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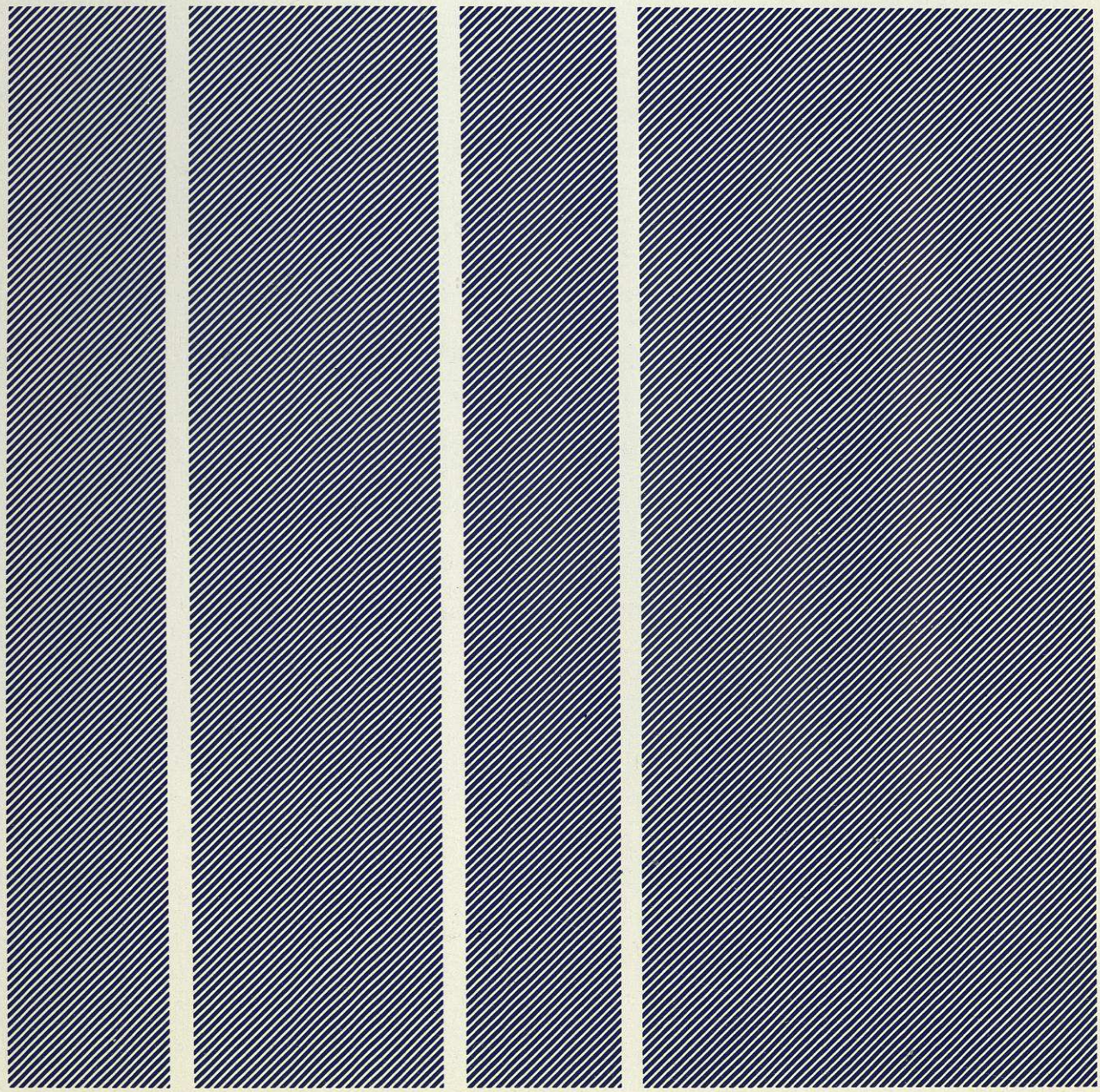
Value Added Network Services

August 1984



The Butler Cox Foundation

THE BUTLER COX FOUNDATION

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VALUE ADDED NETWORK SERVICES

ISSUED AUGUST 1984

Abstract and readership

This report predicts that, by the end of the decade, value added network (VAN) services will have become widespread throughout most of the OECD countries. These services will be adopted because businesses will be able to use them to respond to, and to exploit, the rapidly changing business environment. VAN services can be used by organisations to assist them to decentralise, to externalise their costs, and to become distance-independent. VAN services also enable businesses to co-operate electronically with their trading partners and, when it suits them, with their competitors. These services certainly enable businesses to achieve economies of scale, and sometimes economies of scope as well, by sharing expensive resources and valuable business information.

The report is intended primarily for those responsible for defining an organisation's networking strategy. However, the report emphasises that the decision to use a VAN service as a means of inter-business co-operation should be business led, not technology led — typically by the relevant commercial or marketing director.

The report also provides guidelines for user organisations who may wish to market an in-house network-based system as a VAN service.

Research method

The report was researched and written by:

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The specific research for this report was carried out during the first half of 1984, but it drew also on related studies and assignments conducted by Butler Cox during the previous two years. Following a thorough search of the relevant trade and technical publications, discussions were then held with government departments, PTTs, other network operators, VAN service providers, and VAN service users. Altogether, we spoke with some 35 organisations, both in face-to-face interviews and by telephone. During this phase of the research we obtained input from North America, Belgium, France, Italy, the Netherlands, West Germany, Sweden and the United Kingdom.

Some of the experiences related to us appear in the report as case histories. We would like to acknowledge with gratitude, the time and effort given by these organisations. We would also like to thank all the other organisations whose views and experiences have provided an invaluable input to this report.

THE BUTLER COX FOUNDATION

REPORT SERIES NO. 42

VALUE ADDED NETWORK SERVICES

CONTENTS

VALUE ADDED NETWORK SERVICES

REPORT SYNOPSIS

The title 'value added network (VAN) services' is used to describe network-based services that in some way add value to the messages being transferred. The title is new, but it includes services that have been available for many years. The familiar online database retrieval services are an old-style example. The SWIFT international interbank network is another. The protocol conversions needed to enable Company X's terminals to speak to Company Y's computers are another important class of VAN service. So are the services that interlink the airlines' reservations systems, and those that allow travel agents to access the airlines' systems.

More significant, though, are the newer VAN services, such as electronic messaging and interactive, transaction-oriented videotex systems.

Though the introduction of VAN services is often associated with moves towards deregulation and liberalisation in national telecommunications policy, it is wrong to believe that such services are invariably, and only, a by-product of these political processes. Rather they are the natural outcome of forces such as the pull of market demand and the push of technology and supply. Thus, there is some confusion over what VAN services are, why they exist, how they should be approached and where their future potential lies. These are among the key questions which we address in this report.

We believe that VAN services have an important role to play in the networking and systems plans of Foundation member organisations. VAN services can be used in one or both of two ways: as an alternative technical solution to an in-house networking facility, where the resources (and hence the costs) of the VAN service are shared by the users; or as a means of sharing business information between trading partners (or even competitors).

The advantages of using a VAN service are:

—Users have access to an established network infrastructure.

—The costs of establishing a new network-based service are reduced.

—Charges are related to usage.

—Organisations obtain the benefits of being able to subcontract a complex function to a specialist organisation.

Chapter 5 provides guidelines for prospective users of VAN services. Where a VAN service is to be used as a means of sharing resources, the evaluation can be made on technical considerations alone. The issues to be considered are:

—Anticipate future demands to reduce the possibility of needing to subscribe to several services.

—For transnational access, select a service provider that offers its service in each of the required countries.

—Choose a service facility that can, if required at a later date, be purchased or licensed for use on in-house computers or networks.

There are two additional technical issues concerning the choice of VAN services which will be used for sharing information, both of which arise from the need to interlink the organisation's own systems and services with those provided by the VAN service:

—Evaluate the effect of any mis-match between the technical characteristics (line speed, bandwidth, etc.) of the VAN service and in-house systems.

—Anticipate the impact on the organisation's information systems strategy of linking its in-house systems to the outside world via a VAN service.

However, the decision to use an inter-company information-sharing VAN service must be business-led, not technology-led. Organisations use this type of service for one of two reasons: to allow a consortium of small and medium-sized companies to collaborate in order to strengthen their position against bigger competitors (real-estate agents, for example); or as a means of locking-in the organisation's trading partners. For example, a manufacturing company might use a VAN service to lock-in its retailing partners by providing valuable business information and interactive transaction-oriented applications systems through the service.

From the supply side there are positive forces in favour of VAN services from national telecommunications authorities, computer bureaux, American information-technology suppliers who are expanding in Europe, and owners of information who seek to exploit it commercially. For all these reasons, as discussed in Chapter 1, VAN services are set to grow.

The present base from which this growth will occur is described (in Chapter 3 of the report) through the experiences of seven individual organisations, three in the United States and four in Europe. These case histories describe a variety of services. Honeywell uses a resource-sharing VAN service as a general-purpose tool in combination with the company's private corporate network. SAGE DATA Inc. uses Compuserve's network to provide an electronic reporting and statistical information service for members of the US Society of the Plastics Industry. Amherst Associates uses Tymnet and Uninet for a resource-sharing service aimed at hospitals and other health-care organisations.

In Europe, Distriphar in Paris uses its Distritel videotex-based VAN service to improve communications and supply between the company's depot and its customers. The Article Number Association in London is involved in two trial VAN services, for the pharmaceuticals and retailing sectors respectively, using the Association's Tradacoms data-transfer standards and the Baric bureau's TradaNet network. QZ in Stockholm provides an electronic mailbox and computer conferencing service for research establishments. Datafreight is the name of a Prestel-based VAN service which the National Freight Consortium in London has sponsored to provide information on loads and return-journey space available to road transport companies.

Standards and regulations are of basic importance for both the providers and users of VAN services. Ironically, standards are not a prerequisite for VAN service development because VAN services themselves can help to overcome a lack of standards. But the lack of standards adds to cost and complexity, and so inhibits the growth of the new service. The report (Chapter 2) traces the slow moves that are taking place towards agreement on both low-level and high-level standards.

In Europe, the regulatory environment is dominated by the role of the national telecommunications authorities (the PTTs). At the present time the British Government is liberalising the traditional monopoly held by British Telecom in order to create a more competitive environment, and in other European countries the traditional monopolies are also being questioned. These European developments (see Chapter 2) follow the rapid evolution of a competitive marketplace for telecommunications services in the United States. The United Kingdom is the only European country at present to have an explicit procedure for licensing VAN services.

In developing transnational VAN services, problems of existing PTT regulations and of data protection add to the complexity and the time taken. But governments are under pressure to ease the introduction of new VAN services, including transnational ones.

This report is intended primarily for prospective users of VAN services, but Chapter 5 also includes guidelines for prospective VAN service providers — essentially aimed at users who are considering marketing their in-house systems externally in an appropriate business sector. The business sector may or not be suitable for VAN services, and must be assessed carefully; and the prospective user/provider must have marketing skills, offer a 'natural' service for the chosen business sector, have administrative skills, and possess adequate systems skills and resources.

In several European countries, we believe that the time is now ripe for VAN services also to increase their penetration of the consumer market through the medium of videotex. Promising applications include home banking, home entertainment, and local news and community information. These and other future trends are discussed in Chapter 4 of the report.

We believe that VAN services will have become widespread throughout most of the OECD countries by 1990. They will help organisations to respond to the changing business environment, achieving economies of scale and economies of scope by sharing expensive resources and valuable business information.

More comprehensive, integrated and intelligent VAN services are now on the horizon, together with new specialised services. In other words, as in other parts of the information technology market, there will be more choice. Just as in 1978 an awareness of convergence (and the subsequent appearance of the term 'information technology' — or informatique) marked a milestone, so the present beginnings of widespread network-based services (or télématique) represent another major step towards the widespread application of information technology.

CHAPTER 1

THE VALUE ADDED NETWORK SERVICES MARKETPLACE

The concept of value added network services is relatively new, but they include a range of services that have existed for several years. There are already about 1,500 value added network services on offer in Western Europe. These include 1,000 information retrieval services (providing access to about 2,000 online databases, of which about 500 are based in Europe). They are examples of what we describe as old-style value-added network services.

The newer value added network services tend to be used interactively, rather than just for information retrieval. There are about 450 newer 'information-sharing' value added network services in Europe, mainly based on videotex systems. In addition, the European PTTs and several other suppliers provide more than 50 of what we describe as new-style 'resource-sharing' value added network services.

The newer information-sharing services tend to foster co-operation between trading partners in a given business sector, rather than act as general-purpose tools. Often they are used as competitive weapons, or as strategic marketing tools. Whatever their purpose, they represent new and challenging applications of information technology (IT) which will grow to become a major sector in the IT industry both in North America and in Europe before the end of the decade. It is these newer forms of value added network services that are the focus of this Foundation Report.

There are several misconceptions about value added network services. One commonly held view is that they are the outcome of the deregulation of national telecommunications authorities (PTTs) and of the liberalisation of public communications services. Another common view is that value added network services can exist only in countries where telecommunications have been deregulated and liberalised. Both these views are mistaken. It is true, however, that the concept of value added network services began to emerge following the deregulation both of AT&T in the United States in the 1970s and of British Telecom in the United Kingdom in the early 1980s. In general, though, these services are the natural outcome of several forces, including the pull of market demand and the push of technological developments.

In this chapter we first define what we mean by a value added network service and then describe the classifications of the services that we use throughout the report. We then discuss the technological and regulatory factors that are shaping the value added network services marketplace, and follow this by examining the user demands that are creating the opportunities for these services. We then look at the supplier pressures that are leading to new value added network services being established in Western Europe.

DEFINITION OF A VALUE ADDED NETWORK SERVICE

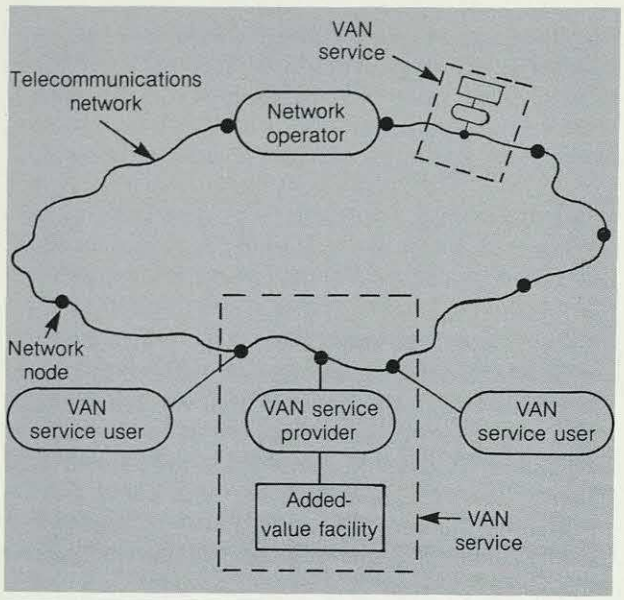
There is no universally agreed definition of a value added network service. The label is too new for this, and those involved in the area have different perspectives depending both on whether they are users or suppliers, and on the country in which they are based. We therefore give a definition based on all the key attributes of this type of service. Our definition of a value added network service is:

"A value added network service is a service based on a telecommunications network by which messages are processed or stored, so that some value is added to the message as it is transferred from the message sender to the message receiver. In addition to the network operator, value added network services involve two other categories of participant: the service provider, and the service users (or subscribers). Apart from the network operator, at least two of the other participants must be from different organisations."

Figure 1.1 shows the main components of, and the main participants in, a value added network service. In the figure, and throughout the rest of this report, we abbreviate "value added network service" to the commonly accepted "VAN service".

Our definition excludes corporate networks used solely for the transmission of internal information. However, the definition does not require all the participants to be from different organisations. For example, a VAN service provider operating an electronic

Figure 1.1 VAN service schematic



mailbox service open to public subscribers could itself be a user of that service. Sometimes, the message sender and receiver can be the same person (for example, a user of an online database retrieval VAN service). Also, the message sender and receiver need not be people. They could equally be the computer systems of a customer and supplier exchanging order-detail and invoicing-detail messages through a VAN service that converts the messages to a standard industry format.

