and multilanguage, with four levels of security and authentication. The TRADEWATCH settlement instruction and reporting system tracks the process between an investment deal and its settlement. BANCOR*EXPRESS is a file distribution and electronic mail system used by banks between branches or clients.

GEIS assisted the Association of International Bond Dealers (AIBD) with their Automated Transaction Exchange System (TRAX). The system required by the AIBD was to allow participants in the Eurobond Market to access same-day, live, on-line comparison and confirmation of transactions between members of the AIBD, and to make this information available to other professional participants in the international markets. Brokers and dealers are required to report daily rates in certain securities, and in January 1988 they were connected to TRAX to facilitate this.

The TRAX systems is operated from the AIBD's computer centre in London and is run on a Tandem VLX mainframe with four interconnected processors. The communications are based upon the X.25 standard. The system is designed to handle a minimum of 200,000 trades a day. GEIS provides the global connectivity for AIBD members outside the U.K. in such a way that members in different locations pay the same costs. Security devices for the system were developed by Racal Guardata in conjunction with GEIS. The company also provided consultancy advice and project management for the TRAX Subscriber Form, the TRAX User Guide and the TRAX Computer Based Training.

In September 1989, GEIS established Financial Information Services, a dedicated group to the banking and finance sector and has spent over $200m ($40m of which was on security and engineering work) on the GEIS network. With annual upgrades GEIS is looking to increase the capacity continuously. The above figures do not include software development expenses to provide connections to PDNs in most European countries.

f. Software

Protocol conversion for synchronous protocols takes place primarily by way of SIMWARE communications software from Simware Inc. This software includes the following packages.

SIM3278 allows a variety of asynchronous terminals and IBM-compatible PCs with asynchronous communications capability to function as IBM 3278 Model 2 Information Display terminals. This software can function when the devices are communicating via MARK*NET to an IBM VM or MVS/VTAM host running SIM3278 software.

SIM3278/PC provides communications from an IBM PC or compatible when a host mainframe is running SIM3278. SIM3278/PC supports almost all the functions of a 3278 Model 2. In addition, it provides error-free transmission for 3270 emulation and error-free file transfer to and from the host computer.

SIM/PASSTHRU is an MVS/VTAM application program that emulates a 3274 bisync control unit. It allows an MVS/VTAM application connected 3270 or compatible terminals to access non-VTAM systems without VCNA.

g. Overall Strategy

GEIS supports standards initiatives such as X.400. GEIS is growing at 20% annually and has 3000 banks worldwide as customers with 50% in Europe. One bank, using cash management services for 100 clients, is considered to be only one user.

One of the major contracts that GEIS has won, a contract to carry out customisation of application development links to client corporations, is from Societe Generale. A contract such as this leads to product development and value added service opportunities. GEIS argues that the service is cheaper on leased lines since applications can then be tailored to local regulatory requirements. However, GEIS cannot win contracts on price and therefore the challenge is to develop new application software products to make use of the network.

Whilst GEIS cannot compete for domestic network business, as links between U.K. and French banks become simpler, the opportunities to offer international links and services to customers increases. GEIS is in a position to actively market these services to innovative banks who are looking to diversify and who will look to third party providers. GEIS is looking at financial transactions that will generate high volumes into the 1990s. As bonds were in the 1980s, so futures and options, trading off balance sheets will be in the 1990s, GEIS believes. It is also targeting the securities markets. The same players will be the key players because, to take advantage of this market, it will be the understanding of application opportunities that will gain market share.

2. Infonet

a. Background

While many of the European PTTs were working towards building a European Managed Data Network Service through CEPT, Infonet was also building a relationship with many of the same European PTTs, and has succeeded in providing many of the solutions to international network management that they were looking for.

Infonet's competition, mainly Tymnet and Telenet, have been building relationships with one or two strategic players, but Infonet has gone one step further. Infonet aims to make many of its services available to large corporate users through the national PTTs.

The company is an international network service provider. In 1988, Infonet was formally established as Infonet Services Corporation. In January 1990, the founder of Infonet, Computer Sciences Corporation (CSC) sold off its remaining 30 percent share ownership. MCI of the U.S. purchased 25 percent for $27.5 million, and the remaining 5 percent was split among other shareholders. Through 1988 to the end of 1989, Infonet's clear strategy to form business partnerships with worldwide telecommunication administrations has resulted in a shared ownership which now includes 10 international telecommunications operators. MCI will now be able to move in the direction of integrated voice and data messaging, and will benefit from Infonet's worldwide network, particularly in its continuing bid to outperform AT&T. Prior to the MCI buy-in, Infonet followed a determined path in building its relationship with PTTs. Together with the distribution of shares among PTTs, Infonet has also established major business partnerships with specific agencies, usually for a particular project. These partnerships emphasise the variety of services available through Infonet.

Revenues are generated for Infonet in a number of ways. For example, by teaming up with national service providers in the supply of electronic data interchange (EDI) facilities, Infonet expects to gain approximately 20 percent of the total international EDI revenues. Associated service providers will take a share of Infonet's total revenues, according to the amount of business they bring in.

b. Market Position

Infonet claims to support over 37 percent of the total international network services data transport market. Telenet and BT Tymnet are estimated to have market shares of 18 and 13 percent respectively. Competitors such as GEIS and IBM Information Network gain most of their revenues from managed network and network application services as opposed to Infonet's focus on international transport services. Companies such as AT&T Istel have concentrated on providing domestic services.

c. The Network

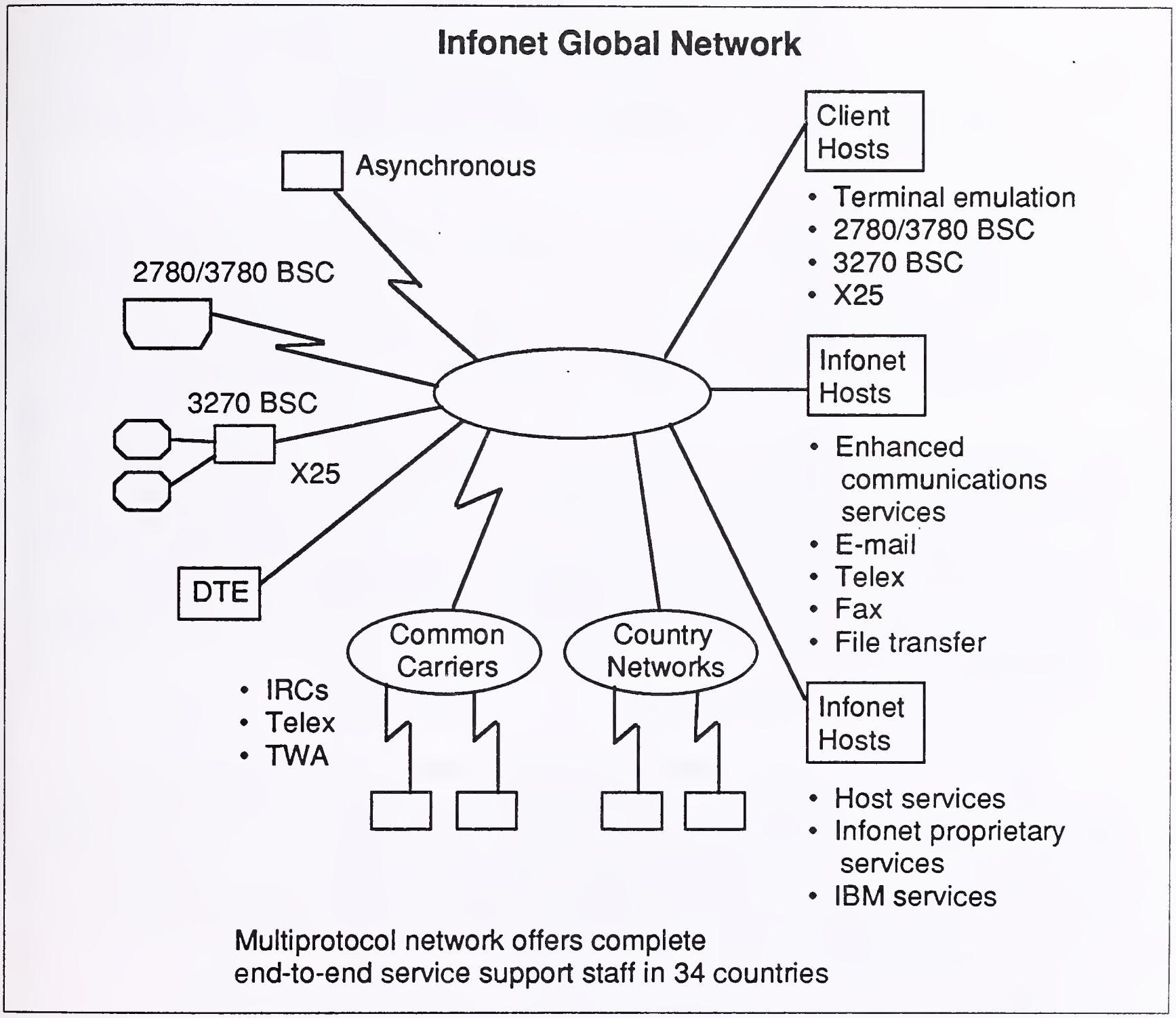
The Infonet network provides international packet switched data communications services for terminal/host transmissions, and directly supports those services in 34 countries. Its backbone network in the US uses 56K bps lines between nodes and is available from 100 countries. Infonet predicts total revenues in the region of $120 million for 1990 compared to $100 million in 1989.

The variety and scope of Infonet network operations and services is limitless in the sense that each customer can receive a customized product. Infonet claims to provide an end-to-end service, and in this respect, customers can go to Infonet and ask for consultancy, training, and management services. Although no longer a part of Computer Sciences Corporation, Infonet maintains that it will continue to provide services in alliance with CSC, which has a history of successful, large computer system and software implementations, and data processing solutions.

At the hub of Infonet's networking solution is the Network Control Centre (NCC) in California. The NCC constantly monitors the entire Infonet system, with technicians having access to a real-time view of network performance. The Infonet Support Centre (ISC) provides 24-hour service and co-ordinates with the Network Control Centre for problem solving. Infonet claims that 80 percent of problems reported to the ISC are solved with a single client call. Users can connect to Infonet's network via public or private ports. For a fixed monthly fee, Infonet will provide a dedicated host link, including two modems, a leased line, and a private port to connect the host computer or front-end processor to the network. Exhibit V-2 contains a diagram of the Infonet network structure.

Optional administrative services include network access control, providing for user and project accounting; billing supplements, reporting network use by user ID and project ID; session tapes, with details of each session held; zone of access verification, the ability to specify which of the 64 types of incoming calls the host computer will accept; and network access security.

EXHIBIT V-2



d. Network Services

Infonet's offerings comprise two main categories: network services and enhanced services. Network services include the provision of worldwide data transport services, with local service and support. A middle ground, between network service and enhanced service, includes the capability of managing interconnectivity and interoperability across the network, increasing the number of different systems and applications which can be accommodated. Enhanced services use the networking infrastructure to provide users with global applications over the network.

An example of an enhanced service is Infonet's NOTICE service. NOTICE provides the infrastructure for the distribution of spreadsheet applications to users. Infonet provides international X.25 packet switched data communications services for terminal/host transmissions. Its backbone network in the U.S. is tied in with nodes worldwide, supported in particular by its PTT shareholders, and offers transmission speeds of up to 9600 bps. Enhanced services with dedicated facilities linking host locations permit speeds up to 19.2K bps.

Infonet manages and monitors customers' data end-to-end. It claims a network effectiveness record of 99.9 percent up-time because no single point of failure exists in the network topology - the backbone network design provides multiple (a minimum of two) independent transmission paths between each backbone node. Infonet states that the probability of a network data error is less than one in every 10 billion transmissions. Both dial-up and dedicated services are available. Terminal connections to the network are made through public dial ports, private dial ports, and dedicated access facilities. Public dial ports are available at Infonet switch locations on a continuous basis and can be used as needed. Dial-up service is provided through the local exchange company (local service) or the interexchange telephone network (WATS service.) Through its PTT subsidiaries, including Transpac in France and Deutsche Bundepost in West Germany, Infonet services have become even more accessible to end-users.

i. Dial X.25 Service

In 1989, Infonet announced that it had broadened the scope of its Dial X.25 service. With the service now available in locations including Los Angeles, New York, London, Paris, and Tokyo, Infonet hopes to attract customers who are transmitting small amounts of data in packet switched form. Infonet's director of U.K. operations has stated that the Dial X.25 service will mean that a new group of customers will have access to the global packet switching service.

ii. X.25 Access

Infonet supports the CCITT X.25 recommendation through its dedicated and dial-up service offerings. Dedicated X.25 facilities for users who wish to link host locations and/or sites with a large number of terminals are available at any Infonet node locations. Access is available at speeds ranging from 2,400 bps to 19,200bps, with higher speeds available as well. DTEs are provided with X.25 packet-switched services through Permanent Virtual Circuits (PVCs) or switched Virtual Circuits (CVs).

Dial X.25 facilities are also available. Infonet Dial X.25 supports both V.22 bis and V.32 access, offering speeds of 1,200 bps to 9,600 bps. Infonet's network architecture supports the 7-layer Open Systems Inter-

connection (OSI) Reference Model. At the first level (physical), Dial X.25 supports X.21 bis or RS-232 for data rates up to 20K bps. It does not support X.21.

At level 2 (the link level), Infonet supports LAPB (link access procedure balanced); LAP is not supported. Framing is in conformance with the HDLC protocol. At the packet level (level 3), Infonet offers virtual circuits and full LCN Assignment 1 - 4095, specifiable at subscription. A virtual circuit is one in which no single physical circuit is established between the sending and receiving stations. Instead, the network dynamically establishes the route of least delay for each packet of data. A logical circuit, an electronic circuit used to complete a logical function, is maintained for the length of the virtual call. The output of the logical circuit depends on the state of the input. As each packet is physically transmitted, a temporary physical link is established through the network to the receiving station.