Added value

A VAN service provides more than the straightforward transmission of telecommunications messages. In the jargon of the telecommunications industry, this additional service is known as the 'added value'. It may take one or more of the following forms:

—Conveying a telecommunications message to at least two users other than the VAN service provider and the message sender, as with multi-address routeing.

—Storing the message, as with electronic mailbox services, or voice store-and-forward services.

—Acting significantly on the format, code or content of the message (or the protocol relating to it) whilst the message is being sent. Thus, an online database retrieval service acts on the parameters supplied by the service user to create the message (the retrieved data) that is returned to the user.

VAN service components and participants

Figure 1.1 shows that every VAN service is based on a telecommunications network. The network itself can be based on one or more of the following physical components:

—The public switched telephone network (PSTN).

—Public circuit-switched or packet-switched data networks.

—A dedicated network leased from the PTT.

—An interactive broadband cable system.

—Satellite links.

The well-known VAN services provided by companies based in the United States (such as GEISCO, ADP, Tymshare and GTE-Telenet) are based on networks that include most of the above components.

The network operator may be any one of the following types of organisation:

—The national PTT.

—An organisation that operates a network in order to provide a specific VAN service.

—An organisation that operates a network as a business in itself by making network facilities available to VAN service providers.

In Europe, the network operator is usually the PTT. Most PTTs now use their networks to provide various forms of VAN services, such as videotex services, electronic mailbox facilities and electronic funds transfer systems.

Sometimes, though, the PTT (or a group of PTTs) will license an organisation to operate a network that will be used to provide a specific VAN service. Examples are SITA (for inter-airline reservation messages) and SWIFT (for the international transfer of banking funds). The basic transmission facilities used by this type of network operator are leased from the PTT. SITA and SWIFT are both examples where the network operator also provides the VAN service.

In the United States, and now also in the United Kingdom, the telecommunications regulatory environment allows an organisation to operate a network which will be used by other VAN service providers. Examples are Tymnet and GTE-Telenet in the United States, and the network operated by Istel (formerly British Leyland Systems Limited) in the United Kingdom. Once again the basic transmission facilities are leased from the PTT.

In Figure 1.1, the network operator is shown separately from the VAN service provider but, in practice, the VAN service is often provided by the network operator (for example, the Telecom Gold electronic mailbox service is provided by British Telecom). Nevertheless, a VAN service provider does not also

have to be the network operator. An example is the VAN service provided by Amherst Associates, as reported in the case histories in Chapter 3. This service is provided via the Tymnet and Uninet networks.

With some types of VAN service, there is also another category of indirect participant. These are the information providers who contract, for example, with an online database service or a videotex service to make their information available via a VAN service.

The main focus of this report is not, however, on network operators nor on VAN service providers. Instead, the primary emphasis of the report is on the services themselves, and the users of the services.

Examples of services that fit our definition

From the examples already quoted, it is clear that a wide variety of services conform to our definition of VAN services. Many of these (such as online database retrieval services, retrieval-only videotex services, SITA, SWIFT and I P Sharp's APL network) predate the label "value added network service". An example of a new-style VAN service is the interactive, transaction-oriented videotex services that allow travel agents to send and receive messages to make airline or hotel reservations.

The range of potential VAN services is very wide. The United Kingdom Government's Department of Trade and Industry, in its explanatory booklet promoting the emerging VAN services industry, has listed a range of possible services. The list is reproduced in Figure 1.2.

Figure 1.2 Range of possible VAN services

Automatic ticket reservation and issuing
Conference calls
Customers' databases
Deferred transmission
Long-term archiving
Mailbox
Multi-address routeing
Protocol conversion between incompatible computers and terminals
Secure delivery services
Speed and code conversion between incompatible terminals
Store-and-retrieve message systems
Telephone answering using voice retrieval system
Telesoftware storage and retrieval
Text editing
User management packages (accounting, statistics, etc.)
Viewdata (videotex)
Word processor/facsimile interfacing

This list is not exhaustive. Potential VAN service operators are encouraged to use their imagination to devise other possible VAN services.

(Source: UK Department of Trade and Industry)

CLASSIFICATION OF VAN SERVICES

There are many reasons why organisations subscribe to VAN services (or even become VAN service providers). Usually, though, the main reasons are to share resources and/or to share information. We therefore classify VAN services into these two types, concerned respectively with resource-sharing and information-sharing. This classification is used throughout the remainder of the report.

Resource-sharing VAN services

We classify a VAN service as resource-sharing where the costs of resources are spread over many users, achieving economies of scale. These economies can be achieved in one of two ways (or sometimes in both ways): through VAN services that allow users to share electronic resources, such as electronic mailboxes, or protocol converters; or through VAN services that allow users to share people resources, such as VAN service employees who provide telephone answering or telephone-based selling.

Information-sharing VAN services

We classify a VAN service as information-sharing where the benefit of the VAN service lies in the value of shared technical or business information.

Within the information-sharing VAN services, there are two sub-types:

— Information-monopoly VAN services, where an organisation has secured a monopoly, or near-monopoly, on valuable information — such as trade and technical statistics on synthetic plastic resins — and can sell that information via a VAN service.

— Information-utility VAN services, where organisations in the same business sector use a VAN service to pool and exchange business information — such as road freight operators pooling information on empty trucks and their locations, in order to gain higher load factors and reduce the likelihood of empty return journeys.

Differences between the types of VAN services

The differences between resource-sharing and information-sharing VAN services are considerable, although they are less so between information-monopoly and information-utility VAN services. All these variations are important when we later consider

Figure 1.3 Features of different types of VAN service

	Type of VAN service		
		Information-sharing	
Feature	*Resource-sharing*	*Monopoly*	*Utility*
Historical background	Timesharing bureau selling computer power	Information retrieval services selling data	Timesharing bureau selling business expertise
Service characteristics	Spare capacity Skills in technical resource Support and service	Good source of data Used primarily as a tool	Business data standards Business applications Solutions, rather than tools
Motivation for using the service	Pilot project Not enough volume for in-house service Interconnecting remote sites Not enough skills	Access to hard-to-get or costly information	Access to pooled information
User characteristics	Single organisation or trading partners	Single organisation or groups who do not necessarily work together, and who could be keenly competitive	Co-operating trading partners Geographically spread
Product/services of user organisation	No unique characteristic	Technical, statistics, information from external sources	High unit-value Volatile Matching supply with demand Matching buyers with sellers

(in Chapter 5) why and how organisations should use VAN services. Figure 1.3 identifies the main features of the three types of VAN service.

In practice, the situation may be more complex than is indicated by the figure. Information-sharing VAN services often incorporate an element of resource-sharing, and are sometimes based on resource-sharing VAN services. For instance, a truck load-pooling VAN service may incorporate a mailbox service and may also be based on videotex, which is a resource-sharing VAN service.

Classification by use

VAN services can also be classified into two distinct types by the way in which they are used:

—General-purpose VAN services.

—VAN services that provide a means of inter-company co-operation within a specific business sector.

Two examples of general-purpose VAN services are telephone-answering and radiopaging services. One example of an inter-company VAN service is a holiday and package-tour booking system. Another is the VAN service used by a major pharmaceuticals company and its customers (pharmacies, hospitals and doctors). Inter-company VAN services can sometimes be the resource-sharing type, but more often are information-sharing. The common characteristic is that the users come from a specific business sector.

Figure 1.4 shows the relationship between the main classes of VAN services and the way in which they are used. The figure contains an example of a typical VAN service for each of the cross-relationships: resource-sharing VAN services used as a general-purpose tool and for business-sector co-operation; and information-sharing VAN services used as a general-purpose tool and for business-sector co-operation.

Figure 1.4 Relationship between main classes of VANS and how they are used

	Type of use	
Type of VAN service	*As general-purpose tools*	*For business-sector co-operation*
Resource-sharing	1	2
Information-sharing	3	4

Examples of typical VAN services:

1 Protocol converters available through a VAN service used to link a variety of terminals to incompatible computers.

2 Application packages available through a VAN service to organisations within a business-sector.

3 Old-style online information retrieval VAN services.

4 New-style information-sharing VAN services that trading partners (and sometimes competitors) in a business-sector use co-operatively.

FACTORS SHAPING THE VAN SERVICES MARKETPLACE

There are four major factors shaping the VAN services marketplace: developments in the telecommunications infrastructure, developments in end-user communications facilities, pressures for more freedom from PTT restrictions, and the falling cost of computer power.

During the past decade, most West European PTTs have developed the basic voice and data transmission facilities, both nationally and internationally, to a level where high-quality transmission is readily available. This trend is continuing with the move towards digital networks and their correspondingly greater bandwidths. The basic foundations for VAN services therefore exist in most West European countries.

At the same time, the availability of low-cost microcomputers, terminals and communications interfaces has increased the potential user population for VAN services. Data communications facilities are now available more cheaply (in real terms) than in the past, and they are not restricted to specialised data processing applications.

There has also been increasing pressure from users, equipment suppliers and service suppliers for more freedom from PTT restrictions. This subject has been widely debated in Western Europe, and several countries have now reduced the PTT monopoly, particularly in the area of equipment supply.

As a result, the PTTs have become more responsive to new ideas, and are keener to provide services to users to gain additional revenue over and above basic transmission revenue. Most PTTs are aware that revenue from voice transmission is now increasing only slowly. By the end of the decade, revenue from data transmission also will be growing less quickly, unless additional sources of revenue — such as VAN services — can be found.

The final factor is the continuing reduction in the cost of computer power. Many small and medium-sized companies can now afford the benefits provided by computer systems. They now wish to exploit inter-site and inter-company data communications, but the costs of the communications and their lack of telecommunications expertise are barriers that prevent them setting up their own private networks. This was a major factor in the development of the VAN services concept in the United States, and is equally valid today in Western Europe.

USER DEMANDS

Telecommunications technology and commercial developments are combining to create market-demand forces for VAN services. The rapid pace of change in today's business world, and the increasingly competitive environment is causing many business enterprises to use information technology (including telecommunications) to cope with the change or to exploit it. This has led to a market demand for VAN services that can be used as strategic marketing tools or as competitive weapons. Organisations are realising that VAN services can help them to cope with business changes in four ways, by:

- —Encouraging decentralisation.
- —Permitting externalisation.
- —Encouraging co-operation between trading partners and competitors.
- —Permitting economies of scale and economies of scope.

The trend towards decentralisation

In recent years there has been a significant trend towards decentralisation in many industries, and this trend is being encouraged by advances in telecommunications. Today, the majority of workers in the developed countries are information workers. To an increasing extent it is no longer necessary for them to work alongside one another in an organisation in order, for instance, to gain access to common records. The information resource in an organisation can be decentralised, yet still remain accessible.

The availability of VAN services enables an organisation to use a network to support decentralisation without having to invest in a private dedicated network. For large organisations with incompatible computers at geographically dispersed locations, a VAN service that provides 'transparent' interfaces — so that, as far as the users are concerned, their terminals can be linked to any of the organisation's computers — is an option that they cannot afford to ignore.

Greater use of external services

The term 'externalisation' is used to describe the situation where a business subcontracts to an external agency all or part of a previously internal business function. Using an external freight company or a commercial warehouse are examples of the externalisation of operational functions. We believe that the trend will be to externalise many professional support functions as well. These include external building maintenance, plant and office security, and also, through the establishment of wholly owned subsidiaries, information systems centres. These are all examples of traditional subcontracting arrangements. Some organisations are now using VAN services to communicate electronically with their subcontractors.

Another form of externalisation occurs when an organisation displaces its costs by arranging for its suppliers or its customers (who may be members of the public or other companies) to undertake some functions on its behalf. As an example, a bank might use a VAN service to allow its customers automatically to identify, select and execute a financial transaction. In another example, the suppliers of a major retailer may use a VAN service to provide and process information on behalf of the retailer about inventory, orders and deliveries of merchandise.

Telecommunications in general, and VAN services in particular, are enabling businesses to interact not only within the organisation, but also with their suppliers and with their customers in a way that is independent of the geographic distance between them. Thus, an investment company can access financial markets around the world. Travellers may place reservations with airlines or hotel chains based in and operating in overseas countries. Customers can order a new product manufactured in another country.

The availability of VAN services provides additional opportunities for externalisation to take place at modest investment levels, particularly where no explicit subcontracting is involved.

Greater need for business co-operation

In order to survive in today's more competitive business environment, many organisations are seeking ways of improving their effectiveness. Most of the organisations who use information-sharing VAN services use them for this reason to co-operate with their business partners. Their common need is to exchange business information with their trading partners and, often, with their competitors as well. To organisations such as these, business information is a vital resource and they are using a specific business-sector VAN service both as a strategic marketing tool and as a competitive weapon.

One example of business co-operation through a VAN service is where a car manufacturer uses a videotex-based VAN service to ensure that its car dealers and showrooms have access to up-to-date and accurate information about available cars in stock throughout the dealer network. This speeds up stock disposal and ensures that a potential customer is not lost because a particular dealer does not have the preferred model in stock. Here an information-sharing VAN service is being used for mutually advantageous co-operation between organisations where there is a large degree of mutual dependence.

Another example is the sharing of booking information by holiday and package-tour companies. Here, the information-sharing VAN service is an aid to synergy, because each of the co-operating subscribers to the service has the potential of gaining more than would have been possible by working separately.

Specific business-sector information-sharing VAN services are likely to be of most value when there is a large base of volatile information relating to valuable (or perishable) merchandise. Examples include large inventories of consumer goods and the space available in a fleet of haulage trucks. The information base is subject to rapid changes as business transactions (such as orders and the delivery of products) are completed. In addition, the administrative procedures associated with the transactions often are paper-based or people-intensive (such as the handling of way-bills in the freight business).

Economies of scale and economies of scope

Most of the examples of existing VAN services exploit the principle of economies of scale — where higher volumes reduce the unit cost. But there is also a trend to using VAN services to exploit a second principle, that of economies of scope. VAN services can widen the scope of an organisation's range of products or services by providing a greater variety of choices for potential customers in the belief that this will increase the volume of business initiated through the service. (For a fuller discussion of this topic, see "Plan for economies of scope" by Goldhar and Jelinek, published in the November-December 1983 issue of Harvard Business Review.) An example of this type of VAN service is where banks, mortgage lenders, insurance companies and stockbrokers are linked together to provide a comprehensive financial service (or 'one-stop financial shopping'). Another example is teleshopping, where a variety of goods may be ordered electronically.

Most of the co-operative use of VAN services is by trading partners in a single business sector, but multi-sector VAN services are also emerging as a means of achieving an economy of scope. An illustration is Homelink, operated in the United Kingdom by the Nottingham Building Society (a mortgage savings and loans organisation that is small and, until it started Homelink, was little known outside the town of Nottingham). Homelink is a videotex-based VAN service that forms a co-operative service between the Nottingham Building Society, the Bank of Scotland, the VISA credit card, Thomas Cook (a travel company) and several other organisations — including suppliers of electrical appliances and other durable consumer goods — selling directly to the consumer.

Homelink aims to be a home-shopping and home-banking service. It is an excellent example of the motivation of seeking economies of scope (rather than economies of scale) through an information-sharing VAN service.

SUPPLIER PRESSURES

The supplier pressures that are shaping the VAN services marketplace in Western Europe arise from three distinct motives. First, the creative motive, as governments encourage the move into the so-called 'information age'. Second, the defensive motive, as PTTs seek to generate data traffic, and as computer bureaux seek new sources of revenue. Third, the entrepreneurial motive, as major IT suppliers seek to exploit the West European market, and as information owners exploit the information they own.

Thus we see that there are five main sources of supplier pressures: governments, PTTs, computer bureaux, other major IT suppliers and information owners (or providers). We discuss each of these in turn.

Governments

West European national governments are keenly aware of the need to foster and to finance IT developments and, within IT, they are becoming aware of the opportunities that VAN services offer for competitiveness and for business growth. The United Kingdom Government has formally recognised VAN services and has set up a VAN service licensing function within a government department, the Department of Trade and Industry (rather than within British Telecom — except for an initial six-month transition period when British Telecom was responsible for issuing these licences).

In addition to national governments, the European Commission also is active in the field of VAN services. It has already established Euronet Diane as a network which provides access to about 500 databases. Dr Jansen van Rosendaal, the Commission's Director for Information Management, was quoted in April 1984 in the press as saying that "Europe has a gap in the negative sense, and the gap tends to grow each year." He went on to say: "Fifty per cent of the online information used by Europeans comes from the United States, and step-after-step we are losing more to our American competitors." What is of most concern to the EC is that about half of the revenue goes to American companies, even though much of the content of the databases is drawn from European sources. In order to try to narrow this perceived gap, Directorate General XIIIB, which is responsible for information technology, is organising pilot VAN service projects in such areas as electronic document delivery, electronic publishing and videoconferencing.

European PTTs

The second source of supplier pressures encouraging VAN services in Western Europe is the PTTs. They themselves operate about 50 resource-sharing VAN services (as listed in Figure 1.5). The figure illustrates how comprehensive the VAN services available from the PTTs are.

The PTTs are well aware that the growth in voice traffic will slow down, and they are keen to encourage

Figure 1.5 Resource-sharing VAN services offered by the major European PTTs (June 1984)

Service type	*Belgium*	*France*	*Italy*	*Netherlands*	*Sweden*	*U.K.*	*W. Germany*
Audioconferencing	P	●	P	T	T	●	
Credit verification		●				●	
Electronic telephone directory		●					
Electronic funds transfer		T			T	P	
Electronic mailbox	T	●			P	●	P
Facsimile	●	●	●	●	●	●	●
Freephone type services		●		P	●	●	●
Radiopaging		●	●	●	●	●	●
Security services		●				●	
Telemarketing		●				●	
Telephone answering						●	
Telex bureau	●	●	●	●	●	●	●
Videoconferencing		●	T	T	T	●	T
Videotex	T	●	T	●	●	●	●
Voice messaging		P					

● In service T Trial service P Planned within next three years

increased data traffic — whether for a single organisation or for multiple organisations supplied by a VAN service provider. Their overall attitude to VAN service providers can be described as pragmatic, enlightened self-interest.

Computer bureaux

The third source of supplier pressures comes from computer bureaux. These companies have seen their revenues from timesharing services continue to decline as organisations transfer more work to their in-house facilities. Thus, the bureaux are forced to look for new sources of revenue, and VAN services provide such a source. It is not surprising, therefore, to find major bureau companies active in the VAN services market. They already have computer expertise and, to a large extent, network expertise; and they also tend to have well-established sales and support departments.

Several computer bureaux are now marketing their VAN services very actively. In France, for example, CAP Sogeti, Steria and Télésystèmes promote videotex-based VAN services, and Cisi provides VAN services for specific business sectors such as petrochemicals. Steria provides three types of VAN services: videotex-based, teletex-based and protocol-conversion-based. In Belgium, Télémedie provides VAN services, and the VAN service provided by QZ (the Stockholm-based computer bureau) is described in the case histories in Chapter 3. And, throughout Western Europe, American-based bureaux also are promoting VAN services (though they are rarely called VAN services).

Nearly all the bureau-based VAN service providers begin by providing resource-sharing VAN services such as electronic mailbox, store-and-forward, and protocol conversion. Often they build on their current customer and business base, and many of them are now beginning to introduce information-sharing VAN services aimed at trading partners in specific business sectors.

Other major IT suppliers

The fourth source of supplier pressures comes from other major IT suppliers. A significant feature of the supply of telecommunications services in Western Europe is the growing presence of enterprises such as IBM, AT&T and ITT. They are forging links with European-based suppliers and are likely to use VAN services as the main means of exploiting the European market.

IBM, for instance, has at least four major telecommunications activities under way in Western Europe:

— In Italy, IBM is discussing VAN services with STET, the holding company for the Italian telecommunications concessionaire companies.

— In West Germany, IBM supplies the Bundespost with equipment for its videotex VAN service.

— In France, IBM is co-operating with the PTT (Direction Générale des Télécommunications — DGT) to supply computerised telephone directory services.

— In the United Kingdom, IBM is collaborating with British Telecom in planning a possible electronic funds transfer VAN service that would link London's clearing banks to retail point-of-sale terminals. In July 1984, a joint general-purpose VAN was announced by them.

AT&T is another major IT supplier active in the European market. In addition to collaborations with Philips and, separately, with Olivetti, AT&T and ICL announced in May 1984 a VAN service partnership based on the ISO-OSI standard. As a result ICL will be able to utilise in Britain equipment used in AT&T's Net 1000, a private packet-switched system. This equipment is likely to form the basis of the TradaNet VAN service for the Article Number Association (see Chapter 3, page 21). It will also enable ICL to enter the American market as a VAN service provider on Net 1000 through an international gateway.

ITT already has a variety of interests in Europe, and now offers a wide range of VAN services. For instance, the British Telecom electronic messaging service (Telecom Gold) is derived from Dialcom, an ITT subsidiary.

Information owners

Finally, the fifth source of supplier pressures comes from information owners seeking new ways to exploit their information commercially. The first category of information owners consists of organisations that have access to hard-to-obtain and valuable information and have set up information-sharing VAN services. The case histories in Chapter 3 describe the information-sharing services provided by SAGE DATA Inc. (data about synthetic plastic resins) and Reuters Monitor (financial data).

A significant segment of VAN services provided by information owners comprises information-monopoly VAN services. These include the established online database retrieval services such as Lockheed's Dialog and the various database retrieval services available through Euronet Diane. Many of these services are being enhanced to include new features such as electronic mail, and some now also include the ability to download a subset of the database for further analysis on the user's intelligent workstation or personal microcomputer. We discuss future trends such as these in Chapter 4.

The second category of information owners consists of manufacturers who are setting up VAN services

to foster vertical co-operation in order to assist their distributors or agents to do better and thereby further their own interests. An example of this type of VAN service (that provided by Distriphar) is included in the case histories in Chapter 3. Distriphar is a pharmaceuticals company, and its customers — pharmacies, hospitals, doctors — all buy from many suppliers. Distriphar believes that the accessibility and quality of information it provides to the customers, and the electronic re-ordering system available through the VAN service, encourage them to choose Distriphar products and result in increased sales.

The third category of information owners consists of trading partners in a specific business sector. The VAN services used by these business sectors to foster inter-company co-operation are often provided by a private, non-IT organisation. Sometimes the service provider is a trade association, though the service may be subcontracted to an IT organisation — as is the case with the Society of Plastic Industry in America, where SAGE DATA Inc. is the VAN service provider.

In all three categories, the information owners exert pressure on the marketplace by actively marketing the use of their information through VAN services.

SUMMARY

We believe that to succeed or even survive in the late 1980s and 1990s, businesses will need to co-operate more than in the past, and that, to an increasing extent, VAN services will form an integral part of this co-operation. If a manufacturer is using a VAN service to co-operate with its dealers and distributors, other manufacturers in that business sector will be under pressure to provide similar services. In the same way, VAN services that foster inter-company co-operation exert pressure on other members of the relevant business sector to join in — because of the fear of being locked out and losing a key competitive advantage.

Electronic information transfer is faster and more accurate than using paper. Given the right mix and number of participants, it will certainly be more effective, and could well be cheaper. That is why the VAN services marketplace is becoming important to businesses and is set to grow to become a major sector of the IT industry.

CHAPTER 2

VAN SERVICES REGULATION AND STANDARDS

In this chapter we describe the environment in which VAN services are regulated in Western Europe in 1984. We address these issues first from the perspective of Western Europe as a whole and then from individual national perspectives. Also, because telecommunications is an international medium, we identify the transnational regulatory issues relating to VAN services. We also identify the changes in VAN service regulations that are likely to occur in the next three years.

The final section of the chapter focuses on standards for VAN services. In particular, it identifies the important role that business data interchange standards can play in promoting the use of VAN services.

GENERAL REGULATORY ENVIRONMENT

The supply of telecommunications services in Western Europe is generally a monopoly in the hands of national PTTs. The PTTs are regulated by the individual nations and they provide a backbone service of switching and transmission facilities. In addition to their monopoly for the provision of switching and transmission equipment and plant, the PTTs also strongly influence, through their type-approval procedures and standards, the supply of end-user equipment for attachment to their networks.

This remains the overall situation in Western Europe, though there are significant national differences in emphasis. But the traditional telecommunications industry structure is now being questioned and, in some countries, is under attack. The rapid evolution of a competitive marketplace for telecommunications services in the United States has led to suggestions that an equivalent market-based competitive model should replace the traditional monopoly approach in Western Europe. There are arguments on both sides as to whether the monopoly of the PTTs should be preserved, and the extent to which the traditional monopoly should be liberalised. The theoretical arguments for and against liberalisation seem to be inconclusive. But that has not prevented a tide of interest in PTT liberalisation from rising in some European countries, most notably in the United Kingdom.

Arguments for preserving the PTTs' monopoly

Those in favour of preserving the PTTs' common-carrier monopoly express the following objections to competition. First, loss of cross-subsidisation could lead to rapidly rising tariffs for local calls when they are no longer subsidised by profits from long-distance traffic. Next, 'cream-skimming' (by which a competitor could choose to compete in the most lucrative service areas) could damage marginal services. And finally, it is difficult to establish an independent and objective telecommunications regulatory authority.

Other arguments in favour of preserving the monopoly include: the need for substantial investment, which can be provided only by the state; the need for strong national equipment procurement policies to support local industry; the need to preserve network compatibility; the need for international interconnection; and the need to maintain the quality of service.

Arguments in favour of liberalising the monopoly

Those in favour of liberalisation, on the other hand, generally voice three arguments in support of competition.

The first is improved economic efficiency. The theory is that resources are used more productively in a competitive market than they are in a monopoly. Although that argument breaks down in the 'natural monopoly' situation, there is increasing evidence that the telephone network may not be a natural monopoly. The pro-liberalisation lobby believes this to be particularly so for longer-distance routes, provided the traffic density is high enough for the economies of scale in transmission to be fully exploited by two or more competing carriers.

The second argument in favour of liberalisation is that it leads to greater innovation. This is at best a controversial argument. There seems little evidence to support the view that monopolies discourage innovation. Finally, there is the argument that cross-subsidisation is in itself undesirable, and that telecommunications carriers should not be agents for redistributing income.

Though the arguments for and against the common-

carrier monopoly seem to be inconclusive, there is a general trend in most West European countries towards a gradual easing of other restrictions on private-sector competition.

NATIONAL REGULATION OF VAN SERVICES

Having described the general regulatory environment, we now examine national regulation in more detail. First we describe common aspects of West European regulation as it applies to VAN services and compare these with the situation in the United States. Next, we outline the United Kingdom regulation that is specific to VAN services. This is the only explicit VAN service regulation in Europe, and it can provide lessons for others on how to, or how not to, regulate VAN services. Finally we discuss the changes in regulation that are likely to occur within the next three years.

Common aspects of West European regulation

The terms of the monopolies granted to the West European PTTs enable and oblige them to offer telecommunications services and facilities to the public, both corporate and individual. Broadly speaking, the extent of the individual monopolies in telecommunication services is the same for each country. Through the Council of European PTTs (CEPT), the individual PTTs agree guidelines as to how the terms and conditions of the monopoly shall be implemented. Normally the guidelines recommended by CEPT are adopted by the PTTs.

In the early 1970s the West European PTTs separately embarked on a radical improvement to the telecommunications environment in Europe. In the past five years the leading countries have introduced new public data services, and the remainder will be doing so between now and 1990.

Huge amounts of capital have been invested, and will continue to be invested, in digital communications infrastructures. The combined capital expenditures by the PTTs of Belgium, France, Italy, the Netherlands, Sweden and the United Kingdom exceeded a total of $10 billion in 1983 alone. But to ensure a return on that investment, the PTTs must encourage their customers to make use of the infrastructure. Yet the PTTs cannot be expected to provide all of the services that are required by business and industry — indeed, they could not and probably would not want to.

If the PTTs cannot provide a service required by a user it is customary for concessions to be made to specific groups of users. Two examples of this are the SWIFT interbank VAN service (started in 1977) and the Reuters Monitor VAN service for financial data (started in 1973). Both organisations required telecommunications services that were more advanced than the PTTs were able to provide at that time. Special arrangements and concessions were granted to enable, in the case of SWIFT, an international packet-switched network to be operated.

Today, the majority of PTTs in the West European countries in which SWIFT operates are able to provide packet-switched facilities equivalent to those provided by SWIFT. Hence, the SWIFT service is now being tariffed, by the PTTs, on the basis of leased lines plus volume usage — that is, on a par with the public packet-switched services.

Because appropriate public services are now available, it is extremely unlikely that a private network resembling that of SWIFT would be allowed to develop in Western Europe today. SWIFT is an example, however, of the PTTs' obligation to their customers either to provide them with the required service, or to enable the customers to use PTT lines to develop their own services.

Different European countries have placed different emphases on the regulations relating to VAN services. VAN services, though, have their origins in the United States, where the telecommunications regulatory environment is generally less restrictive than in Europe. Figure 2.1 (overleaf) compares the regulations relating to VAN services in the United States with those in Europe.

The figure shows clearly that only three European countries — France, Sweden and the United Kingdom — allow VAN services to be established in direct competition with a similar service offered by the national PTT. In the other countries of Western Europe this practice is not permitted.

The figure also shows that licences to provide VAN services are available only in the United Kingdom. In the rest of Europe, there is no procedure for issuing licences because VAN services as such are not officially recognised. The prospective provider of a network service that conforms to our definition of a VAN service has to approach the PTT concerned and apply for approval to initiate the service (without calling it a VAN service). But the PTTs (and the regulations) are flexible, however. Negotiations may be lengthy, but special arrangements can be made, although non-standard tariffs will usually be applied by the PTTs.

In general, the PTTs respond favourably to the requirements of would-be VAN service providers and will enter into discussions to find a mutually acceptable solution. Thus, in the rest of Europe, approval for what we define as a VAN service can be obtained provided that:

— The service does not infringe any specific regulation.

Figure 2.1 Main regulatory similarities and differences relating to VAN services in the United States and Western Europe in June 1984

Area of regulation	*United States*	*Western Europe*
Licence required to operate VAN services	Not needed	Needed in the UK VAN service licences do not exist as such in the rest of Europe
VAN services permitted where PTT (or common carrier) provides a similar public service	Permitted	Permitted only in France, Sweden and the UK
VAN services permitted where PTT (or common carrier) does not provide a similar service	Permitted	Permitted in France, Belgium, Sweden and the UK Elsewhere, subject to negotiations between prospective operator and PTT
Private timesharing and bureaux services permitted	Permitted	Permitted
Resale of private telecommunications circuits	Permitted	Not permitted
Overall trend towards easing of PTT (common carrier) restrictions in the supply of VAN services	Has been in evidence for some years	The trend will continue in all countries, with the exception of West Germany

—The service can be shown to add value.

—In countries other than France and Sweden, the service does not compete with a PTT-provided service.

United Kingdom VAN service regulations

The United Kingdom is the only European country to have an explicit procedure for licensing VAN services. VAN service licences have been available since 1981. Before that, prospective VAN service providers had to negotiate special concessions with British Telecom before they could provide what would now be called VAN services. The explicit procedure for obtaining a VAN service licence eliminates much of the negotiation and reduces considerably the timescale required to establish a new VAN service.

The 1981 UK Telecommunications Act empowered the Secretary of State for Industry to issue licences for VAN service providers to operate such services over British Telecom's telecommunications network. (The same Act inaugurated British Telecom as a public company with the power to provide telecommunications services in the United Kingdom. Previously this power was entrusted to the British Post Office, of which British Telecom was then a part.) The procedure for applying for a licence is clearly defined and is relatively straightforward. The licence fee (in 1984) is £100 on application plus £25 annual renewal. By the end of the first quarter of 1984, nearly 80 licences had been issued.

The general terms of the VAN service licence specify and give examples of typical value added services that may be offered, and these have already been listed in Figure 1.2 on page 3.

Since the 1981 Act, and the more recent 1984 Telecommunications Act, providers of VAN services that existed before 1981 are not required to apply for a licence unless one of the following two conditions applies:

—The nature of their service, or of their network, changes.