A permanent virtual circuit is a single dedicated path connection chosen for a particular transmission. The network is aware of a fixed association between two stations; permanent logical channel numbers (LCN) are assigned exclusively to the permanent circuit, and devices do not require permission to transmit to each other. A new connection between the same users may be routed along a different path. Packet size is selectable at subscription. Bit values available are 64, 128, 256, and 512; the default size is 128. All packets are supported except DTE RJE and Diagnostics.

iii. Managed Network Services

Infonet's managed network service strategy, called EDNS (Enterprise Defined Network Services), was announced in late 1989. The service will integrate private and hybrid network solutions by the provision of a number of specific support services. EDNS will make it possible for customers to have access to Infonet's network management services. One solution that Infonet offers through EDNS is to house companies' private network equipment itself. By maintaining and managing the equipment, customers will be able to implement flexible internal systems as, and when, needed. In this way, Infonet can offer support to companies that grow too quickly to maintain the necessary internal system. Similarly, EDNS will support companies that need to send large amounts of data, and simply cannot take on the management of a large system.

iv. Interpac

In 1985, CSC and two French companies formed a joint venture company to cooperate in international data communications. The partners included Transpac, S.A., which operates the French public data network, and France Cables et Radio, S.A., a supplier of telecommunications equip-

ment and services. CSC interconnected its worldwide Infonet network with the Transpac network. The joint venture company performs marketing and technical support in France for the integrated communications service.

v. Software Services

In March 1986, Simware software products were used in conjunction with the Infonet data network. Under an agreement with Simware, Inc. of Canada, the Infonet division used the Simware software packages to expand CSC's current 3270 Infonet network service to include asynchronous access to 3270 hosts. This allowed clients to integrate personal computers from locations around the world into existing IBM environments. In late 1989, it was announced that Infonet was to market and support Network-Orion from Orion Network Communications, owned by Pi Holdings. The agreement will allow Infonet to offer networking services such as E-mail, fax and telex to IBM users.

vi. Minitel

New York and Los Angeles were linked with the French Minitel videotex network via Infonet. The service was the first U.S. connection with the French Service. Infonet has referred to itself in its press releases as an IVAN, meaning International Value Added Network service provider.

e. Overall Strategy

Demands in the network services market are changing, and vendor strength is perceived in relation to the service and support provided. Infonet is adopting a centralised management strategy to help development of software; support will be localised with contracts being rationalised to one partner and local support. For example, local customers can now use Transpac processors to link to Infonet rather than the Interpac gateway.

Infonet - in common with many banks- is developing an ISDN network parallel to its X.25 network, as the banks are doing. Infonet is aware that it needs to provide new services for banks offering fast transport and the ability for voice/data integration. As a result, Infonet's voice/data network - EDN (Enterprise Defined Network) - is a VAN that is designed to suit the customer, especially since it is the large banks which have asked for an EDN type service, i.e., a private network using the public network. MCI has increased the company's voice/data integration options. Infonet has 37% of the international market and is used by all nationalised banks, except one.

f. MCI's role

MCI decision to buy into Infonet has been critical. Like other public carriers it recognised that the ability to offer global managed network services has become the key to getting and keeping multinational user accounts. By purchasing a 25% stake and becoming the largest shareholder, MCI has caught up with the competition and yet the $27.5m paid for the Infonet shares represent only a fraction of the $355m BT paid McDonnell Douglas for Tymnet or the $290m AT&T paid for Istel. Infonet will gain from MCI's involvement because of the significant number of US-based multinationals being brought into Infonet whilst MCI gains because the big customers need a robust data offering - full-period leased lines as well as packet-switched facilities. Infonet provides the ability to manage worldwide all of the network services for these larger customers.

With an international infrastructure now recognised as essential for transporting data, Infonet views BT Tymnet, US Sprint's Telenet and GEIS as its principal international competitors and sees that the PTTs have the chance to broaden their relationship on public switched voice as well as on data networks. MCI will benefit Infonet by helping to secure a prime US customer base. Finally, it may be that CSC comes to regret its decision to sell for $500m all its shares in Infonet. As systems operations and management become more important, CSC may be required to network its computers to user sites, thus needing to reinvent Infonet.

3. SWIFT

a. Overview

The SWIFT network is a dedicated financial network that banks use to move transactions and other information around the world. The network provides a number of features that make it a highly reliable and secure transmission medium. The SWIFT system checks for format and consistency every message that passes through the network. Badly formatted messages are rejected and good messages are acknowledged. SWIFT then encrypts a valid message and routes it to the destination bank, maintaining a copy for archiving. Once received, the Computer Based Terminal (CBT) in the receiving bank sends an acknowledgement to SWIFT. If the destination bank is logged on when the message is transmitted, end to end transit times are typically around 20 seconds. If the destination bank is not currently logged on to SWIFT, the message is queued for later delivery. A condition of usage requires that banks maintain a connection for a minimum period during each working day, ensuring that all messages are received before a specified cut-off time.

b. Level of Services

The SWIFT network maintains high levels of reliability. Audited figures show 99.7 percent availability, weighted to reflect the true availability as seen by a bank connection device at critical business periods. The objective is to maintain peak capacity even in the event of total destruction of one of the two operating centres. The availability statistics continually improve. The high level of dependability coupled with end-to-end message follow-up and authentication, attract members to the SWIFT network. When banks have to transfer hundreds of millions of dollars, a guarantee that the message will be received intact and on time, is absolutely essential. Prices are based on a standard tariff of around 40 cents per message (plus the PTT connection to the local SWIFT node, borne by the user). Multiple unit surcharges exist for priority delivery, advice of reception, and large messages (normal message size is around 300 bytes). A small annual charge covers directory maintenance costs. The message charge is independent of transmission or connection time, distance or the period that a message is stored. Since 1988, SWIFT has offered volume related discounts on high traffic routes, reducing per message costs to below 20 cents in some cases. SWIFT costs much less than telex, its principal competitor. SWIFT has now displaced telex as the prime international banking communications medium, even though telex remains important due to its global presence and to its penetration in small banks and among corporations.

c. Background

As SWIFT grows in size and scope, so does the need to diversify into new areas of business. Some key statistics for SWIFT are provided in Exhibit V-3. For various reasons, not all within its control, SWIFT has not been entirely successful in achieving the level of diversification into network services that it had hoped. SWIFT Services Partners (SSP) focuses on the development of network services for specific interest groups within the SWIFT community with the idea being that network services serving the whole community are best administered by the basic central SWIFT.

EXHIBIT V-3

SWIFT
Key Statistics

Year	1984	1985	1986	1987	1988
Connections	1,656	1,946	2,161	2,360	2,537
% Availability	99.6	99.3	99.6	99.7	99.7
Annual Traffic (million messages)	130	157	192	222	255
Annual Revenue (M BF)	3,900	5,050	5,900	6,950	8,300

Source: SWIFT

d. Functional Requirements

Functionally, SWIFT's business is transactional in scope. Any international banking operation, whether a payment, a deposit on the money markets, or a foreign exchange deal, requires that information be exchanged with other banks. This information exchange is characterized by:

- Moderate size (typically 200 to 400 bytes),
- High value (up to tens or hundreds of millions of dollars),
- Time critical (not real-time, but the information must be received and processed by the other party the same day, even if the message is sent only minutes before the end of the working day).

These parameters translate into the requirement for extremely high reliability and availability, security, and performance. SWIFT's objectives in providing an international network are not only to satisfy these functional objectives, but to do so within a cooperative framework. Such cooperation involves sharing costs and offering consistent service quality to banks in both developed and less developed countries.

e. SWIFT I

The SWIFT I network infrastructure is a hierarchical network based on leased lines, Infotrom statistical multiplexers and Unisys minicomputer and mainframe computers. Network access is achieved by means of certified software devices that communicate over leased lines using a proprietary SWIFT protocol (essentially a modified BSC 2780 protocol). Banks prepare messages for transmission using special software developed by SWIFT, by third-party suppliers, or by the banks themselves. Most SWIFT messages (especially payments and trading related traffic) are generated automatically by banking applications software packages, but many banks still generate messages manually using screen based programs that check the formats of messages.

Once messages are ready to send to the network, the bank logs on the system. When logging on, the bank can specify whether it wishes only to send, to receive, or both. All messages to be sent are then transmitted to SWIFT in a batch. The system verifies each of the messages and individually acknowledges or rejects them. The SWIFT system checks the format of each message, but not the validity of its contents. The system copies the messages (for archiving) and routes them to output queues where recipient banks can collect them the next time they log on. Messages can be sent to individual destinations, or broadcast to several recipients.

Connection to the local SWIFT node is made over PTT lines. Most lines are leased analog circuits, although many small banks use switched circuits and some groups of banks share access to a leased circuit. Once in the SWIFT node, SWIFT assumes responsibility for the message, but responsibility for message loss due to corruption over the public network remains the sender's responsibility.

f. SWIFT Interface Devices

Banks connect to the network by means of a special piece of equipment called a SID (SWIFT Interface Device). In reality, an SID is a dedicated computer system with software that performs applications such as verification of messages, assembling header and footer information (such as authentication check-sums) and managing the logical elements of the SWIFT access protocol. The most common interface system in use today is the ST200, a product produced by STS (SWIFT's interface equipment subsidiary), to run on Convergent Technologies hardware (carrying either a Unisys or an NCR badge). Available as a single station entry-level system for screen based message entry, the system can be expanded by the creation of workstation clusters, or connected to a mainframe to process messages created automatically by banking applications. STS also offers a solution running on DEC VAX hardware, the ST400, and a high-volume gateway application on IBM Series/1, the

ST500. The ST400 in particular is capable of supporting extremely sophisticated communication applications. Most STS products also support Telex and have optional software applications available for Telex test key processing. The most commonly used interface application after the ST200, however, is IBM's MERVA (or its predecessor DMNL). Intended for multiple-network applications running on System/370 series hardware, DMNL and MERVA represent the most appropriate solution for SWIFT processing on central sites. The third party and bank created SIDs have to pass conformity tests at SWIFT before being connected to the network. Most banks purchase the SID from STS, since the additional cost of developing the application internally is rarely justified.

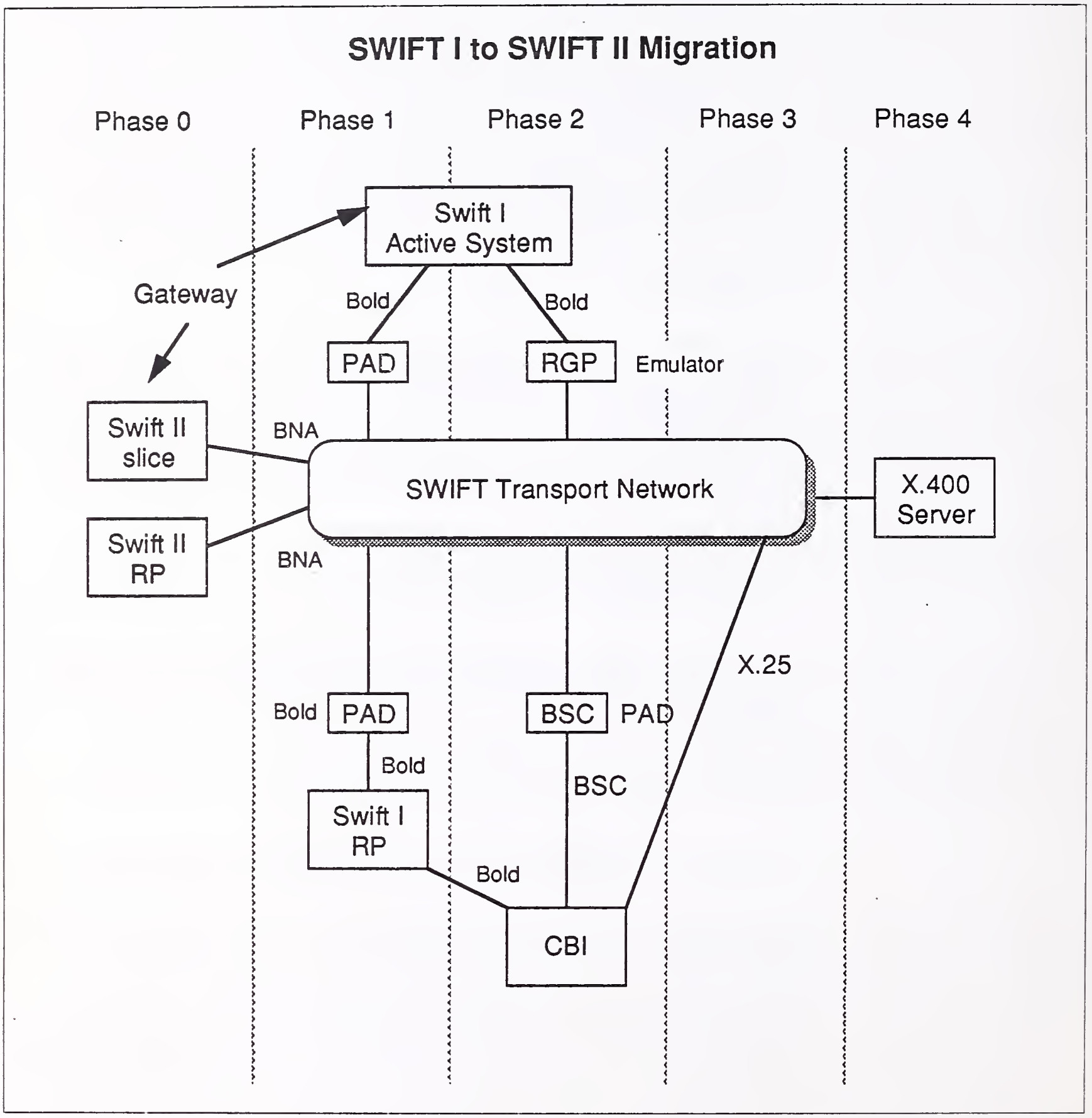
g. SWIFT II

Being highly centralised and monolithic, SWIFT I is fairly easy to monitor and maintain. Its design places constraints on growth, however, and makes the incorporation of value-added functionality difficult. SWIFT II is designed to overcome these limitations. SWIFT II has been designed to be functionally compatible with SWIFT I, simplifying migration and reducing development costs for banks. In particular it should be noted that:

- Message formats and codes remain identical, with only headers and footers changing in structure,
- All the information contained in SWIFT I headers and footers can be converted to SWIFT II format by simple transformation (changing the order of presentation),
- SWIFT II will optionally be accessible in a SWIFT I compatibility mode,
- A gateway exists between the SWIFT I and SWIFT II processors, rendering the bridge transparent between SWIFT I and SWIFT II users.

Nonetheless, many important differences mark the two systems. The most important difference is the distribution of network processing in SWIFT II to different levels of the system, reducing reliance upon any one component or system (thereby increasing reliability), and permitting modular growth beyond the limits imposed by a centralized system. The migration path is illustrated graphically in Exhibit V-4. SWIFT is not an OSI structured network, but borrows considerably from OSI principles, and has always intended to be compatible with X.25 network technology. Proprietary protocols (BNA for point to point connections between SWIFT processors, BSC for customer connection during the migration phase from SWIFT I to SWIFT II) remain in evidence in parts of the network. Nonetheless, SWIFT II offers considerable advantages for future growth potential:

EXHIBIT V-4

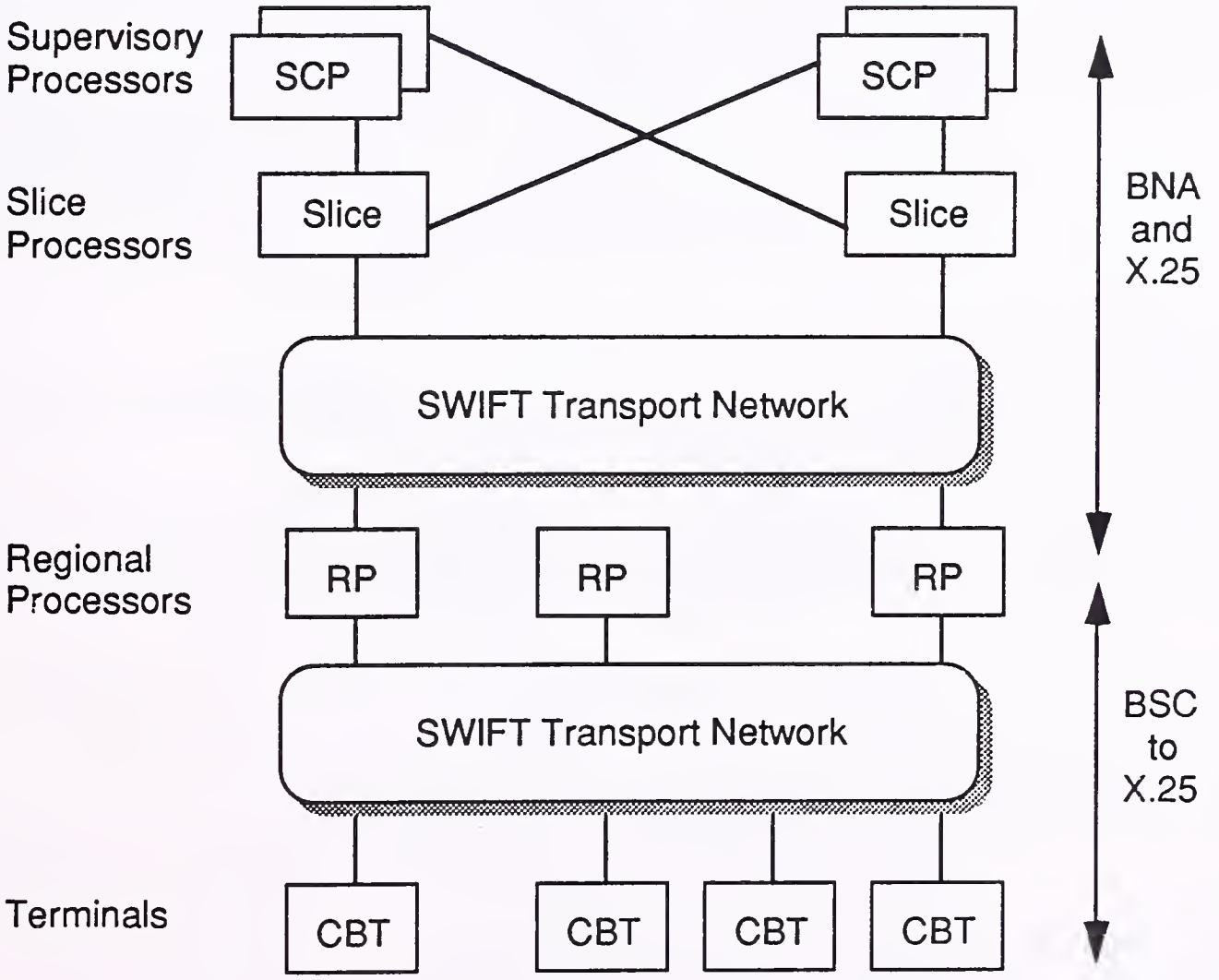


- Its modular, layered approach permits virtually unlimited expansion,
- The use of computer processors at all levels of the architecture permits more efficient implementation of value added functionality,
- The separation of network processing into layers offers even greater system resilience by reducing dependence upon one system for validation, routing, archiving, and reporting. In the event of failure of a slice processor, message routing can be undertaken by alternative processors and less time critical processes can be deferred,
- More of the network process can be undertaken by smaller systems located in unattended operating centres, with the SCP monitoring their functions centrally. This reduces labour costs and permits a more streamlined, integrated network management function.

The SWIFT II network architecture is shown graphically in Exhibit V-5.

EXHIBIT V-5

SWIFT II Architecture



Modular layered approach permits unlimited expansion

Implementing SWIFT II has been an opportunity to integrate new reporting and security features lacking in SWIFT I. For example, the addition of a calculated check-sum field in the footer enables SWIFT and receiving banks to verify message integrity without having a copy of the private authentication key. The private authenticator remains compulsory, however. Banks can also specify optional encryption of the message archive retained by the SWIFT system. The SWIFT II application being introduced now is actually a far simpler concept than that originally proposed. Originally, dual redundant message storage was planned, but abandoned due to cost. Furthermore, many network control functions planned for the Regional Processor have been handed over to the Transport Network, simplifying the RP considerably and bringing the added bonus that the RP need not be physically located in the country of the user but centralised on attended sites.

For the most part SWIFT is not overly critical of any of its service providers, although they continue to be impatient of the organizational difficulties in dealing with European PTTs. Even now, SWIFT often has to take the initiative in opening the dialogue between European PTTs for the installation of an international link. Lead times are also felt to be unnecessarily long, with three months the average and six months common. Network equipment is typically at least an order of magnitude more reliable than the network links - availability figures in excess of 99.95 percent are common. Nonetheless nearly all hardware has a full back-up. Systems vendors are chosen more and more on the basis of deliverables. This is perhaps the most important lesson learned from the SWIFT II experience. A good example of this changing outlook is the decision to acquire Northern Telecom's X.25 offering, which, although being in many ways the least innovative, was certainly the most mature.

h. Charges

Fees are revised annually. The cost to member banks of using SWIFT consists of:

- membership fees: a one-time charge of $75,000 per bank, plus $25,000 per additional connection. Wholly owned subsidiaries of banks can obtain connection at the reduced membership fee;

- annual fees: maintained at low levels, these consist of directory maintenance fees of around $7,500 per annum per connection;

- network charges; marginal costs fixed at around 40 cents per message. Tariffs are increased in multiples of this basic charge for priority delivery, delivery notification and multisegment messages (messages over 400 bytes). Volume discounts, exceeding 50 percent in some cases, are now offered on high density routes (such as the UK to Ireland, Canada to the USA, and, to a lesser degree, many routes within Europe).

i. Overall Strategy

The important issue, as SWIFT itself acknowledges, is whether the network upgrade has come in time for SWIFT to compete with the network services providers. Whereas little competition exists in the core service area (except perhaps from some of the international banks and from Reuters), SWIFT has already lost substantial interbranch file transfer business to vendors such as IBM and GEIS. Furthermore, even if the transport network provides the mechanism for the delivery of network services directly to the banking community, whether it can deliver these at a commercially viable price within a lead time acceptable to the banks and third parties remains to be seen.

An objective judgment of SWIFT's success is very difficult. SWIFT has had the advantage of working in a closed market where the members define their own rules. Unless disaster strikes in the last stages of the migration to SWIFT II it is unlikely that banks would abandon the core SWIFT service. This is, however, a long way from saying that SWIFT is capable of competing in commercial markets against organizations such as IBM and GEIS - where SWIFT does not write the rule book. Fierce competition seems inevitable given SWIFT's stated product plans. Furthermore, banks aren't uniformly agreed on SWIFT's role. For some banks, SWIFT represents an opportunity (for them) to go international, i.e., using SWIFT for branch to head office links. They see SWIFT as their service, not a competitor soaking up what should be their opportunities.

j. SWIFT's EDI Services

i. Background

SWIFT services will focus on the bank-to-bank portion of the traffic. The introduction of EDI tools is separate to the connection of corporations. The introduction of messages which take into account the needs of the corporate end user will mean that SWIFT will capture new traffic. Accomplishing this goal is a major project. SWIFT will be offering messaging services along with other network applications which will permit the system to be operated easily by users.

ii. Services

The service will utilize new messages using the EDIFACT syntax and carried over the X.25 network and the X.400 service which is to be installed in the course of the next two years.

EDI training and awareness programmes will be potentially directed at account officers of banks and telecommunications specialists wanting to understand EDI standards and techniques better. The new services will

be introduced in phases involving:

- New message types.
- New database services.
- New network features.

The service itself will expand over time in much the same way that the current SWIFT service has expanded. The service addresses only the interbank market, messages for use between banks and their corporate customers. The provision of EDI services is separate from the provision of service to corporations over the SWIFT network.

The service's initial focus will be on payments, with other services being added as demand rises. It will also feature value added services which SWIFT believes will be essential to the smooth operation of global telecommunications service in the future and will be targeted at banks that are trying to provide comprehensive and uniform services to their corporate customers - whether multi-national or national. The banks will initially focus on large, multinational customers who are pressing for the service and who have already undertaken investments in EDI. The service will be organised through a pilot group of banks which can provide expertise for the full definition of the service. This will correspond to a group already being established at SWIFT - the EDI project team.

iii. Implementation

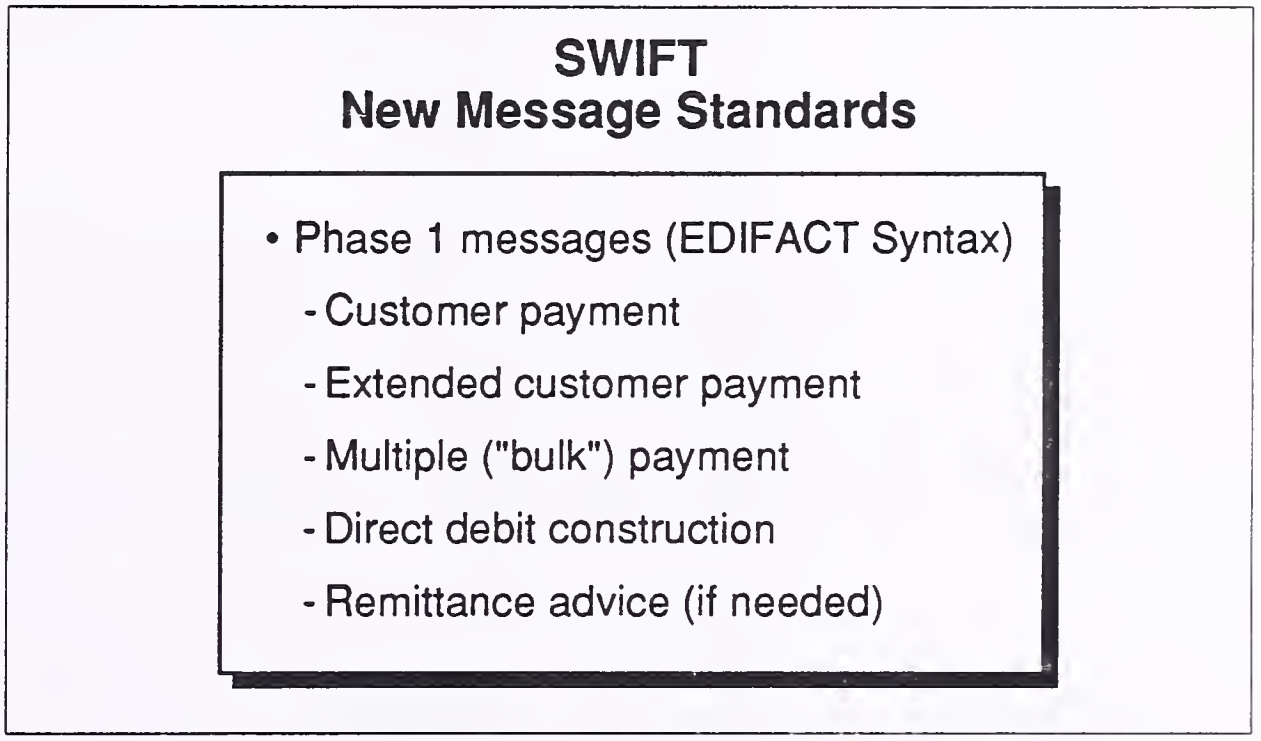
The project will have a phased implementation over a 3 to 4 year period. Phasing enables SWIFT and the member banks to gain experience if the new X.400 and EDI telecommunications technologies and to determine whether the interbank message formats are adequate and can be accommodated within the existing payments processing flow of the banks' operations departments. Although the phases have not yet been formalized, it has been proposed that the first phase be limited to testing the interbank message formats apart from the telecommunications service.