—The original approval granted by British Telecom expires.

Likely changes in West European regulation within the next three years

National regulatory positions are constantly being reviewed, and are changed from time to time. The most likely directions, in our view, will be towards more liberalisation in France, Italy, Sweden and the United Kingdom. There will be a much slower move towards liberalisation in the remaining countries in this period, with the exception of West Germany where there will only be limited liberalisation.

However, the market forces from users and suppliers that we identified in Chapter 1 will place increasing pressure on other European PTTs to follow the example of the United Kingdom and simplify the procedures for establishing new VAN services.

TRANSNATIONAL ISSUES

The transnational issues relating to VAN services regulation are an extension of the more general area of transnational data communications. In the past, when an online database retrieval service provider has been successful in one country, and has seen a market for the service in another, he has needed to seek the approval of that country's PTT.

There is no doubt that there is an international market for VAN services. Since the acceptance of VAN services in the United Kingdom, American resource-sharing VAN service providers — typically operating

an electronic messaging service — have started to offer transatlantic access to subscribers in the United Kingdom. In the future, the search for multinational marketplaces will apply also to the newer, information-sharing VAN services that are aimed at a specific business-sector. For instance, SAGE DATA Inc. has expressed an interest in providing its synthetic plastic resins database service in Europe (see Chapter 3, page 18).

Before a VAN service provider based in one country can offer his service in another country, he must first establish local communications nodes and connections to the prospective service subscribers in the other country. Establishing international links confronts the VAN service provider with three issues: transborder links; data protection; and government policies and PTT attitudes. We describe these in turn, and then identify the changes we believe are likely to occur in each area during the next three years.

Transborder links

Prospective VAN service providers need to be aware that, under a longstanding International Telecommunications Union (ITU) ruling, a private telecommunications connection between one country and another (that is, a leased line) is usually permitted only if both ends of that connection are used by members of the same organisation — unless there is special dispensation from the PTTs concerned (which is rarely granted). In other words, transborder communications that link users from different organisations (as in a VAN service) can be effected only through public switched circuits. This ruling, however, has not prevented existing transnational VAN service providers (online database companies, multinational bureaux, Reuters and others) from operating transnational services. But it does increase the amount of time and effort required for negotiation with the PTTs. It may also result in higher costs caused either by the use of public switched circuits rather than leased lines, or by a special dispensation to use leased lines.

Data protection

National data protection regulations and legislation vary considerably from country to country. Personal data stored and used in a VAN service in one country may not necessarily conform with the data protection legislation in another country. Furthermore, there is a distinct possibility that data protection legislation in several West European countries will be extended from applying only to individual persons to include legal entities, such as companies, as well. Clearly, a VAN service provider who wishes to provide international access to his service must take into account the relevant government policies and local legislation.

The lack of uniformity between the various national data protection laws, and the lack of reciprocal legislation between nations, makes this issue particularly complicated. Regrettably, the international effort to harmonise legislation in this area is somewhat fragmented. There are at least 15 international bodies that have some interest in the subject, including the ITU, CEPT, the PTTs, the United Nations (Commission on Transnational Corporations), OECD (Business and Industry Advisory Committee and the Committee for Informatics, Computers and Communications Policy), the International Chamber of Commerce (ICC) and the International Telecommunications User Group (INTUG).

Although transborder data flow and data protection are becoming important issues, they are not, as yet, major obstacles to establishing an international VAN service.

Government policies and PTT attitudes

A VAN service provider who wishes to offer his service in another country needs also to consider that country's government's attitude to international trade in general, and telecommunications and IT in particular.

Governments in most of the developed countries are well aware of the benefits to be gained from encouraging international trade. We have already mentioned that market pressures will cause governments in Western Europe to consider ways of simplifying the procedures for introducing new VAN services. Any moves in this direction are bound to make it easier to provide transnational links to established VAN services in another country. In addition, the developed countries of the free world do not place any restrictions on the free flow of information across their borders.

On the other hand, some other governments, notably those of less developed countries, take the view that information is the cutting edge of technological advance and of economic growth. Through international bodies, such as the United Nations Development Programme, these countries are beginning to lobby for a transborder tax on data (either sent through magnetic media or electronically through network links) just as there are transborder taxes on merchandise and services.

National telecommunications policies are implemented through the local PTT, and a VAN service provider must also consider the PTT's attitude to any transborder links to his system. The service provider must try to assess whether the national PTT in the country where he intends to offer the VAN service would regard the proposed service as being of benefit to the users, and whether the service would compete with an equivalent PTT service. In this assessment, the service provider needs to estimate the additional

revenue the PTT would gain from allowing the service to operate. If this revenue is high, it is an inducement for the PTT to approve the service.

For international telecommunications service providers, the differences in procedures between countries can be extremely frustrating. Line speeds, interface protocols and approved equipment frequently differ from country to country, even within Western Europe. But nearly all the PTTs have an international division that can help organisations requiring transnational telecommunications to overcome the difficulties of dealing with other national PTTs. Nevertheless, a VAN service provider may have difficulty in persuading his local PTT to provide assistance in setting up international links, unless the service provider is already an important client of the local PTT, and the proposed extension to the service provides benefits to the local PTT.

Changes in the next three years

Transnational VAN services are already in operation but, usually, the time and effort needed for the service provider to obtain PTT approvals are substantial. We do not foresee in the next three years any significant changes in the procedures that service providers will need to follow, or in the time and effort required, to establish transnational VAN services.

In attempting to predict trends, it is instructive to look at what is happening in the two countries that have removed or reduced the restrictions on VAN services. Where restrictions have been reduced, many of the issues and obstacles described earlier simply do not exist. In the United States, for example, a VAN service provider can introduce a service by contracting with a network operator to manage the telecommunications component. The service provider can therefore make his service available through an established network.

Amherst Associates uses Tymshare's Tymnet and United Telecommunication's Uninet in this way to provide its VAN service (see Chapter 3, page 19). In theory, non-American VAN service providers should also be able to use networks in the United States such as Tymnet, and there is evidence to suggest that this is true in practice. Infomart, a Canadian videotex VAN service provider, has launched a service called Grassroots in the United States. Grassroots provides information on weather, on commodity prices and on other subjects of importance to the agriculture business sector. Originally it was provided for farmers in Manitoba, running on equipment based in Winnipeg. More recently, the service has been extended over the border into the United States.

In the United Kingdom, overseas VAN service providers have already been granted VAN service licences. Many of these provide links or gateways to their services in the United States and in continental Europe — thereby offering transnational VAN services. Examples include ADP's Automail and Mohawk Data Systems' WINC, both of which are electronic mail services. Another example is EasyLink, offered in the United Kingdom by Cable and Wireless, which utilises telex-based networks and computers in the United States. As well as being an electronic mailbox service, EasyLink also offers translations from English to other European languages. Thus a message sent in English to a recipient in France could be translated into French through the VAN service. Initially the translation will be done by human operators, though the intention ultimately is to provide automatic translation, when the technology is sufficiently developed.

STANDARDS FOR VAN SERVICES

Standards are not a prerequisite for the development of VAN services. This is because VAN services themselves often help to overcome a lack of standards (for example, protocol converters enable incompatible terminals and computers to communicate transparently). But, despite the lack of formal, international standards, there are already 2,000 online databases available in Western Europe through VAN services. However, the lack of standards can increase both the cost and complexity of VAN services, and can therefore inhibit their growth.

Fortunately, some progress is being made in developing relevant standards. At the lower network-oriented level, VAN services make use of de facto and other standards developed by the telecommunications industry. Online database retrieval or messaging services, for example, use a variety of de facto standards, such as teletype or IBM terminal protocols. And there are more than 400 VAN services in operation today in Western Europe that use the various national videotex standards. All of these standards are equivalent to layers 1 to 3 of ISO's seven-layer Open System Interconnection (OSI) reference model — and no higher.

Business data interchange standards

For specific business-sector VAN services, business data interchange standards are extremely important. These standards allow the automatic interchange of business documentation within a business sector and permit communication between dissimilar systems at OSI layer 7 — the application level.

The main promoters of these business data interchange standards are:

— Quasi-governmental organisations that exist in most West European countries and throughout the world to harmonise international trade procedures.

— Formal or informal trade associations, such as the European Article Number (EAN) Association.

Quasi-governmental organisations

More than 25 countries participate in the work on the United Nations' trade data interchange (TDI) guidelines. The United Kingdom's representative is SITPRO (Simplification of International Trade Procedures Board). SITPRO, and similar organisations from other countries, seeks to simplify paperwork in order to foster international trade. These organisations perform a valuable role in setting business data interchange standards, but they tend to work to very long timescales because they seek to achieve a consensus before proceeding. For some types of business transactions — particularly for transnational trade — the work of these organisations is invaluable.

For example, in Sweden, SWEPRO is in the process of developing data interchange standards for the transport industry (road, rail and air) based on the SITPRO guidelines. Initially, data interchange standards were developed by SWEPRO for the sea transportation industry. In March 1984, members of that industry were interchanging data electronically via bilateral arrangements. Although there was no VAN service at the time of writing this report, the Swedish transport industry acknowledges that, when road, rail and air adopt the standards (planned for 1985), this could lead to a requirement for a VAN service similar to Baric's TradaNet in the United Kingdom. (This service forms one of the case histories in the next chapter.)

Televerket, the Swedish PTT, has indicated that it is interested in providing such a VAN service. The results of a survey carried out in 1982 by SWEPRO indicated that standards should first be developed for the transport industry, and then for the Customs department (for import and export data handling). The Swedish transport industry and Swedish Customs department are anxious to use trade data interchange standards. They realise that these standards will reduce paperwork and speed up information handling so that trade is supported, rather than hindered, by administrative procedures.

Trade associations

The work of quasi-governmental organisations is certainly important, but it is usually a trade association (formal or otherwise) that implements the standards as a result of pressures from its members. For example, many countries in North America, Europe and the Asian Pacific region (including Japan, Australia, Hong Kong and Singapore), as well as South Africa, are making efforts to assign and use bar codes for consumer products.

We believe adopting and implementing business-sector standards (for example those of IATA, or the interbank data standards for credit cards, or EAN bar codes for consumer goods) will provide an impetus for the widespread use of information-sharing VAN services by the respective business sectors.

Usually, it is the larger organisations in a business sector that take the initiative in developing data interchange standards. The speed with which the standards are adopted will, of course, depend on the overall need for organisations in that business sector to exchange information and to co-operate. But, once the standard has come into general use, the larger organisations often put pressure on their smaller trading partners to use it. Hence, the larger organisations in a business sector have the opportunity to develop data interchange standards that eventually will be adopted throughout their industry.

CHAPTER 3

CASE HISTORIES

In this chapter we present seven case histories of VAN services — three from the United States and four from Europe. These case histories have been selected to illustrate and amplify the general discussion about the VAN services marketplace in Chapter 1. They are all new-style VAN services, and represent examples of the classes of VAN services as defined in Chapter 1. Figure 3.1 shows how each of the case history VAN services fits into the overall classification schemes. At the end of each case history we provide examples of other VAN services of a similar kind, and at the end of the chapter we summarise the common themes to emerge for all of the case histories.

HONEYWELL INC. AND TYMNET

This case history describes a resource-sharing VAN service used as a general-purpose tool. Honeywell Inc. uses a VAN service in conjunction with its own private corporate network to enable the company's local and remote offices to communicate as if connected through a single network.

Honeywell Inc. has worldwide business interests in defence, computer hardware and software and industrial controls (heating and lighting sensors). The company has 45 wholly autonomous operating divisions, who are free to use whatever computer and telecommunications facilities they wish to. Each division is geographically distributed and hence has its own telecommunication requirements. The divisions can (and do) establish their own networks, in addition to their use of the telecommunication services provided by the company's Corporate Services Division.

In the United States the business functions of Honeywell are supported by 54 branch offices, each of which accommodates staff from several operating divisions. Each division requires access to host computers that may be located in different corporate or divisional head office computer centres, and to external bureaux facilities.

In addition, there are about 250 local offices that support sales, service and other business functions. These, too, need access to communications facilities for such activities as recording sales, checking delivery data, invoicing and customer servicing.

Services and users

Honeywell's Corporate Services Division provides telecommunications services to the operating divisions via its own corporate network and via the Tym-

Figure 3.1 VAN services case histories

Case Study		Type of VAN service		Type of use	
		Resource sharing	Information sharing	General purpose	Business sector
Honeywell Inc.	American	●		●	
SAGA DATA Inc.	American		●		Petrochemicals
Amherst Associates Inc.	American	●			Personal healthcare
Distriphar	European		●		Pharmaceutical
Article Number Association	European	●	●		Pharmaceuticals Food sector
QZ	European	●			Research establishments
Datafreight	European		●		Freight hauliers

net network. The corporate network is packet-switched and is based on the company's RNP6 equipment, using Level 6 minicomputers.

Honeywell finds it impractical to extend its corporate network to some remote offices — where large distances are involved between a remote user and the nearest network node, for example, or where the volume of traffic is low. In these situations, Honeywell uses Tymnet to connect remote users to the Honeywell corporate network, as shown in Figure 3.2.

If the use of Tymnet by a remote office exceeds a certain traffic volume, the office will be given a direct link to Honeywell's corporate network. This point is reached when the office spends $500 per month on Tymnet usage. Usage is also measured and monitored in terms of application traffic; when use of Tymnet to access an application exceeds a pre-defined level, that application is transferred to the corporate network. This is the way in which VAN services are used by many corporations in the United States.

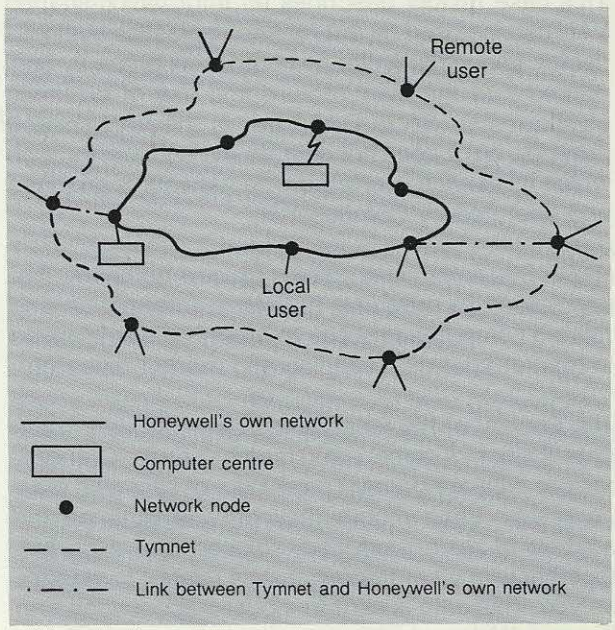
Despite the continuing transfer of remote offices from Tymnet to the corporate network, the number of Tymnet users and the volume of traffic has remained constant for the past two years, and Honeywell predicts that it will remain so for the next year at least. As users and their workloads are transferred to the corporate network, new Tymnet users at remote offices account for a balancing increase in application usage.

One of the operating divisions makes use of the Tymnet VAN service to enable its computer service engineers to access the Corporate Services Division's host computers, located in Atlanta, through portable Texas Instruments terminals. By dialling the local Tymnet mode, service engineers can collect instructions and information concerning service calls whilst they are on a customer's premises.

The major benefits to Honeywell of its use of VAN services is the widespread geographic coverage and the terminal support that is provided. Tymnet has 1,000 public nodes in 450 cities throughout the United States, and almost all of Honeywell's local offices can access these nodes via local calls. Tymnet claims that the network can cope with a peak of 5,000 simultaneous users. It is much cheaper for Honeywell to provide networking facilities via Tymnet to a large number of geographically dispersed users than it would be to extend its corporate network. Another benefit is that of centralised billing from Tymnet.

The main feature that qualifies this case as an example of a VAN service, however, is the availability of protocol converters that enable Honeywell's users to access different (and in some cases incompatible) computers with their existing terminals.

Figure 3.2 Honeywell Inc.'s use of Tymnet to supplement its own network



Future developments

Honeywell is replacing its RNP6 network nodes with its Distributed Systems Architecture (DSA), which is structured around the International Standards Organisation's seven-layer OSI reference model. Honeywell intends to start installing the nodal equipment at its 54 branch offices in 1984, expanding its own corporate network in the process and thereby reducing (but not eliminating) the need to use Tymnet.