As a result, once the initial set of messages has been designed and agreed to by the participating banks, those banks may wish to start testing the message formats using the existing SWIFT MTn98 message as an envelope or using some other existing telecommunications link. This would permit the banks to test the format alone rather than testing X.400, a user level protocol and the message formats all at the same time. The phasing in of the telecommunications service and EIS should start in 1992. The pricing for the service will be significantly more unbundled than for the current SWIFT service. Variables such as message delivery criteria, message storage, use of message testing and certification facilities will be billed separately. This will permit SWIFT to give the banks billing information which they can then include in their own pricing to their corporate customers.

iv. Message Types

One of the most important elements of the service will be the message types which will be created for use between banks. There will be five initial messages plus a possible sixth message, the remittance advice. For a list of these new messaging standards, see Exhibit V-6.

EXHIBIT V-6



These messages will be developed in EDIFACT syntax and format, although they will not be proposed to the EDIFACT board until after they have been used in the pilot stage. The Customer Payment and Extended Customer Payment will reflect the PAYORD and PAYEXT which have been developed by the MD4.B committee for use between banks and corporate customers. It is expected that the interbank messages will have some differences from the messages developed for bank-corporate use.

The Multiple or "Bulk" Payment is a message with one debit and several offsetting credits in the same currency. It is not a series of chained Customer Payments. Uses of this message include salary payments, dividend payments and social security payments. The Direct Debit Order is an instruction by the creditor, relayed through the banking network, to debit the account of the debtor. Its use would be subject to bilateral agreements. In most cases, banks have already agreed that full remittance information will be carried with the Extended Customer Payment message. Should there be an identified need, SWIFT will be able to install a Remittance Advice message for use between banks.

The message will be developed in conjunction with participating banks. Standards will be proposed by SWIFT for consideration by reviewers appointed by the banks, avoiding the lengthy comment process which is

used for normal SWIFT message development. Because the technology and formats are new to the banking community, it is key that messages are developed which can be used in pilot testing as quickly as possible.

Many banks are looking at structuring SWIFT messages in EDIFACT format, either by the addition of structure to certain fields or by the use of structured MTn98 messages. SWIFT is looking to work with the banks to investigate the possibility of creating more structured messages for use by innovative banks.

v. Network Features

SWIFT's EDI service will be based on the X.25 network, which is being installed, and on a new X.400 service. Several vendors are bidding for this contract. Amongst the features which will be covered by the service are encryption techniques, authentication, optional message storage and some level of syntax verification. It is not clear exactly what the apportionment of responsibility will be for the features which are described above. Some tasks will be assigned primarily to the network itself, others to the interfaces or to processors attached to the network. It is most likely that the interfaces will assume responsibility for more aspects of the service than is the case for the existing SWIFT service. One of the chief concerns is to ensure that the throughput of the network is not compromised by a bottleneck caused by processing for one of these services. In particular, a solution will have to be found for format checking which assures users that messages carried over the system use the agreed formats correctly and which at the same time permits EDIFACT messages containing large amounts of data to be processed efficiently and quickly. SWIFT will also be investigating the possibility of including EDIFACT syntaxes in the SWIFT I/II framework either by creating special messages for use in an MTn98 'envelope' or by supporting multiple syntaxes in SWIFT II.

In addition to the telecommunications features, effective use of the system will require that enhanced data base facilities be available. EDIFACT message use large numbers of tables of data elements, similar to the BIC code lists which are used in the current SWIFT service. Maintenance and distribution of these code lists will require an automated system, if users and SWIFT are not to be bogged down in paperwork. Users need to be able to create databases, controlled by themselves and accessed by other users, which provide a user profile including the types of messages accepted and sent by a given user as well as contact, correspondent banking and settlement information. These databases would be available over the X.25 facility, accessed directly through the interfaces. It is anticipated that these services would be introduced in the second phase of the project; see Exhibit V-7.

EXHIBIT V-7

SWIFT Developing Telecommunications Capabilities

- Database facilities
  - Code directories
  - User profiles
- Interface implications
  - Support X.25/X.400
  - Data entry/syntax checking
  - Recommendation/matching
  - Database service support

vi. Strategic Issues

The introduction of these services—both network applications and EIS—has important implications for interfaces. Interfaces will probably bear more responsibility for format checking in the future, and will handle much less data entry since most messages will originate at highly automated back-office systems. Reconciliation programs will be important for matching customer payment instructions with settlement information generated by local clearing systems. In addition, the data base features outlined above will require that the interface be able to access and download data for distribution to internal systems.

SWIFT is looking to continue to expand its education and training programme to include training in general aspects of EDI, including business and technical issues; the organisation of the various EDIFACT bodies; the technical aspects of the EDIFACT messages and how they are developed; and SWIFT's own EDI services and activities. They will develop these courses not only for technical and operations staff in the banking community, but also for managers and corporate account officers who are increasingly faced with telecommunications and information processing issues.

The initial steps of the project have already been taken by the formation of task groups in SWIFT and they will convene a pilot group of banks who have expressed interest in developing an EDI service for their corporate customers. This group will assist SWIFT in the service definition and in piloting the various features of the service and appoint mem-

bers to various task groups, corresponding to the task groups which have already been set up at SWIFT. They will address the basic functionality of the service in the areas of Telecommunications; Standards and Education; Legal and Security issues; the Business Plan; and Interfaces.

These task groups will consist of at most 10 members so that the service description can be agreed quickly and efficiently. It will therefore be necessary for the banks to agree amongst themselves about who to appoint to each group since SWIFT cannot accommodate representatives from each bank on each group. The immediate need is for commitment on the part of the banks; however SWIFT is looking for a commitment to the concept and a commitment of human resources - managers and technical people who will be available to participate in the various working groups. Based on the business plan which is being developed, SWIFT may look for a financial commitment, since the service will not be generally available to all SWIFT members. It is therefore anticipated that independent funding of the project would be preferable.

C

EDI Banking Issues

A number of issues are facing the banks, including:

- Cost recovery.
- Competition with other banks, with network services providers and with SWIFT.
- Timing of the product offering.
- Defining the proper border between the competitive and the common features of product offerings.

For business corporations, EDI represents a new investment. The costs tend to be considered as the costs associated with those of installing a new system, but there are few concerns with the scheduling of the new systems which are required, since they are not going to replace existing production systems. Banks, on the other hand, already have a substantial investment in message switching systems, message processing systems, screen format mapping software, format conversion software and so on. For the banks, the perception is that is there are going to be the costs of developing new systems plus the costs of integrating them into existing systems. The crucial question is: "Who will pay these costs"? In some countries the issue is particularly difficult because automated payment processing is already established as a free or relatively cheap service. Businesses are saying that they also have development costs and, therefore, should not have to pay for the banks to update their systems, although they are willing to pay 'reasonable' transaction fees. Banks will have to view EDI as a means of maintaining market share, rather than as a way of gaining it. The urgency with which the service is required is

widely debated. Most banks say they need the service now, but in fact are not sufficiently integrated to support it. It is not certain how much businesses will be willing to do.

There are a limited number of enthusiastic participants in EDI apart from the large organisations:

- The large banks with global telecommunications networks of their own.
- Large banks without telecommunications networks but with clients who have extensive international business.
- SWIFT.
- Other network services suppliers such as GEIS and IBM.
- The various bodies involved in establishing standards: EDIFACT, ISO, and the American National Standards Institute (ANSI).

Banks without large numbers of international clients and those which are fairly small will probably follow the lead of the major participants or go on supporting national EDI standards only for as long as is practical.

In the development of EDI services, it is useful to note distinct differences in the attitude to SWIFT by banks which can vary according to:

- The size of the bank.
- Whether the bank has a telecommunications network of its own.
- Its geographic location—the power of the banking industry in relation to the corporate community—in each country.
- Local attitudes towards cooperative solutions versus competitive solutions.
- The extent to which awareness of EDI has penetrated the consciousness of each national business community.

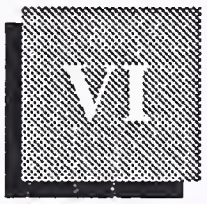
Large banks with their own telecommunications networks tend to look for more competitive solutions, while smaller banks (even though they may be large by their own national standards) favour a more cooperative solution. In general, banks in Scandinavia, the Netherlands, Switzerland, Belgium, Austria, Italy and Spain can be expected to look for a fairly wide range of common services, with SWIFT as a preferred vendor. Large American banks (Chase Manhattan, Citicorp and Bank of America) and Japanese banks will favour a service making use of their already well developed telecommunications networks and corporate services. Banks

in the UK, France and Germany fall somewhere in between these two approaches.

In summary:

- Very large banks connect to their corporate customers through their own networks or through a network provided by a third party.
- Other large banks would probably use a third party in the absence of a global network of their own.
- SWIFT continues to function in its role as the interbank carrier, supporting a larger and more structured payment instruction which can also accommodate all the remittance data supplied by the buyer.
- VANs provide network services to banks, permitting them to connect to their major customers around the world. They also supply services to the corporate community at large, carrying invoices, purchase orders and catalogue information for example.
- Standards bodies are involved in defining the format and syntax of messages moving between any of the parties, although it should be added that some parties may elect to use a purely bilateral standard between themselves.

User Environment



User Environment

This chapter offers a review of three of the major European banks' networking strategies and the future services planned over the network as well as details of their expenditure on software and services.

A

Banque Paribas

1. Background

In August 1989, Compagnie Financier de Paribas, a diversified banking group, acquired an international high-speed voice/data network and centralised some of its most critical computer operations on foreign soil with the aim of gaining market advantage. Banque Paribas, among the world's largest 30 banks with assets of 850FF billion, intends using its network to achieve its objective of becoming one of the world's top fifteen banking institutions.

The bank has 5500 employees worldwide, with 3500 in France, and is pursuing an alliance strategy in Europe:

- In France with AXA Midi,
- In Italy with Comit (Feruzzi),
- Paribas may use its 100% holding in Credit du Nord, for example, to establish an alliance with a German bank or insurance company.

2. IS Systems and Applications

Major events of the past year, facilitated by the network infrastructure, have been:

- Installation of the Digital mainframes to handle its bond issues, currency swaps, equity trading.

- Commercial banking activities being shipped from Paris to London which is perceived as the centre for its activities in most capital markets.

Traders and accountants in Paris will work off the London-based machines as will Paribas traders in Tokyo and New York. The trading activities that had been scattered across numerous personal computers in diverse financial markets are increasingly residing on the Digital VAXs in London, enabling traders worldwide to sign on and off the same shared system as their trading days begin and end as opposed to having to rely on file transfers and messaging amongst personal computers.

The sum of the trading activities of Banque Paribas' Capital Markets Group, which accounts for 60% of the bank's activities in 54 countries, is being driven by London-based machines. However, the location is imperceptible on account of the transparency, flexibility and resilience of the basic communications transport structure. Paribas has put high emphasis on the resilience of PBNet, the bank's private voice/data network that ties Paribas' Paris, London, New York and Tokyo activities together with lines operating at speeds as high as 2 megabits per second.

3. External Services

In the area of external services, Paribas uses public X.25, Reuters, Telerate, SWIFT, CHIPS and CHAPS. The bank's expenditures on external services is growing at 30% a year. The bank's expenditures are 2.5FF million to Transpac and 2FF million to GEIS, and it uses IBM and Infonet as well. Its regional outlets use the Transpac network.

4. The Network

PBNET stands for PariBas Network, see Exhibit VI-1; it is an international private voice and data network, linking London, (Paribas Ltd and the branch), New York, (PNA and the branch), Tokyo, (PCM and the branch) and Paris (Head Office and Courcoux-Bouvet). The network consists of a set of international digital circuits (satellite or fibre optics), linking the sites, over which individual circuits are "multiplexed" through digital multiplexers.

The network carries four types of traffic:

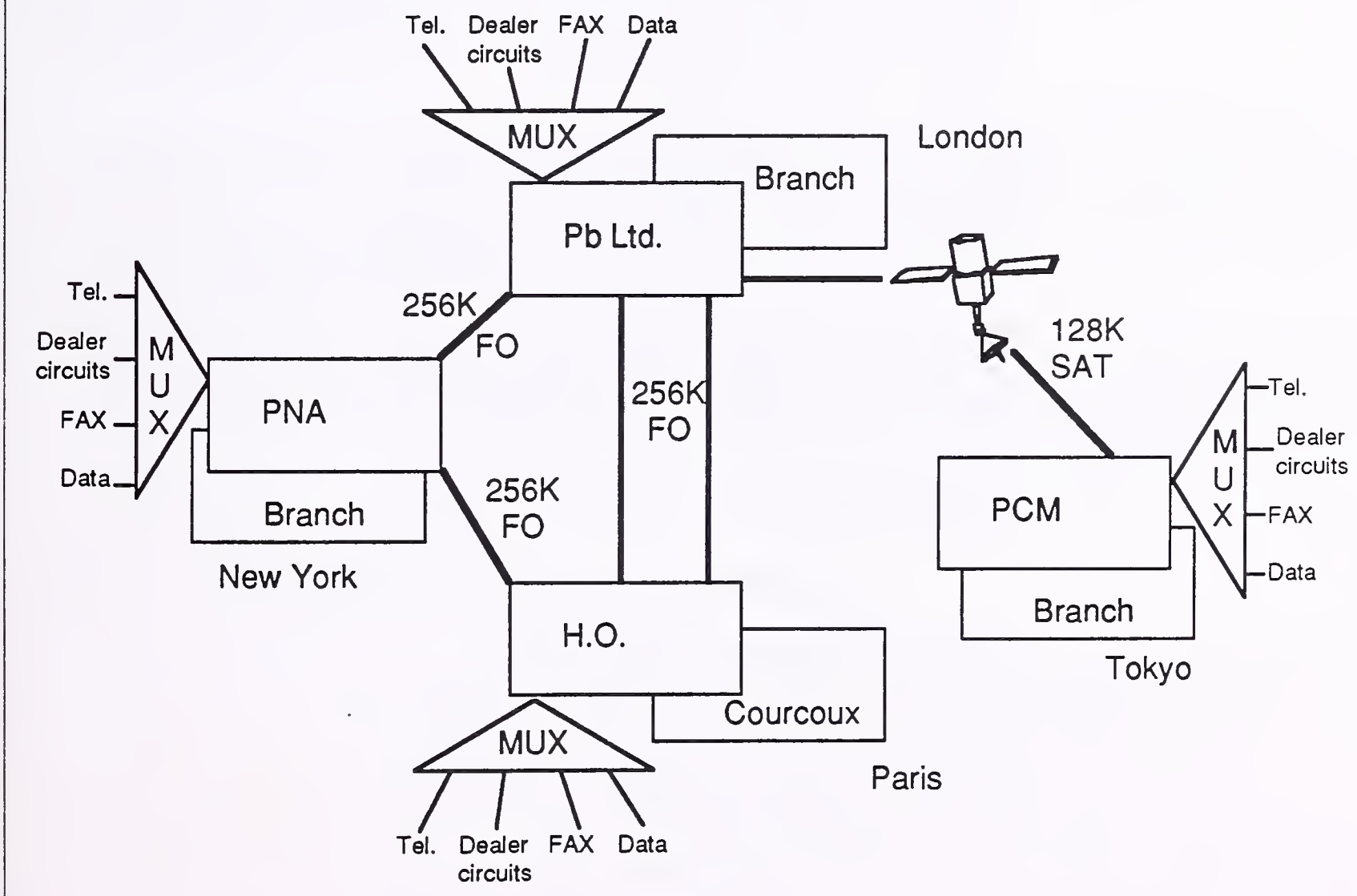
- Dealer lines (Hoot & Holler, conference bridge, top lines): 12 circuits,
- Fax: 7 circuits,
- Switched voice: 31 circuits - fax and voice through the interconnection of the PABX on all the sites: 6 PABX of different makes,

- Data leased lines: e.g., Paris/London @ > 200 Kbps,
- In the near future it is planned to carry Telex.

It is significant to note that at the start of 1989 Paribas' network traffic comprised 85% voice and 15% data. Currently the ratio is 60% voice and 40% data. This shift in usage was not planned. The network is managed in cooperation between Paribas Ltd London and the Head Office. Paribasnet Ltd has been founded to collect all the bills and to charge the users back, relative to their network usage. An international phone directory is distributed twice a year throughout the network.

EXHIBIT VI-1

Pariba's PBNet



The previous year, 1989, saw the end of network installation but it took several additional months to bring the network to the correct level of quality, mainly because the carriers were not able to deliver the international circuits correctly. Since the end of July 1990, however, the network works almost perfectly. The network budget remained within forecasted limits, showing a positive result, mainly because of the start-up costs. The network has fulfilled the expectations in terms of reliability, functionality and flexibility and facilitated unplanned expansion of the Capital Markets data network between Paris and London.

Annual costs are $1.9m and the PTT equivalent costs would have been $2.5m. Strategically this has enabled Paribas to add more capacity without buying additional international circuits by compressing the voice, whilst all international circuits between Paris, London and New York are on fibre optics.

As an example of the redundancy built into the network, a Paris-London transaction can go either directly from Paris or via-Belgium, either via-British Telecom or Mercury, either over a leased line leased from France Telecom or a public-switched 64-kilobit-per-second back-up circuit provided by France Telecom's ISDN.

Paribas' cost justified development of its network based on estimates of 30% annual savings on voice telephone costs. And with compression technology enabling a voice channel to be carried over a 7-kilobit stream - rather than 56 kilobits - Paribas is realising its own projections. The network has altered the structure of the bank's international communications. Upon implementation, 85% of the network was voice transmission; this has now fallen to 60%, with data traffic representing 40%. Voice savings are made by using the private network to call into the public network in New York.

5. Overall Strategy

Paribas is now evaluating the following strategic options:

- Expansion to Brussels and Frankfurt,
- Expansion to Hong Kong,
- Expansion in North America,
- Additional link: Paris/Tokyo.

In 1990, the bank will be adding Brussels, Frankfurt, Hong Kong and additional US cities to the network. Whilst the network has been used 95% for securities trading, it will be tailored to handle some of the administrative needs of Paribas' more remote branches and will support several different data services.

Despite the sophistication of its network, Paribas is not technology-orientated. The network is perceived as a cost, not a benefit. The bank has no X25 network, preferring to maintain a high-level, private voice/data network.

The rationale behind the development of a global network can be summarised as follows:

- Significant cost savings over public tariffs, i.e. > 20%.
- Flexibility: (an international circuit takes less than a month to install).
- Enables better data network integration.
- Enables reduced voice calls set-up: now typically under 5 seconds.
- Resilience built into the network provides better reliability.

B

Deutsche Bank

1. Background

Deutsche Bank (Deutsche), which has often been described as a state within a state, wields enormous power in Germany. With the pending fall of national barriers in Europe, Deutsche wants to extend its sphere of influence across borders to become a truly European banking empire with global outlets.

With assets of around 350DM billion at the end of 1989, Deutsche is not only Germany's largest bank, but also in terms of market capitalisation the number one financial institution in Europe by a considerable margin. Furthermore, Deutsche has large shareholdings in many industrial companies, enabling the bank to secure business for itself through informal channels and outside the arena of competition.

2. IS Systems and Applications

Deutsche has three major IS centres, in Eschborn, Dusseldorf and Hamburg all running IBM mainframe systems. The total processing power in these centres is 420 Mips; they carry out 190 million transactions/year, capacity 1.148 gigabytes. The software is IMS, DB2, ADABAS, CICS, IMS/DC, and COMPLETE. However, Deutsche feels that it is running too many software products and intends reducing the number drastically in the near future and run just DB2 (CICS) as the bank has experienced problems with data consolidation. The bank also has 23 secondary DP centres, running on Siemens, whilst at a third level there is a base of 2,200 Nixdorf controllers and 20,000 terminals.

3. IS Budget

The IS budget amounted to just over 8000DM million in the year 1989 (including all usage in non-IS departments) and can be apportioned as follows

- Hardware and systems software - 30%
- Software Products - 10%
- Application development - 40-45%
- Networking (telecommunications) - 6%
- External services - 10%

The bank is linked to Reuters (two connections), and to Telerate over 2 Mbit lines and is the largest SWIFT user in Germany. The bank's use of IP Sharp (a Reuter subsidiary) is limited to trading room applications only. Deutsche may well offer financial services within the next few years. The bank uses the GEIS Global Control system for certain applications, requiring powerful computer centres and a worldwide network.

4. New Services

Deutsche Bank planned to treble the number of ATMs from 210 to 750 by mid-1990, but also planned to reward customers who make full use of their electronic banking facilities. That Germany is one of the world leaders in EFT for recurring payments is well-known. Standing orders and direct debits take care of rent, electricity bills, telephone invoices, insurance contributions, installment purchases and other payments. Advancements in EFT are attributed to the fact that all employees have current accounts and receive their wages by credit transfer. Germans prefer credit transfers to cheques. More than 50% of all cashless payments, amounting to 20,000DM billion/year are by credit transfer, another 40% are by direct debits and less than 10% by cheques and plastic cards. Deutsche Banks' intention is to introduce further electronic elements into the first and last of these payment modes.

Deutsche Bank has departed from the bank charge structure and clients who use electronic services will be charged a flat monthly fee of 7.50DM, whilst others will have to pay 0.50DM per transaction. Deutsche wants to significantly boost the electronic transfer payment. Personal computer programs for transfer payments are selling and Deutsche has designed a cost calculation scheme which details all possible savings a corporate can achieve by switching to electronic payments. Cash management systems have been adapted to suit the needs of small and medium-sized companies.

Deutsche's trebling of ATMs is just a start; it is conscious of the customer's desire for more services and intends introducing more self-service machines like statement printers and money transfer terminals as well as information terminals for customers in large branches. With 1332 branches throughout the country, the rest of the German banks are severely compromised by Deutsche's presence. Furthermore, the attractiveness of ATMs has risen following an announcement by the bank's payments system company, GZS (Gesellschaft fur Zahlungsysteme) that all cash dispensers will be opened up for Eurocard/Mastercard by the middle of 1990.

Another field likely to emerge is that of home banking. Deutsche's forceful drive into electronic banking is likely to be a catalyst for an area that has been plagued by high rental costs for BTX terminals. The designs clearly go further than electronic banking per se. More personal computer users are hooking up to the Datex-P network, an inexpensive alternative to BTX. In addition, the banks and the post office have just agreed on a new security system for home banking based on smart cards. It is expected to be introduced after a trial period in mid-1992.

5. The Network

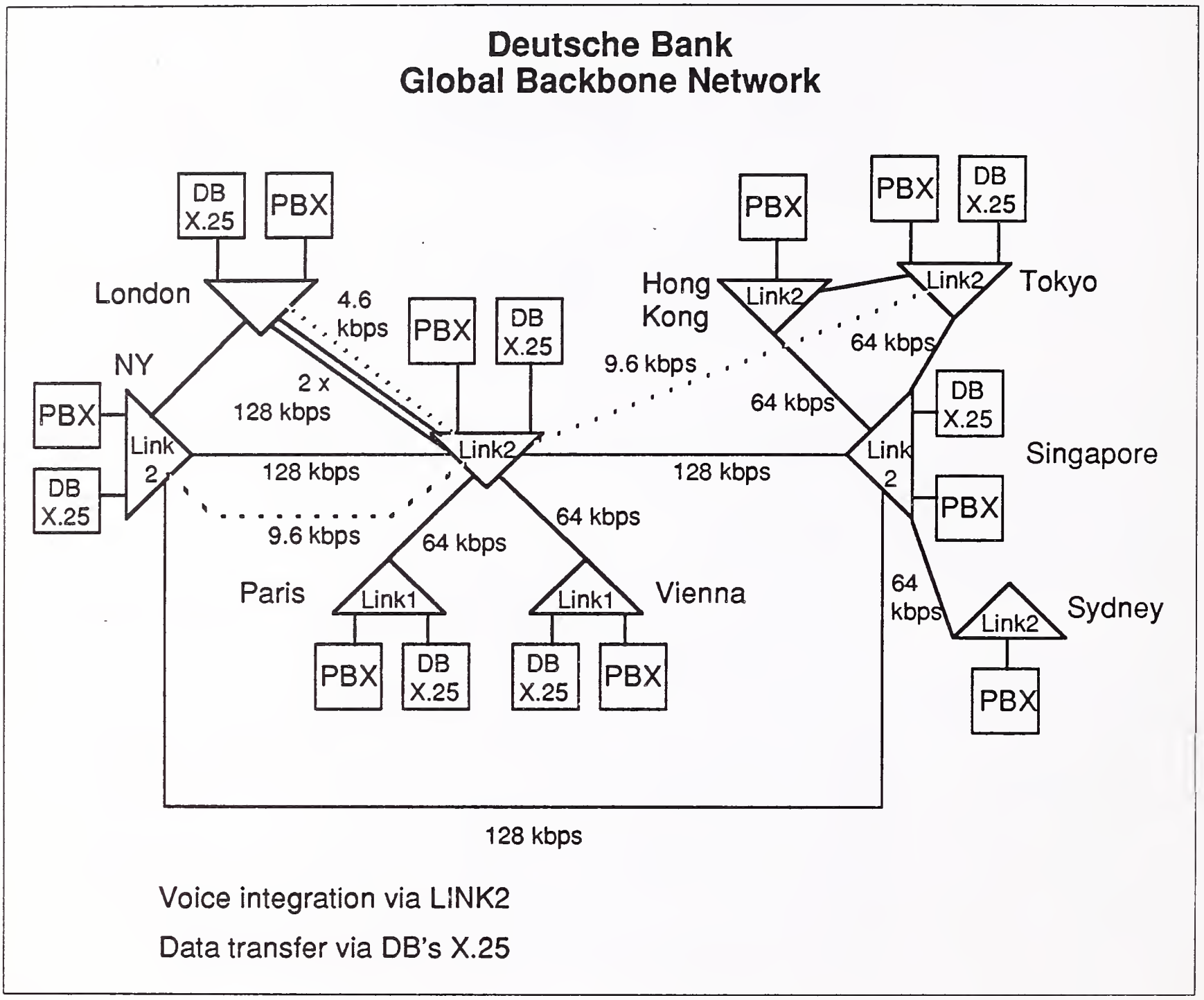
For domestic traffic, the bank uses 3 leased lines from an IBM host to a switching node in Frankfurt (9.6kbps). From GEIS, it has a direct connection to London, Brussels and Paris.

For its network, Deutsche uses Siemens and IBM hosts and Datex-P protocols. Network nodes are Timeplex (50) and X.25 (70). The bank uses leased lines from the Deutsche Bundespost Telekom (64kBit and 2Mbit). Currently with no experience of ISDN, 1991 will see the first ISDN connection (Eschborn - Frankfurt). The bank has a satellite link between Leipzig and Eschborn but finds it very expensive. Ultimately, in keeping with its international objectives, Deutsche wants to move to a private network. However, there are currently regulatory difficulties. The issues are price and flexibility, hence the desire to change.

The newer level of network has 225 Mips total processing power, 576 MB of main storage and carries out 570 million transactions/year. The operating system is BS2000, running ADABAS database management. Software AG is developing software, using the IBM CSP product. Deutsche has a hardware problem in that it needs more channels.

The costs of networking represents 6% of the IS budget (not including personnel) and Deutsche is looking to change their billing structure to a per port (transmission, connect time, time of day) basis. The global backbone network is shown in Exhibit VI-2.

EXHIBIT VI-2



The network has a near 100% availability and internationally carries voice and some electronic mail. The network management is carried out centrally. Deutsche has two EDI projects currently under development; one with IBM and Daimler Benz to exchange invoices, the other with BASF where Deutsche installed the software products using EDIFACT standards.

6. New Projects

Key projects for Deutsche are:

- The development of software to process cheques.

- CM24, a card processing and clearing system.

However, like many other banks, it does not have the necessary skills in house to carry out the development work.