Honeywell's Corporate Services Division intends also to offer its own VAN services on the combined Tymnet and corporate network. Currently, for example, it provides an order-entry and delivery service to a number of Honeywell's customers.

Other resource-sharing VAN services used as general-purpose tools

In the United Kingdom, several organisations use the network operated by Istel Limited to communicate with their depots and sales staff in a way that is comparable to Honeywell's use of Tymnet. For instance, Sony UK connects its London head office computers to the Istel network via a front-end DEC VAX machine running Mistel (a videotex software package developed in Finland). Sony uses the network to communicate with its eight depots, its factory and its sales staff (all located in the United Kingdom). Remote locations communicate with the Sony head office computer by dialling into their local Istel network node, which is connected to the London node via a leased-circuit.

SAGE DATA INC.

This case history describes an information-sharing VAN service used by the American plastics business sector, and in particular by companies primarily concerned with the manufacture and use of synthetic plastic resins. SAGE DATA Inc. is the VAN service provider, but it does not operate the network through which its service is offered. The network is provided and operated by Compuserve.

SAGE DATA Inc. is a small software company that specialises in providing economic information and related computer services to organisations involved in market analysis, planning and market research.

The Society of the Plastics Industry (SPI) is a trade organisation of some 1,200 member-firms. Of these, ten per cent are primary producers of synthetic plastic resins. Each month they provide data on the amount of resin produced, shipped and exported, together with other trade statistics related to markets served. This data is sent to a public accounting firm (Ernst & Whinney) who consolidate it, and publish a printed monthly report on behalf of the SPI.

Traditionally, the data was mailed in paper form to Ernst & Whinney. Over the years, the operation had grown to the stage where the amount of paper had become unwieldly, and it required a substantial effort to ensure that the statistics were not corrupted as they were re-typed into Ernst & Whinney's formats. Member-firms' data was not always received early enough to be consolidated on a timely basis, and the tendency was to delay the monthly report to ensure its completeness. Furthermore, the costs of the operation had risen to an unacceptably high level. The obvious solution was to automate the whole process.

The parameters for an automated system, based on a VAN service, were defined jointly by SPI, Ernst & Whinney, SPI member-firms and SAGE DATA. After a three-year development and trial period, the VAN service commenced in the summer of 1983.

Services and users

The VAN service offered by SAGE DATA provides an electronic reporting system that enables SPI members to input and retrieve statistical data about synthetic plastic resin production and markets. The system is structured to ensure the security of confidential company data, with Ernst & Whinney controlling the data consolidation and data security aspects of the system. Users access SAGE DATA's computers via local nodes of the Compuserve network.

The commercial service began with 12 users and by June 1984 the number of users had increased to about 40. Users pay $22 per hour (including telephone charges) for inputting or retrieving data. The average user spends $150 per month, most of which is spent on retrieving data. A typical use is for an SPI member to retrieve statistics relating to his market share for the previous month. SAGE DATA claims that the leading firms in the plastics business sector now subscribe to the VAN service, and this augurs well for the credibility of the service.

The benefits of the VAN service to the user include easier data input, increased accuracy of retrieved data, automatic calculation of market-share statistics and automatic retrieval of 12 months of historic data in tabular form. Also, the consolidated industry-data is available earlier than it was before. Statistics relating to a particular resin are made available via the VAN service as soon as all member-firms have provided their monthly data about that resin. Typically, the report on important resins is available in five weeks, instead of the ten weeks previously required to produce the entire report for all resins under the old method.

The benefits to Ernst & Whinney, in addition to the above, include a reduction in the overall cost of running the operation.

Future developments

SAGE DATA sees the service being extended in four ways. First, the company plans to develop for SPI an historic database which will be updated automatically by users' inputs, rather than by today's process which requires Ernst & Whinney to consolidate the data before updating the database.

Second, because SAGE DATA owns the software, it is seeking similar markets for its services via other trade associations (for example, the fibre industry).

Third, SAGE DATA is developing versions of its software for use on the IBM PC. These software packages will enable SAGE DATA users to download a subset of the data from the resin database via the network, and then to manipulate and analyse that data in greater detail without incurring further telecommunications or VAN service charges.

Fourth, SAGE DATA has also discussed with the European petrochemicals industry the possibility of extending the service to provide a worldwide service for the industry.

Other information-sharing VAN services used by specific business sectors

Data Resources Inc. (DRI), the econometrics subsidiary of McGraw-Hill, analyses and processes statistical data (which is supplied free of charge by the Government), and then sells it to customers through a VAN service. DRI also uses the VAN service to provide advisory services and econometric and forecasting information. The service is similar in concept to

that of SAGE DATA, except that it is aimed at several business sectors. Also, as with SAGE DATA, DRI now offers some of its software and services on microcomputers, under the name Visilink.

Another example of a VAN service that is aimed at a specific business sector is the Reuters Monitor financial information service. Reuters is the 133-year-old news and information dissemination agency used by organisations in most countries. Monitor is available in about 110 countries, through some 34,000 terminals used by 15,000 customer organisations. The computer centre is in London and the network links are provided in the various countries in which Monitor is available. In 1983 ninety per cent of Reuters' revenue of $360m (and most of the profit) was generated by Monitor.

Monitor began operation in 1973, and now provides information on over 100 currencies, 135 commodities, 37,000 stocks and 3,000 bonds. Each commodity market and each foreign exchange service can be subscribed to separately, at about $1,500 per month each. The average subscription is $25,000 per annum. In 1981, Reuters extended its service to 490 subscribers (including eight in the Soviet bloc) who are able to negotiate currency and bullion deals direct with each other electronically. These transactions are conducted through the Monitor VAN service.

AMHERST ASSOCIATES INC.

This case history describes a resource-sharing VAN service that is used by a specific business sector (personal health-care) in the United States. Amherst Associates Inc. is the VAN service provider, offering its services through Tymshare's Tymnet and United Telecommunication's Uninet networks.

Amherst Associates is a computer services company that specialises in supporting the management of hospitals and other health-care organisations. It designs, develops, markets and supports computerised financial modelling systems that are run on its own computers, on a timesharing basis, and/or in conjunction with its clients' own microcomputers. The company was founded in Amherst, Massachusetts, in 1970 and now has offices in eight cities across the United States. By October 1983 more than 400 hospitals were customers of the company's VAN service.

Services and users

In the United States, hospital services and medical health-care are provided on a private basis, and hospitals and health-care organisations operate as profit-making commercial businesses. There are 3,100 general hospitals, each with 100 beds or more. These institutions, which function in an increasingly competitive marketplace and are subject to comprehensive and frequently changing government regulations, are the primary market for Amherst Associates' VAN service.

The company's major services include:

—A Hospital Systems Library, which is a computerised modelling system for hospital planning, budgeting, reimbursement and reporting.

—A Case-Mix Library, which is an online interactive system that combines financial and clinical data for 'what-if' simulation, planning, budgeting and reporting on case-mix management.

These systems use data gathered from the hospitals' general accounting functions, medical records and operational statistics to assist their managements in preparing annual business plans and budgets, in controlling hospital administration, in strategic and financial planning, in maximising reimbursements from government or private health insurance schemes and in regulatory reporting.

Rather than develop its own communication network of leased lines between nodes, with customers accessing the network through a local node, Amherst Associates has contracted to use Tymnet and Uninet. Amherst connects its computers to its local network nodes, and users connect their terminals to their local nodes.

As a VAN service provider, the key benefit for Amherst of using Tymnet and Uninet is the availability of a managed, nationwide network. A massive investment would be required to build and operate an equivalent network from scratch. Another advantage is that customers can be linked to Amherst's VAN service with the minimum of delay via their local nodes — Amherst customers do not have to wait for the telephone companies to connect and commission new circuits. Furthermore, if a customer's local node fails, the next nearest node can be accessed for continuation of service.

Amherst has found that there are several advantages to using established commercial networks (such as Tymnet and Uninet) as the vehicle for providing its VAN service:

—The network transmission error rate is insignificant, although this is not necessarily so on the local link between the customer's terminal and his local node; this link is part of the public switched service and lacks any special error-detection or recovery facilities.

—A range of incompatible terminals is supported by the speed and protocol conversion software resident in the network.

—Should a circuit connection between two local nodes fail, the node is automatically switched by the network to an alternative circuit.

—The VAN service provider does not have to employ technical support staff to plan and maintain the network. In practice, however, a small team of about four staff is needed to assist customers who experience network difficulties.

The main benefit to the hospitals using the VAN service is that, in effect, they gain all the advantages of a sophisticated and competent information systems department without having to operate it themselves. This is a form of facilities management, except that the facilities being managed happen to be elsewhere and are used via a network.

Future developments

Amherst Associates has a limited private network connecting its own offices in eight cities to the computer facility in Amherst. This network is used for internal communication and administration, but is not currently used for the company's VAN service. Amherst is monitoring the traffic volume and the cost of using Tymnet and Uninet. When the economics are right, the company will implement a dual network for its VAN service, similar to that used by Honeywell, as described earlier.

Amherst is also developing its application software for microcomputers, and has offered some systems (IBM PC hardware and Amherst application software) to those users who wish to run some of the applications themselves. An increasing trend is for customers to use their own microcomputers for the more straightforward aspects of the service, whilst continuing to use the VAN service for complex 'what-if' modelling that relies, for example, on industry-wide health-care statistics and trends that Amherst has collected.

Other resource-sharing VAN services used by specific business sectors

Medical Information Network (MINET) is an example of a resource-sharing VAN service used by a specific business sector. It is offered by the American Medical Association using the GTE-Telenet network to distribute health-care data in the United States, and is, in essence, a complementary service to Amherst's VAN service. Subscribers to this service can also use the messaging facility provided by GTE's Automail service. Either service can be accessed from the same terminal.

Another example of a business-sector resource-sharing VAN service is the Retail Inventory Management (RIM) service provided in the United Kingdom by Centre-file, the computer services subsidiary of National Westminster Bank. RIM provides smaller retailers with computer-assisted inventory management facilities.

DISTRIPHAR-SPID

This case history describes an information-sharing VAN service that is used to encourage vertical co-operation within a part of the French pharmaceuticals business sector. Distriphar, the VAN service provider, is improving communications between its main distribution depots and its customers through a videotex-based VAN service named Distritel. Distriphar does not operate the network, which is based on the French PTT's videotex service. This case history is also an example of a VAN service provider being a major user of its own service.

Distriphar is a Paris-based subsidiary of Roussel-Uclaf, one of the two largest pharmaceuticals groups in France. Distriphar is responsible for storing, marketing and distributing pharmaceutical products to pharmaceutical wholesalers, pharmacies, doctors, hospitals, clinics and laboratories throughout France.

Services and users

Distritel, Distriphar's VAN service, offers a range of information to its users:

—General information — such as warnings and safety information; and general marketing information.

—Product information, which can be retrieved from the products file by product code, by name (first two letters) or by main chemical component. Detailed information about the chemical composition of drugs, dosages, health risks and restrictions on use can also be obtained.

—Specific information such as useful contact names, addresses and telephone numbers.

—Product prices.

—Medical diagnostic and prescription aids.

Distriphar's customers can also order products direct via the VAN service, which will automatically take account of quantity and special discounts and order extensions.

The VAN service is run on two ICL 2966s at Distriphar's computer centre. These processors are front-ended by a communications unit, and a protocol converter to permit ASCII mode and 1200/75 bit/s (videotex) transmission. The cost of implementing the system was about $150,000. This included software (developed by Roussel-Uclaf's Technical Services Group) and additional hardware.

The VAN service is used by approximately 1,300 users, of whom about 850 are pharmacies and 450 are internal users (such as Roussel-Uclaf's laboratory staff). Users access the VAN service via Minitel videotex terminals, rented from the local PTT shop for $9 per month. The terminals connect to Distritel via the PSTN for local users, or via Transpac (the French public packet-switched network service) for remote users.

Typically, pharmacies make six or seven calls per month to the service, with each call lasting about 12 minutes. Most of their use is to access product information and to place orders. The internal users within Distriphar and Roussel-Uclaf use the system more intensively. They make about 13 or 14 calls per month, with each call lasting about 14 minutes. The internal users can also access the electronic messaging facility (external clients cannot currently use this service), and can make use of training programs available via the system. All users pay for telecommunication charges (PSTN and Transpac charges) and the lease of the terminal; apart from these charges the VAN service is, at present, free.

The benefits of the service to Distriphar include:

—Increased product sales.

—A competitive edge over rival pharmaceutical product suppliers.

—A reduction in paperwork.

In addition, the VAN service has become a powerful marketing and sales tool, by providing a shop window for Distriphar's products. In particular, it encourages customers to buy from Distriphar rather than from a rival supplier.

The VAN service also provides benefits to Distriphar's customers by improving their sales or lowering their stock holdings, and by reducing the paperwork required to order products. The success of the service can be gauged by the growth in the number of users. Distriphar anticipates that the number of users will more than double to 3,000 by the end of 1984.

Future developments

During 1983 and 1984, a new set of information and the necessary application software was added to Distritel at about three-month intervals. Along with Distriphar's plans for a subscriber base of 3,000 clients, the company intends to offer new, chargeable services, industry internal management information for its customers, a database on all available drugs, and information on product availability.

Distriphar also intends to allow other pharmaceuticals companies in France to use the system, to market their own products. There are no plans to expand the service outside France.

Other information-sharing VAN services where a supplier aims to encourage vertical co-operation

The Volkswagen Audi Group (VAG) in the United Kingdom links its IBM mainframe computer to its dealers through a videotex VAN service. The initial application was designed to assist a dealer to locate the right cars for its customers from any other dealer participating in the service, or from central stock.

Six new applications will be added to the VAN service during 1984, including a parts locator service and a sales control system. In addition to the direct benefits of reduced inventory costs and increased sales, other benefits include reduced telephone bills, fewer errors, and the faster dissemination of information on new products and special promotions. VAG claims that these services will benefit itself, its dealers and its customers.

A similar type of VAN service is provided by Allianz, a major West German insurance company, for its agents. Because many insurance agents are not tied to a specific underwriter, an insurance company that provides up-to-date information to its agents through a VAN service has a distinct advantage over competitors who do not.

ARTICLE NUMBER ASSOCIATION AND TRADANET

This case history describes two United Kingdom resource-sharing VAN services which have some elements of information-sharing as well. Both are at the pilot project stage. The respective users are from the United Kingdom pharmaceuticals business sector, and the retailing (primarily food) business sector. One of the key participants in the pilot projects is the British Article Number Association. The VAN services are being planned, and will be operated by Baric — a computing services company owned by Barclays Bank and ICL. Baric will also operate the network, which it has called TradaNet.

The Article Number Association (ANA) was established in the United Kingdom in 1976 by leading consumer goods manufacturers, wholesalers and retailers. Its purpose is to standardise article numbering through the use of bar codes. The ANA is one of several European associations with similar objectives. Collectively they work under the European Article Number (EAN) guidelines.

Since the late 1970s, many of ANA's larger members have been exploring the possibility of extending the Association's role to facilitate the interchange of data between trading partners through members' own in-

house computer systems. The aim is to reduce their dependence on paper systems and to improve both the speed at which information is exchanged and its accuracy. The work undertaken by these members has led to the ANA Trade Data Communications (Tradacoms) standards.

The Tradacoms standards define message formats for the various data transfers that occur between trading partners — invoices, delivery notes, prices, orders, credit notes, etc. The message structures have been designed to comply with the SITPRO syntax rules. (We discussed SITPRO in Chapter 2 on page 15.)

In April 1984 the Tradacoms standards were being used by some 70 ANA members through the Interbridge software that translates their in-house computer data formats to Tradacoms formats. The data is then transferred to another ANA member on floppy discs or magnetic tapes, or by telecommunications circuits set up between individual trading partners. The recipient of the data converts it from Tradacoms format to its own in-house format, again through the Interbridge software.