7. Overall Strategy

Deutsche is looking for its network to improve office communication and has already connected between 4,000 and 5,000 staff. The need is for speed of internal communication. The objective is for international branch communication, using Wang's gateway software. Deutsche plans to have all workstations connected by 1992, and to make a return on the investment within 2 years.

Deutsche is keen to offer new products itself:

- There has been a bitter clash with Allianz, Europe's largest insurance holding company, after Deutsche announced the creation of its own life insurance company, Wolfgang Schieren.

- It is buying several international banks.

- It is working with Osiris/F-Losung in developing an OSI FTAM application between itself and other regional and cooperative banks.

In summary, Deutsche is moving so fast in so many directions that network planning has had to take a back seat; this will make future developments extremely challenging.

C

Barclays Bank

1. Background

Barclays Bank spends almost twice as much as any of its U.K. rivals on information technology. In theory, this gives Europe's most profitable bank a huge competitive advantage. More significantly, Barclays is one of the few European bank with an extensive global network.

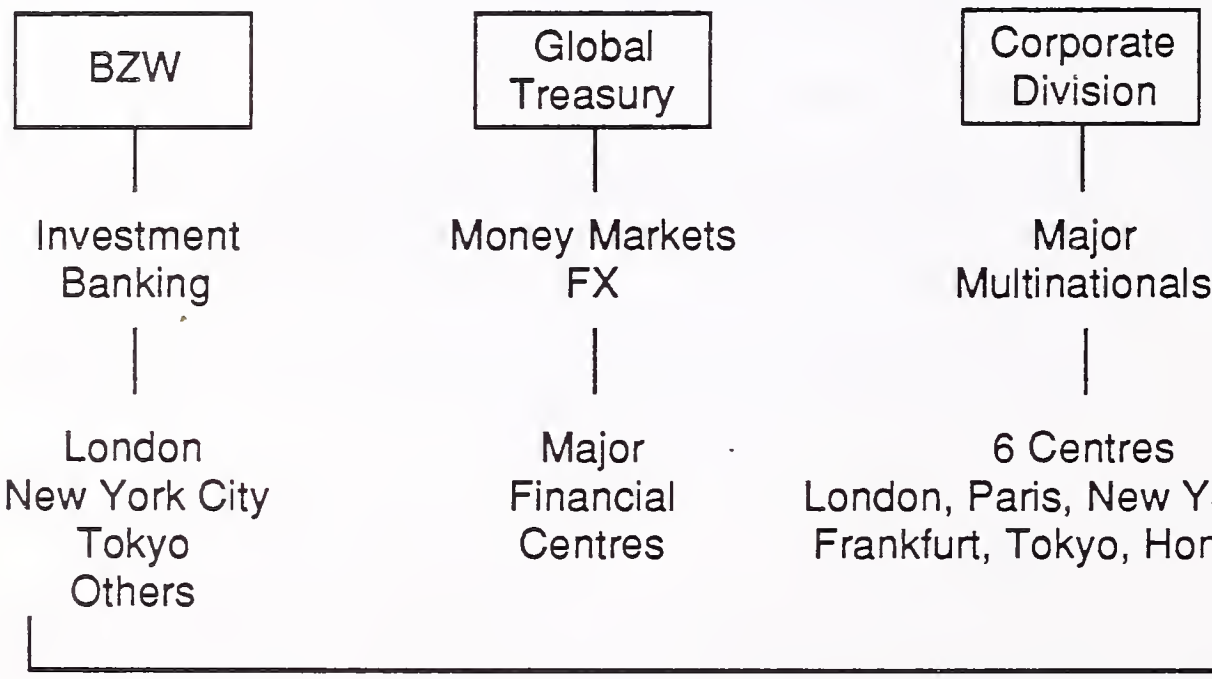
Whilst its major UK competitor, the National Westminster Bank has budgeted to spend £1bn over five years, Barclays spent just over £500m in 1989 and budgeted another £550m in 1990. These levels mean that Barclays is one of the UK's largest corporate spenders on IT. Its IT investment was only £186m less than last year's profits.

2. Organisation

Whether its competitors with smallest IT budgets can match its progress is debatable. Already Barclays' costs are lower than those of its competitors. Overheads accounted for 63% of revenue in the second half of last year as against 65% for Lloyds, 67% for NatWest and 75% for Midland. However, with Barclays' cost advantage not as large as shareholders hoped, given its extra investment in IT, there will be a question mark over the wisdom of its strategy. The bank's IT division is run on a market segment basis with the objective being to build a global business by tracking the client. Exhibit VI-3 shows the organisation's lines of business and main locations.

EXHIBIT VI-3

Barclays Organisation



Barclays splits its organisation into local operations, with the UK being the largest. Barclays also professes to have the highest number of overseas branches, at 1700. Barclays' Corporate Information Services Division (CISD) has 3000 staff with 50% in the UK; 900 of which are operational staff.

3. DP Systems and Applications

Barclays' major international platform is DECNet. Its large systems are IBM 3090s, with about six in each processing centre. Barclays is the single largest IMS mainframe user in the world, as well as being a large user of Tandem. Barclays effectively brought Tandem out of the U.S. by installing the first fault tolerant computer for dealers. Tandem is, of course, also now used for CHAPS. IBM is the bank's preferred domestic processing supplier to its domestic market retail division.

Barclays' global office automation strategy covering management information and global applications (i.e., for access from any branch in the world) is based in the DEC VAX All-In-One product. The concept is of having a large database on corporate customers held centrally but perhaps later looking to moving it to a decentralised set of platforms based also on DEC VAX. The bank has currently 480 DEC VAX nodes. These huge clusters incorporate possibly in excess of 1,000 Mips.

Barclays is looking to produce a site profile database, as the use of DECNet grows, in order to encourage end-user system development. Site profiles will help with configuration sizing and permit tracking of what is happening on nodes. Predictably, a great deal of enhancement is taking place without central control. The bank finds that monitoring software version levels is a problem, made especially difficult by the nature of global operations and the complexity of the DECNet environment.

4. IS Budget

Barclays' IS budget amount of around £625 million can be apportioned as follows

• Hardware and turnkey systems	£280-300m
• Software and networking	£305-320m
• X.25 U.K. network	£8m
• Worldwide network	£4.6m
• Reuters	£10m

Barclays is the biggest user of SWIFT which its end-users access via a local concentrator and, therefore, SWIFT traffic is kept clear of the in-house network.

Since another network currently handles all intra-bank transfers, and because of the low cost of 22BF per Swift message, Barclays is looking to put more traffic over SWIFT and reduce the number of its internal

subscribers to SWIFT. Chase Bank has shown that it is technically possible to use one address only.

5. New Projects

First phase of a branch automation project has just been completed by ACT Financial at Barclays Strand branch in London. The system is now being evaluated by the bank with a view to its possible application in other branches. The Branch Internal Data System (BIDS) is based on an ACT UNIX minicomputer linked to 56 PCs and running Informix database products. It replaces previous standalone PCs. The second phase of the project will cover:

- The bank's securities.
- Open/close accounts.
- A link to the mainframe system.

Barclays is looking for productivity returns of around five percent on its IS investments as well as intangible benefits such as improved control, new products and added value particularly on the marketing side. Marketing fought for two years to get the go-ahead for a large development and was finally granted its wish at the end of 1989. Part of the aim is to cut secretarial jobs but Barclays feel that the main advantage will be a marketing one, allowing the bank to respond more quickly to meet customer requirements and to take advantage of marketing opportunities. Barclays feels it could become a very powerful vehicle for product cross-selling. The system is based on customer names so that when a customer comes into a branch for one service the system can be accessed and will, for example, automatically flag if that customer does not have a Barclaycard.

Barclays has a number of ongoing projects under development:

- The bank has developed its own cash management services.
- Offers part of the GEIS offering to certain customers.
- It is working on EDI projects with Lucas and one of its suppliers.

For global trading systems the bank has 12 centres, developing a common platform for dealers and is using X-Windows with single dealer workstation screens accessing both video and digital feeds. Barclays is reputed to have the largest dealing room in the world.

6. The Network

The bank has five major switching nodes (Hong Kong, France, UK, US and Australia) and 14 minor nodes elsewhere. Predictably, the bank's stockbroker company, BZW is the largest user, feeding off all the networks but commercially working at arms length and in its applications. The network has a mesh structure, 56/64 kilobit links connecting X.25 packet-switch nodes from BBN (Bolt, Beranek and Newman). The smaller nodes have offices directly connected at 9.6 kbps where they don't warrant the 56 kbps links (by reason of volume of traffic, cost, etc.) i.e., in Madrid, Paris etc.

The bank runs a Global Customer Information System covering customer data and the portfolio at risk. It is structured vertically by customer industry sector. It is now seeking a digital dial-up, local access system for back-up in case of switch/circuit failure. The digital access is via 9.6 kbps modems. Links will be installed between fast circuits (56/64 kbs) and slow circuits (9.6 kbps).

Barclays' international network has been operational since 1987, linking London, Paris, New York, the Far East, Asia and Canada. As costs comes down and capacity improves, the network will move out to the branch level. Currently the bulk of traffic is electronic mail, management information and business applications (there is some use of GEIS for telex retry in Hong Kong and the U.S.). The next stages are:

- The integration of voice and data.

- The development of an international voice private network.

Currently the bulk of traffic is data orientated with the bank charging the divisions for network use; however, there has been an increase in speech and video requirements with the setting up of 11 video studios in the U.K. Barclays is looking for compatibility between U.S. and U.K. video-conferencing standards.

High-speed switches operating at 8 Mbps will further reduce application delay. Voice, video and data combined will need a new architecture:

- Circuit switching will be used for high bandwidth usage,

- Packet switching will be retained for data running under DECNet over traditional circuits. The bank feels that ISDN in its current format cannot be used by banks either for domestic or national networks via - X.75 gateways.

Barclays has links for operational use to Transpac, Telenet and Tymnet, and uses X.400 in Europe but not in the US (although it is under consideration there). The bank has transactional, terminal emulation applications on DECNet, distributed across a series of DEC VAX platforms. This network has acclaimed 100% availability through the extreme reliability of the DEC nodes. Service level agreements can now be addressed on a global basis.

Currently, Barclays is carrying out a study with Digital on network management and is evaluating a system based on BBN Viewnet and which could be incorporated into the existing network management capability and be compatible with the current circuit switching technology. The bank is evaluating the impact of open systems and is keen for suppliers to support Network OSI; but does not believe that IBM's NetView has the solution. On the topic of security management, the bank is now trying to sort out the unhealthy situation caused by the free-for-all that was allowed in local DECNet systems. It is making a concerted effort to tighten up on systems security:

- Developing captive account menus for system administration and encryption for central security,

- Challenge and response is already in place,

- The bank is also considering selective encryption, so that a user can decide what security level to have at session or transaction level.

7. Overall Strategy

Barclays has made a significant commitment to systems and network technology in establishing an IT board with ten senior executives. This move has been taken because the large outlays on computer systems have failed to bring costs down proportionally.

There is a wide gap in understanding between staff in the front and back offices, and between the business developers and the operational businesses. The strategy has enormous significance for jobs. After noting the big redundancy programmes at other large corporate IT spenders e.g., British Telecom and British Petroleum, Barclays is looking at ways to reduce middle management in order to gain cost benefits from IT investment.

For Barclays, the network objectives are:

- Intra-corporate connectivity.

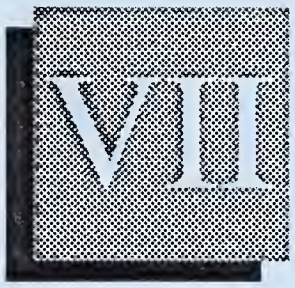
- Accessibility.

- Speed of communication.

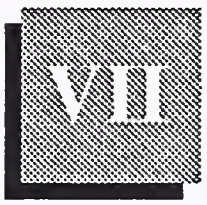
- A delivery mechanism for global systems.

The bank believes that application products will lead to new markets, new products and a competitive edge. It intends offering EDI and value added services in the near future because it is concerned that the network services providers want to keep the connectivity of their client base to themselves.

Barclays has developed a joint business and a technical approach with stress on the partnership between the two. This approach is viewed as an enabler in allowing the bank to become a global financial services provider. The success of the network will be measured by what percentage of costs the bank obtains back in revenue; the network is seen as enabling product and services to be both marketed and used.



Future Directions



Future Directions

A Introduction

The dual challenge facing international banks in the 1990s can be summarised as follows:

- Develop specific network-based services in order to maintain competitive edge.
- Keep pace with and exploit the rapid changes in the banking and finance environment.

This challenge is being met in different ways by banks in different geographic markets.

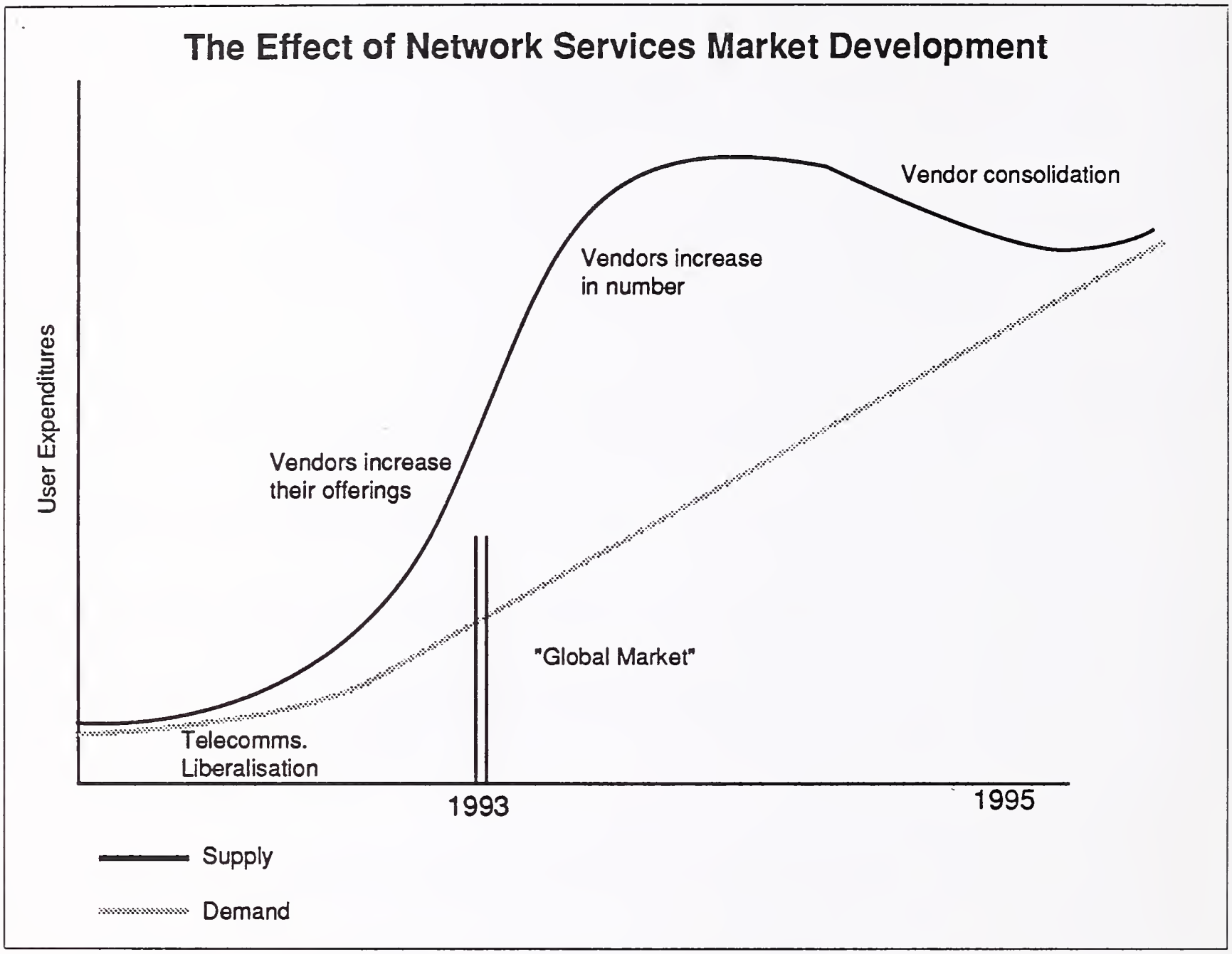
The objectives of this final chapter are:

- To summarise the differences as well as the points of commonality between the banks.
- To highlight strategic objectives which financial services companies need to evaluate.
- To identify the service opportunities that arise from this study.

B Market Development

In the banking and finance market of the 1990s, international banks must recognize the volatility of the market; this volatility will impact their choice of supplier. Exhibit VII-1 illustrates how an oversupply of products and services can all too easily occur as expectations lead to continuing expansion of supply when demand for their products and services has levelled off. For example, one of the central concerns of US banks is the viability of network services vendors which indicates that the period of consolidation forecast in Europe over the next five years has already to some extent occurred in the U.S.

EXHIBIT VII-1



The two questions that any bank with a developed network infrastructure has continually to ask itself are:

- Whether there is sufficient demand internally to justify the network.
- Whether there are opportunities to expand into the external services market.

The key differentiator for banks is the quality of their services to their customers. Some are developing their own international networks and are looking for supporting vendors with strong integration skills that will enable them to achieve improved levels of customer service quality.

International banks embarking on a network-based strategy recognise that the market has its risks as well as its opportunities. Dependent on the advances made in network technology and the incidence of corporate requirements, there are significant country differences between corporate requirements.

Vendors such as GEIS, SWIFT and Reuters are already strong in the international financial markets and are looking to expand. Others such as BT Tymnet and Infonet are looking to enter it. There is the possibility of an oversupply developing in certain sub-sectors, for example in the increasingly ubiquitous area of cash management services.

For the banks the scenario is one of undersupply. As financial markets become more international, cash management services are a must. This capability to provide services that are rapidly being considered as essential is the differentiator for the banks. If there is an oversupply, some banks will inevitably lose market share. It is significant that European banks (such as Societe Generale) are looking increasingly to use the X.25 networks of the international service suppliers (such as GEIS and Infonet).

C

International Financial Networks: Technical Characteristics

In the U.S., the advance of network technology has led to banks looking to develop sophisticated networks using multiplexing, T1 etc. The prevailing strategy is to exploit the technology wherever possible. For US banks, technical issues are secondary; the concern is to develop increasingly sophisticated financial services which use a combination of data and voice supported by a combination of technologies.

In Europe, with the exception of Barclays in the UK and Banque Nationale de Paris in France, the global ambitions of banks are, by necessity, more modest. The existence of X.25 networks has been viewed as a ready-made international protocol. The requirements for voice transmission, however, has led Paribas to develop a sophisticated private voice/data network which is more economical than either third-party or public networks.

Exhibit VII-2 gives an assessment of the three types of networks used by the banks and their ratings in terms of cost and of other key factors. As can be seen, the third-party network sits comfortably between the private and public networks in terms of service and costs. It is anticipated that banks will increasingly follow the U.S. lead in using the combination of a private and a third-party network, with a view to developing enhanced voice/data capabilities.

EXHIBIT VII-2

Comparison Between Public, Private and Third-Party Data Networks Key Factors

Factor	Private	Third Party	Public
Traffic charges	1	3	5
Operating costs	4	2	1
Capital investment required	4	3	1
Quality of service provided	4	4 or 3	2
Flexibility provided to the user	4	3	1
Level of customisation available	5	3	2
Degree of control in user hands	5	2 or 3	1
Importance of operational/ Management issues	5	2 or 3	1

Scale of factor rating is 1 to 5,

Where: 1 = Very low
5 = Very high

D

Network Contribution to Bank Strategy

The US leads the rest of the world in terms of network development and systems integration projects. This can be readily understood when the substantial investments made in the network are analysed. Billion dollar budgets are common and the overall IT spend is in the region of three times the size of that of all European banks put together.

The situation in Europe is significantly different from that of the US since the level of investment in the network is so much less. Most European banks have been focusing on the development of their domestic networks and on the need for effective and secure data transfer between remote sites. There is less focus currently on the potential service opportunities, (there are, of course, the various regulatory difficulties), and more on the issues of implementation.

In France, Credit Lyonnais is developing an international network and recognises its importance as a strategic tool for building products and services. However, the immediate objective for the bank is to interconnect Credit Lyonnais agencies outside France in order to bring together all the elements of their operation. Banque Paribas' approach has been

to develop a private voice/data network, successfully cost-justifying the implementation because of the bank's strong presence in global trading. The bank requires flexibility and intends using the international network for global operations. However, it is looking to a third-party service provider to provide it with additional coverage and, significantly, to manage the network software.

The diversity of Societe Generale's activities has resulted in the bank opting totally for a service solution, using an X.25 network with ISDN back-up for its domestic traffic and outsourcing to GEIS/Infonet for international coverage. The bank is looking for service solutions from suppliers in order to gain the network coverage that will help it build products and services. This is likely to become an increasingly common strategy as banks look to concentrate on core services.

In Germany, neither Deutsche Bank nor Dresdner Bank has an international network. Deutsche outsources to GEIS internationally, although a plan to develop an international network is under consideration. Dresdner is developing an international network (DRENET) on the back of its strength in electronic banking products. It is possible that an outsourcing contract will be offered to a service provider.

Barclays in the UK and BNP in France are the European banks closest to what might be called the "U.S. model":

- Barclays has developed an international network with five major nodes in the five large financial centres with a further 14 nodes around the world,

- BNP has one with five primary nodes and 40 secondary nodes and 25 nodes overseas.

Barclays believes that its position as a European bank with an extensive global network will give it a competitive edge in providing banking services. BNP has been developing its network for four years. National Westminster, by contrast, has rejected the option to develop its own international network, after having considered the move two years ago. It is instead concentrating on its domestic network and its services in the U.K., and eventually expanding into Europe.

E

Vendor Opportunities

1. International Networking

French banks have generally considered that a global applications service, providing network software and a high service visibility, was critical to their successful operation. These banks view the limiting factors as:

- Internal organisation.
- Branch autonomy.
- Cost of links.
- Requirements for higher speeds.
- Costs.
- Organisational issues.

In Germany there is also the recognition of:

- The need to provide global services.
- The need for specialist quality of service provision to ensure delivery of the correct level of quality of service.

The limiting factors in Germany were considered to be network planning and investment levels.

Among U.K. banks:

- Barclays is following the US approach in meshing together the business and technical aspects of network services development.
- National Westminster is backing an integrated future for voice and data, aware that the lack of an international network may cost them market share.

With the banks' increasing emphasis on international services, network services vendors will need a comprehensive portfolio of services products in order to win the substantial contracts which will undoubtedly materialise in the future.

2. Environmental Developments

Restructuring following deregulation will create opportunities for vendors assisting financial institutions to manage in the short term the effects of restructuring. As soon as the restructuring of a specific financial institution, or local financial markets has been completed, these tactical opportunities will disappear. In planning which products and services to target in the 1990s, banks and vendors must differentiate between short term restructuring demand and the genuine strategic demands for continuing 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 of demand must be recouped quickly, so that profits can be made before this short term market comes to an end. Banks should also look to see if they cannot transfer their expertise between local, and national banking and finance markets, as they start up and complete their development cycles at different times. To ensure that any profits made from these short term restructuring markets are retained, banks and vendors must have contingency plans to reallocate resources into other product and service activities when these markets level off.

3. Competitive Environment

Although there are many opportunities in the financial sector, there is growing competition between new and old vendors for market share in the financial network services market. It has become a target for the major independent US and European services and equipment vendors all of whom are looking for pan-European market sectors to develop.

With many of the more successful smaller banks being taken over by larger ones to establish local market presence, many services vendors have followed a parallel path. For example:

- Sema has acquired interests in a number of companies in the banking and finance sector around Europe.
- Andersen Consulting is moving to selling software products in this sector alongside its traditional professional services and systems integration skills.

However, it will be those companies with specific networking skills such as GEIS, Infonet, IBM and Bull which will prove an invaluable asset to the larger banks as they look to integrate systems into their overseas networks.

4. New Services

The differentiator is likely to be services offered to the corporate sector. For this reason, this report has concentrated to some degree on the evolution of corporate services. Whilst ATM networks, EFTPoS projects and cash management services continue to grow, EDI is offering banks with strong networking capabilities an opportunity to "lock in" key corporate customers. However, with the control of this market sector likely to stay in the control of a limited number of key vendors with already developed EDI networks, it is probable that the importance of the small number of these leader companies will increase over the next few years through acquisition and joint ventures. In the network services hierarchy, banks now require services pitched at the upper echelons of the OSI levels and vendors should be concentrating on such services.

5. Risks

As the banking and finance sector evolves into a deregulated era after 1993, short term over-capacity in the network, or in financial services markets themselves could appear and extend throughout Europe. Radical restructuring of large markets never happens smoothly, and banks are having to evaluate the technological and the commercial ramifications of a network-based strategy:

- Is maintenance of a domestic and overseas network in the face of the growing capabilities of the international network services vendors such as GEIS and SWIFT really justified?

F

Requirements for the 1990s

Most of the banks interviewed in this research study cited costly development problems in the past through failing to control and deliver key developments on time. Vendors who can point to and guarantee successful delivery times will be able to exploit this positively in marketing their services in the 1990s.

"Flexible solutions" are a major requirement for the banks in the 1990s. Banks do not necessarily know whether they will be involved in mergers and acquisitions, nor whether they could be forced to expand into new products and services through competitive pressures. They must, therefore, develop flexibility during this period of high uncertainty.

As financial institutions become larger and more concentrated in the 1990s, professional services from third party vendors such as GEIS and Infonet are becoming more targeted and will compete with those of software products companies, delivered to in-house teams. Banks still want to manage and develop as much as possible in-house. However, they will need specific external advice and skills. Many vendors are clearly identifying such areas and are looking to sell niche, rather than generalised, services.

As banking systems become more complex through wider geographic coverage, through the increased number of products and services, through the incidence of mergers and acquisitions, vendors will be able to sell integration skills. In many cases these will not be total project integration services. Banks, such as Societe Generale, for instance, are increasingly looking to external vendors who can support them in all, not just a limited number of, countries that they are operating in. This means that the concentration of control over the financial sector will tend to move to those vendors who have the best global coverage. It is U.S. vendors like GEIS and IBM who have currently the best international coverage. For the European vendors to compete strongly in the financial sector in the 1990s, they must improve their international coverage. Only Infonet has taken positive steps to acquire the necessary local bases

from which to offer a truly pan-European service. The lack of a truly global presence means that companies such as BT-Tymnet, Telenet and SWIFT will be less well-positioned to offer banks total solutions.

G

Recommendations

Vendors should define their competitive strategy very clearly, especially following the comments that have been made in the previous section on the likelihood of major banks looking to acquire successful smaller banks as a way to establish local presence. The quality of service will be the key differentiator.

Banks should only develop network services in a carefully planned manner. All too frequently such developments are not the expected success that they were intended to be and this can obviously lead to a reduction in profitability and severe commercial problems. At the same time, the banks should clearly define their requirements for products and services. The services vendors should decide which products they will concentrate on marketing and on what the scope of these products will be.

To complete the loop in the financial network services market, EDI is key. Whilst the development of EDI in banking is being hampered by the time that it is taking to get agreed EDIFACT standards for key banking documents, there is no question that EDI is a dynamic opportunity. There is a clear need for the banks to offer a comprehensive service to major users who are looking to improve their productivity ratios via the medium of EDI. Many banks are carrying out EDI pilot trials so it can be expected that over the next two years this market will grow considerably after years of disappointing results. Security will become a key issue once standards have been finalised.

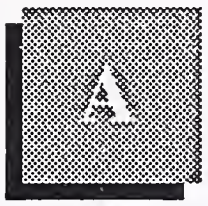
Finally, the message for vendors is clear:

- They must ensure that they have good banking and finance skills from each local market that they are targeting in the 1990s.

These can often only be obtained by recruiting personnel from banking and securities firms.