Services and users

Rather than allowing an unco-ordinated set of private circuits between trading partners to develop, ANA envisages that a network operator will provide a VAN service for the member organisations. Initially, ANA members would use the VAN service to connect to the service provider's computers in order to access a customised mailbox service. This would, therefore, be a resource-sharing VAN service. The ANA is also discussing ways in which the initial VAN service could be extended to allow members to share information in a more direct way.

In March 1984 Baric was selected by ANA to provide the service and to conduct a six-month pilot trial for the industry, commencing in July 1984. About 12 member organisations (typically supermarkets, drug stores, food and drink manufacturers, wholesalers and distributors) are involved in the trial. If this trial is successful (in terms of pre-defined criteria for throughput, response times and network serviceability and availability), ANA will endorse the service and promote its use by members.

In parallel with this trial, five or six large British pharmaceuticals organisations will be conducting a similar trial, again using Tradacom standards and the Baric TradaNet network.

In both trials the users provide and use the Tradacoms Interbridge software, and pay the communications costs for the connections to the TradaNet node. Four nodes will be provided by Baric initially, interconnected by British Telecom Megastream (high-speed leased digital public) links.

Baric is proposing a charge equivalent to just over 3 cents for every 1,000 characters received from a user organisation. A typical invoice transferred via the network would comprise about 2,000 characters. Hence the cost of sending an invoice would be approximately 7 cents.

ICI, the United Kingdom's leading chemicals company, has been involved in the work of both SITPRO and ANA and is participating in the TradaNet pharmaceuticals pilot project. It claims that using Tradacoms standards has reduced by half the time taken by the United Kingdom Customs and Excise department to process export goods. One of ICI's eight autonomous divisions has not yet adopted the Tradacoms standards, but it is now under pressure to do so from a wholesale trading partner that places some 100,000 orders with ICI each year. ICI foresees that all of its divisions could be using Tradacoms standards by 1990. Furthermore, the standards would be adopted for internal traffic between divisions and head office as well as for external trading.

However, there are factors that may impede the spread of the ANA VAN service. The cost and timescale needed to implement product code number standards may be substantial. Organisations may resist the change from paper to electronic systems and the accompanying cultural changes. Nevertheless, the pioneer users of the VAN services believe that adopting the Tradacoms standards should lead to increased orders; failing to adopt the standards could lead to a loss of orders and customers.

Future developments

As more organisations adopt Tradacoms standards there will be an increasing need for the TradaNet VAN services. Many retail organisations are already showing great interest in the pilot trials. Assuming that the pilot projects are successful, and are followed by a commercial service, Baric would expect, by 1986, to extend its network so that it can be accessed on a local-call basis by 85 per cent of the population. As the expansion proceeds, Baric will need to introduce additional services and extensions to existing services. The company could provide the Interbridge software itself, for example. It could also provide an applications service for smaller retailers on its computers. VAN services could also be provided for other business sectors related to food and pharmaceuticals — transport and warehousing, for example.

Other resource-sharing VAN services used co-operatively by a business sector

In the United States, the grocery industry is using a Tymnet-based VAN service that is similar to the ANA

pilot projects. This service uses the Universal Communications Standards (UCS), and the Universal Product Codes. These standards and codes have been developed by the Transportation Data Co-ordinating Committee for the United States grocery industry. In the past 12 months the volumes of UCS data carried by Tymnet has more than doubled.

QZ's COM SERVICE

This case history describes a resource-sharing VAN service that is used primarily by a specialised business sector — that of research establishments. The VAN service provider is the computer bureau QZ, located in Stockholm. QZ is owned jointly by Stockholm University, Sweden's Royal Institute of Technology, Karolinska Institute and the Swedish Defence Research Institute (SDRI). It is a self-financing organisation whose revenue comes directly from sales of its services and products.

COM, the VAN service provided by QZ, is a high-level electronic mailbox and computer conferencing facility, used mainly by research establishments in Western Europe and the United States.

Services and users

COM provides 'continuous conferences' facilities, where the participants subscribe to databases of information on specific topics (such as, for example, software for expert systems). The subscribers typically are both information originators and information recipients, and individual subscribers may participate in several conferences within COM. Subscribers to a particular conference are notified, via COM, of new information that has been entered. A synopsis of the new information is available to the subscriber, who can then elect whether to obtain the complete information. Unlike users of low-level electronic mail systems, the COM subscriber is free from unsolicited mail.

The COM software was developed by QZ for DEC 10 and DEC 20 machines and was first used internally in 1979. It was developed for the SDRI which, as a department, was decentralised in 1977 and saw a need for the facility.

COM was extended to external users (for example, education and research organisations) in the early 1980s, and in May 1984 there were about 6,000 registered subscribers to COM conferences. Access can be made via the public switched telephone network and the public circuit-switched or packet-switched data networks.

Some of the COM conferences are very 'active', (that is, of current interest to subscribers), and some are not. Of the 6,000 registered users, 2,000 make extensive use of the service (an average of 20 minutes per day). Of these 2,000 active users, about 1,500 are located in Sweden, with the remainder in the rest of Western Europe and the United States.

During 1983 and 1984, new users were joining COM at the rate of 600 to 900 per year but, prior to this, the build-up was much slower. QZ attributes this recent growth to more public awareness of COM's availability, arising from press articles.

Users pay a $37 annual registration fee and typically spend between $25 and $60 per month in using the service.

Future developments

QZ's main thrust is towards marketing the COM software to the commercial sector (the company licenses other organisations to run the software on in-house computers). In May 1984 there were 30 private COM installations, of which two were run by commercial (rather than academic or research) organisations. Having originally developed COM for DEC 10 and DEC 20 machines, QZ has since developed versions of the software for VAX machines and for IBM machines running under the VM/CMS and MVS/TSO operating systems. These versions, called PORTACOM, will be available commercially in the autumn of 1984. Other versions, including one for Univac machines, are also planned.

QZ is confident that PORTACOM will succeed in the commercial sector, and envisages that multinational organisations such as oil companies will be among the early users.

QZ will adopt the CCITT GILT recommendations, which are due to be published in the third quarter of 1984. These recommendations provide a framework for exchanging messages between dissimilar computer-based messaging systems. They will enable, for example, users of ITT's Dialcom and of I P Sharp's Mailbox electronic mail systems to intercommunicate.

Other resource-sharing VAN services

Other examples of electronic mailbox services include ITT's Dialcom, British Telecom's Telecom Gold (which is derived from Dialcom) and in France, SEMA's Metratel, a videotex system that incorporates mailbox services. Metratel is used by banks, insurance and travel companies in France, Belgium and Spain.

FCS DATAFREIGHT

This case history describes an information-sharing VAN service that is used by road freight transport companies in the United Kingdom to reduce the number of unladen return journeys made by their vehicles and so

increase income and profit. The VAN service is called Datafreight and is provided by Freight Computer Services (FCS). This company does not operate the network, but uses both Prestel, the British public videotex facility and the public packet-switched data network and, separately in late 1983, a private commercial network. This history is also an example of the main users of the service being part of the same group as the VAN service provider.

More than 80 per cent of all freight in the United Kingdom is carried by road. There are 120,000 freight transport companies (hauliers), operating half a million commercial vehicles. However, most of these transport companies are very small enterprises and only 15,000 of them operate heavy goods vehicles of more than 3.5 tonnes per vehicle when loaded.

One of the largest heavy goods vehicle hauliers in the United Kingdom is BRS, with about four per cent of the total market. Its 6,000 vehicles operate from 130 branches, each of which is an autonomous profit centre.

One of the major factors contributing to hauliers' profitability is the extent to which vehicles can be fully loaded, particularly for return trips. Indeed the Government-sponsored Transport and Road Research Laboratory has estimated that British heavy goods vehicles spend one-third of their time running empty, wasting 4.5 million kilometres' worth of fuel each year. In attempting to locate return loads, hauliers make an average of seven long-distance telephone calls (at a cost of about $20 in telephone calls and labour) for each return load actually carried. Even so, they are successful in only 15 per cent of cases.

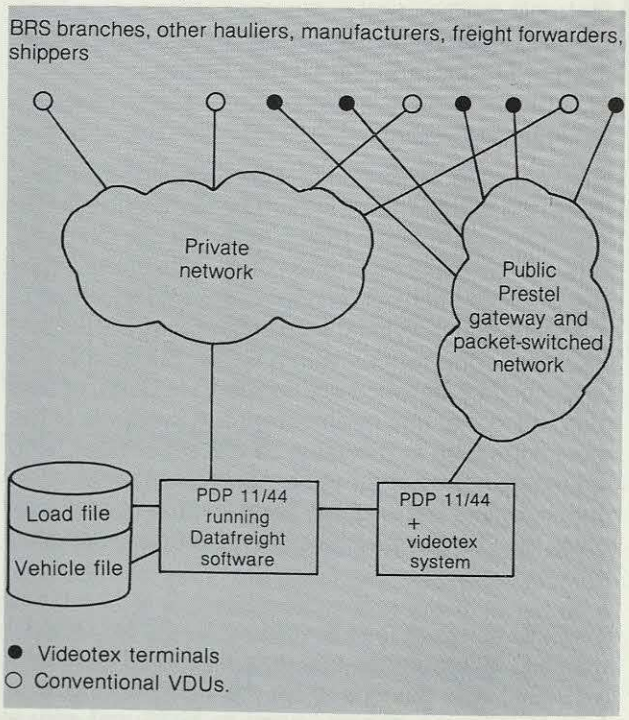
Services and users

The Datafreight VAN service is based on an internal system initially offered in 1979 by BRS to help its branches locate loads and match them with vehicles that would otherwise run unladen. In essence, the original internal system consisted of two files: a record of all vehicles that were seeking loads; and a record of all loads that a branch could not conveniently carry using its own fleet of vehicles, and for which another vehicle was being sought. BRS branches would then search these files, looking for available loads or vehicles. If an appropriate one was found, the branch would telephone the operator and negotiate the terms for the journey. The system did not (and still does not) locate vehicles or loads automatically. The system was run on a DEC minicomputer operated by the computer bureau ADP Network Services Ltd, and Hewlett-Packard terminals were used to access the service.

In March 1982, BRS decided to offer its internal system as a service to other freight hauliers. But the company believed that the service would be more attractive to other hauliers if it involved cheaper and less sophisticated technology, terminals and communications media, and if the time needed to train users could be reduced. Another objective was that it should be easy (and inexpensive) to expand the service as the number of subscribers increased.

BRS invested about $150,000 in developing the software for the VAN service. The software ran on twin PDP11/44 minicomputers. One minicomputer ran the interactive Datafreight system, and could be accessed over a private network from conventional visual display units. The other PDP11/44 acted as a videotex front-end processor and Prestel gateway interface. The VAN service is shown schematically in Figure 3.3. This arrangement ensured that existing Datafreight users could continue to use their conventional terminals, whilst new users could use videotex terminals.

Figure 3.3 The Datafreight VAN service configuration (early 1984)



In May 1983, after a three-month marketing campaign, there were about 125 Datafreight users, of whom less than 30 were in BRS branches. Datafreight users pay $450 a year, plus an additional $50 a week for the terminal, its maintenance, and the cost of using the Prestel gateway and network. The total annual revenue covered the costs of running the VAN service. BRS estimated that an individual haulier could recover his charges if, each week, he could find one additional load, or if he could avoid 150 kilometres of empty travel each week.

In January 1984 BRS withdrew the private network service and the use of the ADP bureau computers, continuing only with the Prestel videotex facility. There were 140 users by that time, but the system was not providing the expected commercial return, and market projections indicated that demand would not pick up in the near future.

BRS believes there are two main reasons for the failure of the service to reach its expected potential (which had been estimated as several thousand subscribers). First, the company says that the road freight industry was not prepared to change its methods of working and to adopt the new technology. Second, BRS claims that the typical user (freight broker, or haulier) is not yet ready to use computers and so prefers to maintain the present method of working, even though Datafreight could help to reduce costs.

In our opinion, though there is at least one further reason. The system presented information on loads and vehicles, but did not itself actually match them. Nor did the system take bookings, and so the user still had to make telephone calls. Furthermore, because the system did not take bookings, the apparently available load or vehicle would not necessarily still be available by the time the telephone call was made. This is a major drawback of retrieval-only systems.

FCS, which, like BRS, is a subsidiary of the National Freight Consortium (NFC), now operates the Prestel-based VAN service on behalf of BRS and NFC.

Future developments

For the present, FCS will maintain the less sophisticated system (based on manually updating pages of information stored Prestel), and will make small changes to services for existing users. If the demand for the VAN service grows and is likely to make the service profitable, FCS will develop it further. It cannot foresee a major growth in demand for this VAN service in its current form, however, until a new computer-literate generation of goods vehicle despatchers and schedulers starts to replace the current staff.

Other information-sharing VAN services used for business-sector co-operation

In the United States, the American Trucking Association provides a VAN service similar to Datafreight. This system is proving to be more attractive than Datafreight because the longer distances involved increase the cost both of unladen trucks and of long-distance telephone calls to arrange return loads. There are also videotex-based services in Belgium and the Netherlands that are similar to Datafreight.

SUMMARY OF CASE HISTORY EXPERIENCES

From the case histories, and from other VAN services investigated during the research of this report, we are able to draw out some common themes about the way in which these services are being used. In general, our research showed that:

- Although resource-sharing VAN services are now widely established, there are also a large number of examples of information-sharing VAN services of the newer kind (that is, those that are interactive and transaction-oriented).
- Examples of VAN services used as general-purpose tools are easy to find, but there are also many examples of VAN services that are used co-operatively by trading partners and competitors.
- Economies of scale represent the dominant motive for using VAN services, although some organisations are starting to look for economies of scope through the co-operative use of VAN services.
- Nearly all the VAN service providers continue to add to their portfolio of applications and services in order to remain attractive and competitive.
- Many of the VAN service providers are also in the timesharing bureau business.
- New users can be added to a VAN service quickly and at very little cost.
- VAN service users do not need to make major investments in installing or in expanding a private network, and hence the entry costs are not prohibitively expensive.
- VAN service users are typically charged on the basis of their usage, rather than a high subscription fee.

National differences

Our research shows that there are more similarities than differences between VAN services in different countries. However, we have identified three main reasons for national differences in the development and exploitation of these services: geographical differences; differences in PTT services and regulations; and differences in marketing thrust.

The geography of a country has an obvious effect on VAN services. As an example, the combined network used by Honeywell in the United States, exploiting its dedicated network for high-volume traffic and a VAN service for low-volume traffic, would not be very useful in a compact country such as Belgium or the Netherlands. The cost advantages of many resource-sharing VAN services comes from their distance-related tariff savings. These advantages are much diminished in geographically compact countries.

Differences in PTT services also have an effect on VAN services. Telecommunications regulations in the United States prohibit a national public packet-switched system. The lack of such a network encouraged the pioneer private network operators (GTE-Telenet, Tymnet, etc.) to move into the market. Similarly, it was the availability of British Telecom's Prestel videotex service that has encouraged a broad sweep of VAN services in the United Kingdom, ranging from services for travel agents and tour operators, to those for real estate agents and for insurance agents.

Differences in national regulations were discussed in more detail in Chapter 2. We believe that these differences affect merely the initiation of VAN services and their proliferation — not the essential need for these services.

Finally, as so often happens in information technology, the natural marketing instinct and entrepreneurial thrust of many American companies have once again pushed them to the fore — not only in the United States, but also in Europe.

CHAPTER 4

FUTURE TRENDS IN VAN SERVICES

In Chapter 1 we predicted that the VAN services marketplace is set to grow, and will become a major sector of the IT industry. In this chapter, we identify the major trends we see developing in this emerging and rapidly evolving area of IT. We focus on three areas: developments in the means of delivering VAN services; trends in the two major classes of VAN services (resource-sharing and information-sharing); and the emerging market for VAN services that are aimed at the consumer.

DEVELOPMENTS IN THE MEANS OF DELIVERING VAN SERVICES

Today the conventional delivery mechanisms for VAN services include the public switched telephone networks, public circuit-switched and packet-switched data networks and transatlantic satellite links. In the future, VAN services undoubtedly will use new PTT public transmission services (such as integrated services digital networks, or ISDNs) as and when they become available. In addition, though, we predict that developments in four areas (satellite transmission, interactive cable networks, cellular radio and, in a slightly different context, high-density local data storage) will bring about significant changes in the way in which VAN services are delivered.