Equally, vendors should ensure that they have the right integration and networking skills to complement their range of products and services, and the necessary geographic coverage. The opportunities for network and systems integration will increase dramatically over the forecast period as banks look to offer both corporate and private customers increasingly sophisticated services.

Appendixes



Definition of Terms

A

Overall Definitions and Analytical Framework

Information Services - Computer/telecommunications-related products and services that are oriented toward the development or use of information systems. Information services typically involve one or more of the following:

- Processing of specific applications using vendor-provided systems (called **Processing Services**)
- A combination of hardware, packaged software and associated support services which will meet a specific application processing need (called **Turnkey Systems**)
- Packaged software (called **Software Products**)
- People services that support users in developing and operating their own information systems (called **Professional Services**)
- Bundled combinations of products and services where the vendor assumes responsibility for the development of a custom solution to an information system problem (called **Systems Integration**)
- Services that provide operation and management of all or a significant part of a user's information systems functions under a long-term contract (called **Systems Operations**)
- Services associated with the delivery of information in electronic form—typically network-oriented services such as value-added networks, electronic mail and document interchange, on-line data bases, on-line news and data feeds, videotex, etc. (called **Network Services**)

In general, the market for information services does not involve providing equipment to users. The exception is where the equipment is bundled as part of an overall service offering such as a turnkey system, a systems

operations contract, or a systems integration project.

The information services market also excludes pure data transport services (i.e., data or voice communications circuits). However, where information transport is associated with a network-based service (e.g., EDI or VAN services), or cannot be feasibly separated from other bundled services (e.g., some systems operations contracts), the transport costs are included as part of the services market.

The analytical framework of the **Information Services Industry** consists of the following interacting factors: overall and industry-specific business environment (trends, events and issues); technology environment; user information system requirements; size and structure of information services markets; vendors and their products, services and revenues; distribution channels, and competitive issues.

All **Information Services Market** forecasts are estimates of **User Expenditures** for information services. When questions arise about the proper place to count these expenditures, INPUT addresses them from the user's viewpoint: expenditures are categorized according to what users perceive they are buying.

By focusing on user expenditures, INPUT avoids two problems which are related to the distribution channels for various categories of services:

- Double counting, which can occur by estimating total vendor revenues when there is significant reselling within the industry (e.g., software sales to turnkey vendors for repackaging and resale to end users)

- Missed counting, which can occur when sales to end users go through indirect channels such as mail order retailers

Market Sectors or markets, are groupings or categories of the users who purchase information services. There are three types of user markets:

- *Vertical Industry* markets, such as Banking, Transportation, Utilities, etc.

- *Functional Application* markets, such as Human Resources, Accounting, etc. These are also called "Cross-Industry" markets.

- *Generic* markets, which are neither industry- nor application-specific, such as the market for systems software.

Specific market sectors used by INPUT are defined in Section D, below.

Captive Information Services User Expenditures are expenditures for

products and services provided by a vendor that is part of the same parent corporation as the user. These expenditures are not included in INPUT forecasts.

Non-captive Information Services User Expenditures are expenditures that go to vendors which have a different parent corporation than the user. It is these expenditures which constitute the information services market.

Delivery Modes are defined as specific products and services that satisfy a given user need. While *Market Sectors* specify *who* the buyer is, *Delivery Modes* specify *what* the user is buying.

Of the eight delivery modes defined by INPUT, five are considered primary products or services:

- *Processing Services*
- *Network Services*
- *Professional Services*
- *Applications Software Products*
- *Systems Software Products*

The remaining three delivery modes represent combinations of these products and services, bundled together with equipment, management and/or other services:

- *Turnkey Systems*
- *Systems Operations*
- *Systems Integration*

Section B describes the network services delivery mode and its structure in more detail.

Outsourcing is defined as the contracting of information systems (IS) functions to outside vendors. Outsourcing should be viewed as the opposite of *insourcing*: anything that IS management has considered feasible to do internally (e.g., data centre operations, applications development and maintenance, network management, training, etc.) is a potential candidate for outsourcing.

IS has always bought systems software, as it is unfeasible for companies to develop it internally. However, all other delivery modes represent functions or products that IS management could choose to perform or develop in-house. Viewed this way, outsourcing is the result of a make-or-buy decision, and the outsourcing market covers any product or service where the vendor must compete against the client firm's own internal resources.

B

Network Services

Network services typically include a wide variety of network-based functions and operations. Their common thread is that most of these functions could not be performed without network involvement. Network services is divided into two major segments: *Electronic Information Services,* which involve selling information to the user, and *Network Applications,* which involve providing some form of enhanced transport service in support of a user's information processing needs.

• *Electronic Information Services*

Electronic information services are data bases that provide specific information via terminal- or computer-based inquiry, including items such as stock prices, legal precedents, economic indicators, periodical literature, medical diagnosis, airline schedules, automobile valuations, etc. The terminals used may be computers themselves, such as communications servers or personal computers. Users typically inquire into and extract information from the data bases. Although users may load extracted data into their own computer systems, the electronic information vendor provides no data processing or manipulation capability and the users cannot update the vendor's data bases.

The two kinds of electronic information services are:

- *On-line Data Bases* - Structured, primarily numerical data on economic and demographic trends, financial instruments, companies, products, materials, etc.

- *News Services* - Unstructured, primarily textual information on people, companies, events, etc.

While electronic information services have traditionally been delivered via networks, there is a growing trend toward the use of CD ROM optical disks to support or supplant on-line services, and these optical disk-based systems are included in the definition of this delivery mode.

• *Network Applications*

- *Value-Added Network Services (VAN Services)* - VAN services are enhanced transport services which involve adding such functions as automatic error detection and correction, protocol conversion, and store-and-forward message switching to the provision of basic network circuits.

While VAN services were originally provided only by specialized VAN carriers (Tymnet, Telenet, etc.), today these services are also offered by traditional common carriers (AT&T, Sprint, etc.). Meanwhile, the VAN carriers have also branched into the traditional common carriers' markets and are offering unenhanced basic network circuits as well.

INPUT's market definition covers VAN services only, but includes the VAN revenues of all types of carriers.

- *Electronic Data Interchange (EDI)* - Application-to-application exchange of standardized business documents between trade partners or facilitators. This exchange is commonly performed using VAN services. Specialized translation software is typically employed to convert data from organizations' internal file formats to EDI interchange standards; this software may be provided as part of the VAN service, or may be resident on the organization's own computers.

- *Electronic Information Exchange (EIE)* - Also known as Electronic Mail (E-Mail), EIE involves the transmission of messages across an electronic network managed by a services vendor, including facsimile transmission (FAX), voice mail, voice messaging, and access to Telex, TWX, and other messaging services. This also includes bulletin board services.

- *Other Network Services* - This segment contains videotex and pure network management services. Videotex is actually more a delivery mode than an application. Its prime focus is on the individual as a consumer or in business. These services provide interactive access to data bases and offer the inquirer the capability to send as well as receive information for such purposes as home shopping, home banking, travel reservations, and more.

Network management services included here must involve the vendor's network and network management systems as well as people. People-only services, or services that involve the management of networks as part of the broader task of managing a user's information processing functions are included in Systems Operations.

B

Forecasting Assumptions and Exchange Rates

The market forecasts provided in this report cover the period 1990-1995 and include assessments for the base year of 1989. The forecasts have been formulated in local currency and converted into US dollars for aggregation and comparative purposes. The US dollar exchange rates used are listed in Exhibit B-1.

EXHIBIT B-1

US Dollar Average Exchange Rates and Inflation Assumptions

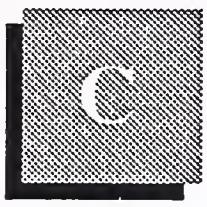
Country	Currency	U.S. Dollar Exchange Rate	Inflation Assumptions
Austria	Sch	12.77	3.0
Belgium	BF	38.06	3.2
Denmark	DK	7.05	4.5
Finland	FM	4.21	6.5
Italy	Lira	1,336.0	5.8
Netherlands	Dfl	2.05	1.8
Norway	NK	6.85	4.5
Spain	Pta	115.8	6.6
Sweden	Sek	6.39	8.0
Switzerland	SF	1.61	4.5
United Kingdom	£	0.631	7.0
Germany	DM	1.81	3.3

The forecasts have been expressed in actual monetary terms and they therefore include an allowance for inflation. The general inflation assumptions made by INPUT in formulating these forecasts are listed in Exhibit B-2. This exhibit also shows the assessment of the systems operations market for comparative purposes.

EXHIBIT B-2

Inflation Assumptions

Country	Assumption 1989-1994	Assumption 1990-1995	Change
France	4.0	4.5	+0.5
Germany	2.5	4.0	+1.5
United Kingdom	5.5	7.0	+1.5
Italy	6.0	7.0	+1.0
Sweden	6.0	7.0	+1.0
Denmark	6.0	5.0	-1.0
Norway	4.0	5.0	+1.0
Finland	6.0	6.0	0.0
Netherlands	2.0	3.0	+1.0
Belgium	3.5	4.0	+0.5
Switzerland	2.5	5.0	+2.5
Austria	3.0	4.0	+1.0
Spain	5.5	6.5	+1.0
Rest of Europe	8.0	10.0	+2.0
European Average	4.5	5.5	+1.0



Vendor Questionnaire

Background Information

1. Types of banking and finance organisations served (circle as appropriate)

Prime/Secondary Activity

a) Commercial Banks

Retail Bank _____

Building Society _____

Merchant Bank _____

International Bank _____

b) Brokers

Finance House _____

Securities Broker _____

c) Other

Card Company _____

Credit Database _____

Some Other _____

please describe _____

c) Cont.

Could you also indicate the size of your organisation

Total annual turnover _____

Proportion from banking and finance _____

Current growth rate _____

Expected future growth rate _____ % per annum

Main West European market _____

Other West European markets _____

% breakdown of West European revenues by country markets _____

2. What are your principal products/services for the banking finance market?

1. _____

2. _____

3. _____

Comments

_____

_____

_____

3. 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 to 5 (1 being low, 5 high) the importance of the following for you:

a) The 1992 initiative of the European Commission in gradually developing a single European Market during the 1990s

1 2 3 4 5

Comments

b) Open international standards (e.g. OSI, UNIX, EDIFACT)

1 2 3 4 5

Comments

c) Staff/skills shortages

1 2 3 4 5

Comments

d) Providing links between front and back office systems

1 2 3 4 5

Comments

e) Improving the ability of your clients to access your products/services via more sophisticated terminals

1 2 3 4 5

Comments

_____

_____

_____

4. Could you please rank between 1 to 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:

a)	Minimise the use of third party networks	1	2	3	4	5
b)	Maximise the use of CASE tools	1	2	3	4	5
c)	Maximise the use of software products, rather than develop bespoke software specifically for your organisation	1	2	3	4	5
d)	Maximise the use of UNIX	1	2	3	4	5
e)	Obtaining and keeping skilled staff	1	2	3	4	5
f)	Being able to meet development deadlines	1	2	3	4	5
g)	Other factors	1	2	3	4	5

Comments

_____

_____

_____

5. Security is also a key issue for any financial institution and is a factor that is constantly putting pressure on increasing the complexity of systems and hence on costs. Do you have any views on this?

Comments

_____

_____

_____

Note: Comments on SWIFT, Stock Exchange Information Services (TOPIC in London), Equity and Bonds Networks (TAURUS in London)

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

a)	EDI	1	2	3	4	5
b)	Other network services (EFT, EIS)	1	2	3	4	5
c)	More sophisticated end-user terminals	1	2	3	4	5
d)	Others	1	2	3	4	5

Comments

_____

_____

_____

7. Could you provide a brief description of network services in your own words?

_____

_____

_____

8. Have you identified network services as a strategic product offering?

YES ___ NO ___

9. On a scale of 1-5, how important are network services to your business?

Rating ___ (please indicate reason) _____

_____

10. On a scale of 1-5, how important will network services be to your business five years from now?

Rating ___ (please indicate reason) _____

_____

11. In your opinion, do your clients consider network services (network use, network software, professional services) to be a single service?

12. Please give the three most important capabilities that a vendor should have to successfully offer network services.

13. Please provide an estimate of the amount of revenue you received from network services over the past year. (Please include any revenues received from carrier-provided services).

    (If revenues are not available, get an example of the percent of total revenues)

14. Please provide an estimate of the average annual percentage increase you expect from providing network services over the next five years.

15. What, in your opinion, will be the three most important factors affecting the network services market over the next 5 years? What effect will they have on your business?

(If Question 7 is zero, skip next question)

16. Considering the revenues discussed, what percentage will result from network integration projects?

17. Please indicate the industry sectors you believe offer the greatest potential for:

Network Services (Top 3)

Network Integration (Top 3)

18. What are your principal products/services for the banking and finance market?

19. Please rank the importance to your company of the following factors:

Open international standards (rating for each)

UNIX _____
OSI _____
EDIFACT _____
X.400 _____

20. Do you feel that the banking and finance sector will increase or decrease its use of the following:

External vendors for Processing Services	Increase _____	Decrease _____
External vendors for Disaster Recovery	Increase _____	Decrease _____
External vendors for FM	Increase _____	Decrease _____
External vendors for third party networks	Increase _____	Decrease _____

21. Do you have any comments on the security issue given the complexity of systems?

22. How do you rank (1-5) the importance of the following with regard to the future development of your services?

X.400	1	2	3	4	5
X.500	1	2	3	4	5
X.435	1	2	3	4	5

23. Which do you see as being the leading network services vendors in the banking and finance sectors?

Thank you

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: ***Financial Network Services—Western Europe, 1990-1995***
(NEFNO)

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

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: _____

_____

_____
Name Title

_____
Department

_____
Company

_____
Address

_____
Country

_____ _____
Telephone Date completed

Thank you for your time and cooperation.

UK/M&S 633/01 12/89

INPUT

FOLD HERE

Please Post to:

Attention: Marketing Department

INPUT

Piccadilly House

33/37 Regent Street

London SW1Y 4NF

FOLD HERE