Satellite transmission

We predict that VAN services will make greater use of satellite links in the future. At present, all international satellite communications are controlled by Intelsat, which has more than 100 nations (or national nominees, such as Comsat in the United States) as members. But the United States is now poised to allow private satellites to carry voice, data and television signals across the Atlantic (although these transmissions would obviously need reciprocal arrangements to be made with European countries before they can commence). For reasons of cost, available bandwidth and reliability of service, satellite links should prove an attractive alternative to landlines and underwater cables for VAN service providers.

Already, transatlantic (and, in North America, transcontinental) VAN services make use both of landlines and satellites. We predict these uses will grow.

In addition, many European-based companies historically have close ties with trading partners in the Asia-Pacific region. Many economists predict that this region will be a significant growth area in the late 1980s and the 1990s. Satellite communication capacity with this part of the world is increasing year by year and, in our view, multinational satellite-linked long-distance VAN services between Europe and the Asia-Pacific region are likely to proliferate by the end of the decade.

Interactive cable television networks

Broadband cable television networks are already in place in most West European countries. In September 1983 nearly nine million households in Western Europe subscribed to cable television and, by 1988, this number is likely to grow to over 13.5 million. By that time, between one and two per cent of connections (that is, between 135,000 and 270,000) will be of the two-way interactive kind. These networks will be capable of transmitting voice and data signals as well as video. It would be possible to use the interactive cable networks for VAN services that incorporate colour pictures (either moving or stationary) which display and demonstrate merchandise or give pictorial instructions. We anticipate that interactive cable television networks will provide an alternative to the more conventional networks for the delivery of VAN services in the future.

Cellular radio

In the case histories in Chapter 3 we described Honeywell's use of portable terminals in conjunction with a VAN service (see page 16). In the future, the progressive introduction of cellular radio systems will mean that VAN services can be delivered via a combination of conventional transmission media and cellular radio. VAN service users will be able to interact with the service via highly intelligent and powerful hand-held microcomputers that incorporate modems for decoding the radio signals.

Cellular radio will be used primarily to provide mobile telephone services, but the technology can also be

used for data transmission. In 1983 there were fewer than 100,000 mobile telephone units in the whole of Western Europe, but we estimate that, by 1989, the number will have grown to nearly 800,000 units. Many of these will be used by salesmen, repairmen and other mobile workers — the same people who would be VAN service users.

High-density local data storage

We noted earlier the pressure on computer bureaux to become VAN service providers as their customers transferred traditional timesharing work to their own in-house systems. Another area of concern for the bureaux (and VAN service providers) is that of downloading data. Many users are either overtly practising, or overtly demanding, the ability to download subsets of data for processing on their own intelligent workstations or communicating microcomputers.

This is a particularly pertinent issue for the online database retrieval service companies. Some VAN service providers of this type are already offering microcomputer software packages and related downloading facilities. Others are resisting the pressures to do so by trying to provide more attractive services that can be accessed only through the VAN service. This is a sensitive area for these companies at the present time, and is likely to remain so for the next year or two.

Even so, we predict that the use of local storage for storing copies of subsets of the data obtained through VAN services will expand exponentially. This will occur in association with the microcomputers that will be installed at VAN service user sites (as with the services provided by SAGE DATA and Amherst Associates, which we reported on in Chapter 3). The local storage will be provided both by rotating magnetic media (whose price-performance ratio will continue to improve) and, before the end of the decade, by videodiscs that provide high-density data storage.

The combination of microcomputers with high-density, low-cost local data storage will provide VAN service users with a more cost-effective service. The users will need only to access the remote computers, either at the VAN service providers' location or at their trading partners' locations, to download bulk data and store it locally. They will be able to analyse the locally stored data without incurring further VAN service usage charges.

TRENDS IN RESOURCE-SHARING VAN SERVICES

At present, individual resource-sharing VAN services offer separate, unrelated services — such as electronic mailbox, radiopaging, or telephone answering. There is already a move to link and to integrate some of these services. For example, a telephone answering service could automatically page the recipient by radio. We foresee a trend in which service providers link their services together so that their users can, if they wish, subscribe to a full family of integrated services to support their business communication needs.

The motives of the service providers in doing this will be both protective — to make it less attractive (and more difficult) for the users to replace the integrated services by in-house services; and aggressive — to increase revenue and market penetration in the face of competition.

This trend will benefit VAN service users. They may be able to purchase all the services they need from a single service, so avoiding multiple contracts, interfaces, terminals, workstations, etc.

Nevertheless, there is as yet no resource-sharing VAN service available in Western Europe that provides the whole range of facilities that would be needed before a major organisation could consider using a VAN service in place of its own network. But, by extrapolating from today's simple resource-sharing VAN services, and taking account of the trend towards a greater integration of facilities, we would not be surprised to see VAN services evolve into comprehensive, intelligent, managed networks that could take on this role. Thus an organisation could buy-in services to provide a corporate network, and would therefore avoid the difficulties and problems of designing, installing and operating its own network.

We predict that the PTTs, major United States-based IT enterprises such as AT&T, IBM and General Electric, and some of the established bureau companies, will by the end of the decade, be able to provide intelligent managed networks such as these. Smaller organisations will provide selected specialist services, for which there will continue to be a market demand. But smaller organisations who attempt to compete in the wider market are unlikely to be successful.

The final significant trend in resource-sharing VAN services is complementary to the previous one. It is a move towards more general-purpose services. We believe that there will also be a trend for VAN service providers to offer resource-sharing services aimed at specific business sectors.

This trend will benefit VAN service users, because it will provide a greater choice of services and service providers, assuming, of course, that the bigger operators do not drive the smaller ones completely out of business. We believe that this is unlikely to happen because of the overall trend towards greater deregulation and liberalisation. Smaller VAN service providers can, and already do, use other people's net-

works to provide specialist VAN services. In our view, there will be more, not fewer, entrepreneurs in the VAN services market, during the next three to five years.

TRENDS IN INFORMATION-SHARING VAN SERVICES

We predict that the most significant trend in information-sharing VAN services will be for the 'information monopolies' (the online information retrieval services) to transform their services into online interactive transaction-oriented services. In other words, we predict a trend towards a greater use of what we defined as information-utility VAN services in Chapter 1. Some of the financial information retrieval services have already been transformed into online interactive services, enabling stockbrokers not only to enquire about prices, but also to place orders to buy or sell through the VAN service.

The information-utility VAN services available today tend, in the main, to be concerned with a single business sector. Sometimes, as with Distriphar or Sony, they are used solely by a single distributor or manufacturer and its agents or customers. We have identified a trend in which the VAN service that serves a single supplier and its agents or customers becomes so beneficial that the originator decides to market the service to its trading partners or competitors as a business in its own right. This is already happening with the Datafreight service, and Distriphar plans to use the Distritel service in the second way. This trend, we predict, will continue.

On the other hand, we foresee a slower movement from single-sector VAN services towards those serving multiple business sectors. An example would be an airline booking system that already provides a variety of related booking services for the travel business — hotel reservations, railway and ferry bookings, car rental reservations, etc. In future, this service could be expanded to include travel insurance, theatre bookings and so on — that is, an expansion from the narrower travel business into the wider leisure business. Such a trend would enable VAN service providers and users to achieve economies of scope.

Another evident trend is for information-sharing VAN service providers to increase the added value of their service (and hence their revenue and profit) by supplying communicating microcomputers and associated software which together form an intelligent workstation. This enables the service provider to increase revenue by selling microcomputers and software packages. It also enables the service provider to offload some of the data and the processing, thereby reducing the user's communications costs, which, in turn, makes the service more attractive to the user.

Finally, for those information-sharing VAN service providers that specialise in a particular business sector, a natural extension of their service is to provide specialised applications consultancy. We have already seen examples of this trend in our case histories: Amherst Associates provides advice on hospital management systems; SAGE DATA provides econometric consultancy, particularly as applied to synthetic plastic resin supply and demand; and Centre-file provides advice on retail management systems. It is this specialist expertise that enables smaller VAN service providers to compete with the large multinational IT suppliers and the PTTs.

VAN SERVICES FOR THE CONSUMER

In Western Europe, the videotex medium has encouraged VAN services for business purposes, whereas in the United States videotex has been applied more in the consumer services field. In our view, though, the time is now ripe in several West European countries for videotex VAN services to increase their penetration of the consumer market. Such services will offer home banking, home shopping, home entertainment and local news and community information. Indeed, this is already happening in several countries, most notably in France, the United Kingdom and West Germany, but also in the Netherlands, Sweden and elsewhere.

In France, the PTT has set up an electronic directory enquiry service. To encourage telephone subscribers to use this service, the government has underwritten the cost of providing three million videotex terminals free of charge to subscribers. Already 100,000 terminals are installed, mostly in homes. A further incentive for using videotex is provided by the French PTT, which makes available local packet-switching adaptors that give inexpensive and quick access to Transpac (the national packet-switched service). The overall system approach for the directory enquiry service makes use of Architel, a standard protocol developed by the French PTT and based on ISO-OSI recommendations. The installed base of videotex terminals, and the open-system architecture, are stimulating the introduction of a wide variety of consumer VAN services in France.

We have already mentioned the Homelink service for home shopping and home banking in the United Kingdom. Another example of a consumer service is Comp-U-Card, an American teleshopping VAN service. Comp-U-Card began to offer its services in the United Kingdom in 1983, but with the consumer telephoning the Comp-U-Card centre, rather than using a VAN service. Nevertheless, Comp-U-Card plans to set up a VAN service in the United Kingdom that will link with home microcomputers, so that consumers can have direct access to the information

base, and can carry out their own browsing and ordering.

In West Germany, also, there were 5,000 videotex terminals by early 1984, connected to the Bundespost's Bildschirmtext service. Despite some early delays, the videotex industry in West Germany is predicting that there will more than 500,000 terminals in service by 1987, most of which will be in consumers' homes. Once again, the basic infrastructure necessary for consumer VAN services is being installed.

We believe that conditions are right for the consumer VAN service market to grow rapidly. On the one hand, businesses are continuing to seek means of externalising their costs — in the case of teleshopping by getting the consumer to do the selecting and ordering. On the other hand, many social commentators believe that more and more consumers will turn to electronics to replace some of the more mundane aspects of day-to-day transactions — buying food, withdrawing cash from banks, and handling domestic administration such as renewing insurances, or car licences. Even if only five per cent of all consumers use VAN services, the volume will be quite substantial in most countries — two to three million users in each of France, Germany, Italy and the United Kingdom.

SUMMARY OF FUTURE TRENDS

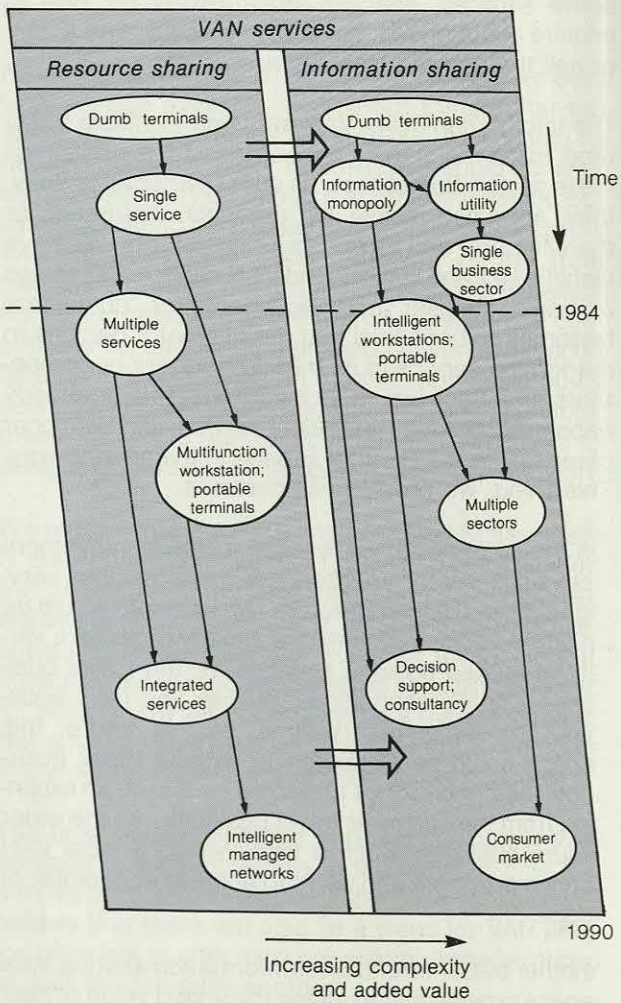
Figure 4.1 summarises the overall trends in VAN services. The horizontal axis is an indication of service complexity and of added value, and the vertical axis represents time. The figure is not drawn to scale, but is intended to represent the evolution of VAN services in the next three- to five-year period.

The figure shows resource-sharing VAN services expanding from single services delivered through dumb terminals, to multiple services delivered through multifunction workstations or portable terminals. The multiple services evolve first into integrated services and eventually into intelligent managed networks. Some of the resource-sharing services are evolving, and many more will evolve, into information-sharing VAN services.

The figure also shows information-monopoly VAN services expanding into new areas: downloading data to intelligent workstations, decision support and modelling software; and being supplemented by consultancy services. We foresee information-utility VAN services growing from single-business sectors into multiple related sectors and into the consumer market.

We further predict that over the next several years the overall direction of VAN service evolution will be towards choice, towards more comprehensive and integrated services, and from the general to the particular. The trend will be from a small number of services aimed at selected markets to a large number of services aimed at mass markets.

Figure 4.1 Future trends in VAN services



CHAPTER 5

GUIDELINES FOR USING AND PROVIDING VAN SERVICES

VAN services offer an alternative means for an organisation to satisfy its electronic communications needs. The choice of whether to use a VAN service depends on the advantages and disadvantages compared with the alternatives (the public switched network, or a dedicated private network, or a combination of all three). We begin this chapter, therefore, by highlighting the advantages and disadvantages of using the various types of VAN services identified earlier in the report. We then present guidelines that can be used by corporate communications planners as they consider where using VAN services would best fit into the corporate networking strategy. Finally, we provide guidelines for prospective VAN service providers, for the benefit of those Foundation members who might wish to consider following this path.

ADVANTAGES AND DISADVANTAGES OF USING VAN SERVICES

We have identified four main advantages of using VAN services compared with the other alternatives:

- —The costs and effort required to implement a network-based service are lower.
- —The charges for using the service are related to the usage made.
- —The user organisation has access to an established network infrastructure.
- —A complex business function can be subcontracted to an organisation with specialist skills.

We discuss each of these advantages in turn, but point out that using subcontractors can also have disadvantages.

1. Lower implementation costs and effort

By using a VAN service (for electronic messaging, for example), an organisation can avoid the costs and effort of designing, developing and implementing an equivalent in-house application. To develop a simple in-house mailbox system would cost, say, $50,000 and take six months. To purchase a ready-made mailbox system to run on an in-house computer would cost between $5,000 and $20,000 in licence fees (for 100 to 500 mailboxes). To lease or purchase a videotex system that can provide the basis for a complete application service would cost, say, $50,000 to $250,000, depending on the features required and system capacity. And a bespoke interactive transaction-processing videotex service used by a manufacturer and its dealers or agents could cost about $1 million and take 20 man-years of development effort.

All of these applications can, today, be provided by VAN services for a modest sign-on fee, ranging from a few hundred to a few thousand dollars. Furthermore, the prospective user, by talking to existing users, is able to evaluate in advance the performance of the service and the benefits that can be gained.

2. Usage-related charges

The second advantage of using a VAN service is that charges are related to usage. There is, of course, likely to be a standing charge or subscription fee, but this reflects a minimum level of likely usage, and is a good measure of whether such a service is needed at all.

3. Use of an existing network-infrastructure

The third advantage of using a VAN service is that it allows network services to be provided without the need to make major capital investments in a dedicated corporate network. The investment required would depend on the number of nodes, the type of nodal equipment, the number and the capacity of lines interconnecting these nodes, and the amount of redundancy needed to provide the level of service required. For a company operating in a medium-sized country such as West Germany — with six main nodes and branch lines to, say, another ten locations — the cost of such a network could vary between $1 million and $5 million.

An additional advantage is that there is less risk of using technology that might, in practice, not be the right solution to the problem, or that might become obsolete before the required return on capital is achieved.

4. Subcontracting to a specialist contractor

The fourth advantage comes from using a VAN serv-

ice as an externally supplied service. This advantage is similar to that obtained from any other externally supplied service — using a freight company to transport the products, for example, or a warehousing company to store the products. The external service providers take responsibility for a self-contained part of the business. The advantage is that, for an appropriate fee, the external service provider — in this case, the VAN service provider — is responsible for providing an agreed service. The user pays for the service provided and does not need to be concerned with the mechanics of how it is achieved.

By subcontracting a network-based application to a VAN service provider, an organisation receives four specific benefits:

—Economy, by cost savings achieved by sharing services with others.

—Convenience, because the network is managed and administered on the user's behalf.

—Technical support, which is available when needed from the VAN service provider.

—Flexibility, because initiating and cancelling the application is quick and inexpensive.

There are, however, four disadvantages of subcontracting to a VAN service provider:

—There is no guarantee that the objectives, evolution and direction of the service will continue to match the evolving requirements of an individual user. The VAN service provider may see, and follow, a developing market that is completely different from the needs of some of the existing users. These users will then have to seek alternative solutions.

—The user has no control over the VAN service or its operator, and this includes the provider's staff and suppliers. For example a user could be affected by disputes between the VAN service provider and his staff or suppliers.

—The VAN service provider could decide either to improve or reduce the service levels (availability, reliability, security and so on). Improved service levels often mean higher fees — which may be wasteful if the user does not really need them. Reduced service levels may be more economic for the operator and may indeed be satisfactory for the majority of his users, but will cause difficulties for those users who need higher levels of service.

—There is always the concern that the user's sensitive business data stored in the VAN service provider's computer might be accessed (accidentally or otherwise) by his competitors.

Resource-sharing VAN services

For users of resource-sharing VAN services, there are three specific advantages. First, resource-sharing VAN services can be used as a means of allowing incompatible terminals and computers to communicate in a cost-effective way. In effect, the user has the benefit of using a real or virtual open systems interconnected (OSI) network.

Second, a resource-sharing VAN service can be used to provide a (virtual) dedicated network, or it can be used to extend an in-house corporate network. In the latter case, users can keep their options open: if the VAN service usage increases, they can extend their own networks and transfer the work to them.

Third, using a resource-sharing VAN service provides flexibility in the way in which network-based services are introduced and used. Users may select from a portfolio of available services, and pay only for those actually used. Additional services may then be selected as they are needed. A VAN service may also be used as a means of conducting a trial or pilot project (electronic messaging, for example), before deciding whether to implement a full-scale system.

Many organisations use a resource-sharing VAN service, such as electronic messaging, in this way. But there is a potential disadvantage. Sometimes, these trials or pilot projects are seen by users as expressions of a lack of management commitment. Partly because of that, the users may not commit themselves to the project. This, in turn, causes the project to fail to meet the criteria required for it to become a full service.

There can also be disadvantages when an organisation decides to bring in-house applications or facilities that have previously been provided by a resource-sharing VAN service. This could cause user dissatisfaction if the in-house service is inferior to the one it replaces.

The flexibility provided by a resource-sharing VAN service can, in itself, be a disadvantage, particularly if a dedicated private network is being designed to replace a VAN service. If the VAN service has been used as a means of allowing incompatible equipment to communicate, there will have been no incentive to acquire compatible equipment. The short-term advantage of using a VAN service in this way may be small when compared with the long-term costs of converting and replacing incompatible equipment to achieve an integrated dedicated network.

Information-sharing VAN services

Information-sharing VAN services are used primarily for business-sector co-operation and, in general, the more users there are of an information-sharing VAN

service, the more valuable the information is to all the users. Our research showed that users of inter-company information-sharing VAN services experience one or more of the following advantages:

—They gain a competitive advantage by sharing information on high-value and/or short-life products or services (such as airline seats or fresh food).

—They reduce costs by replacing people and paperwork with electronic transfer, often making use of a clearinghouse and relevant business data interchange standards.

—They often improve their service levels, sales, market share and/or profit.

—They incur no application development costs. Instead they can use an established VAN service that provides specialist applications or consultancy services specific to their business sector. Someone else (usually the VAN service provider) has paid the costs of developing the applications, and is seeking to recover those costs by sharing the applications among many users.

The key benefit of information-sharing VAN services is that they enable businesses to consider externalising their functions, or to forge co-operative links with their trading partners without having to make large infrastructure investments. By definition, a single organisation cannot provide equivalent information-sharing through a dedicated in-house service. The network itself can be dedicated, however, but the VAN service provider will often be a trade association or a special organisation that operates the network and related services for the trading partners.

We identified only one main disadvantage of using a business-sector VAN service. Users, potentially, may become over-reliant on a third party for critical business information and, as a result, may come to depend on the VAN service for vital business functions.

Another minor disadvantage is that, in some cases, the availability of accurate, up-to-date and reliable information can, initially, introduce short-term costs. We know of at least one motor manufacturer that suffered a short-term fall in orders from its dealers when they realised that the VAN service enabled them to find and deliver required models without needing the high stock levels they previously required. A similar effect applies to electronic funds transfer VAN services — bank accounts can be debited immediately a transaction takes place, rather than after the usual clearance period of several days.

Using inter-organisational information systems (of which business-sector VAN services are one type) can also have hidden, second-order effects in other parts of the organisation. For instance, using a business-sector VAN service can cause existing business procedures and practices to change both within the organisation and between the organisation and its trading partners and competitors. It can also affect sources of supply, pricing of merchandise or services and, sometimes, can cause an increase rather than a decrease in operating costs. The implications of these second-order effects require careful consideration.

GUIDELINES FOR NETWORK SERVICES PLANNERS

Because VAN services are one of several ways of implementing network services, the guidelines for using them should form a component of an organisation's information technology and network strategy. We now discuss the issues that a prospective VAN service user must consider when planning his corporate network services strategy.

Resource-sharing VAN services

The decision about whether to use a resource-sharing VAN service, as opposed to establishing an equivalent in-house facility, is concerned with technical issues and the relative costs of the alternative technical options. It can therefore be made by the organisation's management services or telecommunications function.

In considering possible resource-sharing VAN services, the prospective user should look ahead and select a VAN service that offers a portfolio of facilities beyond those meeting the initial requirements. This should enable the organisation to continue to use that service as its requirements evolve and expand, and should also avoid the need to subscribe to several different VAN services.

If access to the VAN service is required in several countries, it is preferable to choose a VAN service provider that offers the appropriate service in each of those countries, rather than using a different national service in each country.

If there is a possibility that the VAN service functions may be transferred to an in-house facility at some future date, the service facility chosen should be one that can be purchased or licensed for use with the organisation's own computer (or network).

Information-sharing VAN services

The decision to use a resource-sharing VAN service is largely one of trading off the relevant advantages and disadvantages of using an external service against those of providing equivalent facilities in-house. With information-sharing VAN services, however, no such choice exists because, by definition,

the information is either costly or difficult to obtain, or other organisations are involved (as information receivers and possibly also as information providers).

The decision about whether to use an information-sharing VAN service falls, therefore, into two parts. The first part is concerned largely with technical issues and, again, can be made by the organisation's management services or telecommunications function. This part concerns aspects of information-sharing VAN services that do not relate to business co-operation between trading partners (or competitors) in a business sector. The second part is concerned with the business implications of using a VAN service for co-operating with trading partners. We discuss these issues separately under business-sector VAN services.

There are two technical considerations, both of which concern the match between internal systems and external systems (the VAN service).

First, when the user organisation decides to link into a high-speed, high-bandwidth system (the information-sharing VAN service), the organisation's internal systems may need to be upgraded. If the internal system operates at a lower speed, it may be a constraint on the overall system performance.

Second, if an information-sharing VAN service is used for day-to-day transactions, it could impose significant constraints on the organisation's information systems strategy. Linking internal systems and data (either computer or paper-based, and however tenuously) to an external system can distort timescales, performance levels, development priorities and overall direction. These distortions must be anticipated, and they may create a need for major amendments to the organisation's information systems strategy. There could also be an impact on the organisation. This impact is no different in nature from the changes imposed by in-house systems, but it must be planned for.

Business-sector VAN services

In general, businesses co-operate through business-sector information-sharing VAN services for two distinct reasons.

First, businesses use VAN services as a means of defence. In this situation, small and medium-sized companies in the same business sector, such as real-estate agents, co-operate through a VAN service in order to strengthen their position against bigger competitors. This has certainly happened in some countries where, for example, many small and medium-sized tour operators co-operate through VAN services in defence against the leading package-tour operators who offer their own online reservation systems.

Second, businesses use VAN services in an entrepreneurial role. Here a major organisation may find that a VAN service is a good means of expanding its business or of locking-in its trading partners. For example, Distriphar (the Paris-based pharmaceuticals company) has used a VAN service to lock-in its retailers by providing valuable business information and interactive transaction-oriented application systems through the service.

Decisions about using information-sharing VAN services for business-sector co-operation should therefore be business-led rather than technology-led. Typically, the commercial director or the marketing director would lead the deliberations and make the decision. Several technical issues involving costs and benefits, service levels, compatibility, etc. will also need to be considered, but these are secondary to the business decision to use this type of service.

Information-sharing VAN services aimed at specific business sectors tend to be managed either by a trade association or by a market leader (often in conjunction with the trade association) in that sector. Such services usually are provided in only one country.

Prospective users of business-sector VAN services need to be aware of the activities of all of the relevant trade associations. A food retailer, for example, may also sell health and beauty products and so may well belong to the national or regional pharmaceuticals trade association as well as to the food retailers' association. In addition, there are overlapping trade associations. For instance, the British Article Number Association has as its members not only individual companies but a dozen or so other trade associations — such as the Food Manufacturers Association and the Federation of Wholesale Distributors. The Article Number Association and the various member trade associations may well be pursuing different VAN service projects. The difficulty lies in deciding which of the several overlapping services to use and which not to use.

Finally, having selected which service to use, the organisation must decide on the optimum time to subscribe to it. This, again, is a business decision rather than a technological one. If the chosen VAN service is in the process of being established, the advantages of joining early are: the ability to influence the facilities that will be provided, and their relative priorities; the opportunity to minimise potential interface problems or costs; and the opportunity to reorient internal plans in anticipation of using the VAN service.

But joining early and helping to pioneer a new VAN service also has disadvantages. These include investing more in development and planning than later users will need to, and exposing the organisation's

own plans explicitly or implicitly to actual or potential competitors.

In the end, it will be the corporate culture that dictates whether a particular organisation will be a leader or follower in a specific business-sector VAN service project.

GUIDELINES FOR PROSPECTIVE VAN SERVICE PROVIDERS

As a result of reading this report, some Foundation members may wish to consider offering an existing in-house network-based service as a VAN service. Others may wish to take a leading role in establishing a business-sector VAN service. The case histories in Chapter 3 included several examples of user organisations who had become VAN service providers (but still used their own service). The research also confirmed that a VAN service provider does not necessarily have to operate the network over which the service is offered. In this section we therefore supply guidelines for prospective VAN service providers.

Figure 5.1 shows the key characteristics of the business sectors in which VAN services are likely to succeed. A prospective VAN service provider needs to assess whether his in-house system is capable of being extended to serve a business sector with these characteristics, and so could be offered as a VAN service to that sector.

Figure 5.1 Key characteristics of business sectors where VAN services are likely to succeed

Business environment
Offices and transactions should be geographically spread.
Business procedures should be paper-bound or people-intensive.
The environment should be highly competitive with complex alliances which either lock-in trading partners or lock-out competitors.
The products or services should either have a short life or incur high inventory costs.
There should be the potential either for economies of scale (efficiency), or economics of scope (effectiveness).
Trading partners
Trading partners should be geographically spread.
Business should be transacted either via many agents or brokers, or via a clearing house.
Each company should need to communicate with a large number of trading partners.
Information about products and services
The product or service should involve high volumes, and be vital, valuable or subject to a high degree of change.
A single database for the business sector would be an advantage.
Data interchange standards should exist for the business sector.
There should be a critical need to match supply and demand, buyers and sellers.
An historical database would be an advantage.

From the point of view of a prospective VAN service provider, our research has shown that:

- The entry price consists of costs for hardware, software and concentrator (or switching) equipment, and is not trivial. Some expertise or speciality needs to be acquired or, if it already exists, needs to be packaged for external consumption.
- A further initial investment may be needed if the network being used does not have data nodes or other equipment located near to the users or prospective customers. There is, of course, the possibility that the prospective VAN service traffic may be sufficient to persuade the network operator to install additional nodes or other equipment as part of his general network.
- VAN service regulation is a factor to be considered at the outset (see Chapter 2).
- To operate a VAN service across national borders adds another dimension to the complexity of obtaining approval from PTTs (this aspect was also discussed in Chapter 2).
- For a VAN service to be acceptable, the reliability, availability and security of the service must be extremely high. A level that is adequate in-house may well fall short of commercial expectations and standards.
- If the VAN service is a resource-sharing one, then the service provider must be prepared for users eventually to transfer the service to an in-house version, just as external timesharing bureaux have been faced with transfers to in-house information centres.

In conclusion, to succeed in setting up and providing a VAN service, an organisation needs to have four key attributes:

- First, good marketing skills. It must assess the customers' needs, sell effectively, market the service by working with the most influential trade association in that business sector, and sell to market leaders and opinion formers in that sector.
- Second, a product that is 'natural' to the business sector. It must provide a service that satisfies a genuine need.
- Third, strong administrative skills. It must have general management abilities, and the ability to run a commercial business.

— Fourth, systems capabilities. It must have the development, maintenance and support skills, and the hardware resources, to provide the expected levels of service.

Finally, a prospective VAN service provider must have sufficient capital resources to enable it to endure the inevitable delays in establishing the service as a profitable venture.

CONCLUSION

There are already 1,500 VAN services available in Europe. Of these, about 1,000 are information retrieval services providing access to 2,000 online databases — of which 500 are based in Europe. Of the remaining 500 VAN services, 50 are resource-sharing services offered by the PTTs. Most of the remaining 450 VAN services are based on videotex. Thus Europe already has a substantial base of VAN services. This is a relatively new field, however, where new services are proliferating and existing services are evolving and expanding.

The newer VAN services are used interactively for business transactions rather than for retrieval only, and they tend to foster co-operation between trading partners (and, sometimes, competitors) in the same business sector. These newer value added network services are often used as competitive weapons or as strategic marketing tools, and they provide new opportunities for exploiting information technology.

Telecommunications technology and commercial developments are creating demands to develop VAN services to cope with and to exploit business changes and pressures. This exploitation occurs in four ways: by encouraging decentralisation, by permitting externalisation, by encouraging co-operation and by achieving economies of scale and of scope.

There are also several examples of transnational VAN services. The provider of such a service has to deal with the complexities of differing national legislation and regulations. But the problems can be overcome and, for a multinational user, such services can provide large benefits.

Whilst standards are not prerequisites for the growth or successful use of VAN services, their absence adds to complexity and to cost. Progress is being made in agreeing the lower-level network-oriented standards (equivalent to layers 1 to 3 of the seven-layer ISO Open Systems Interconnection reference model).

More importantly, information-sharing VAN services used by specific business sectors need business data interchange standards. Examples of these standards include IATA standards for airlines, SWIFT standards for interbank funds transfers, and EAN article numbering represented by bar codes on food products and other such merchandise for consumers. These standards typically are agreed between trading partners, often under the aegis of their trade association.

Transnational data standards also are being agreed. These activities often take place under the guidance of quasi-governmental organisations whose objectives are to foster international trade through simplifying import/export procedures and documentation.

The PTTs play a dual role in VAN services. One role is that of service provider: the West European PTTs operate a variety of resource-sharing VAN services. The other role is that of infrastructure supplier and telecommunications regulator.

Within this second role, the PTTs have two somewhat conflicting aims. The first aim is to encourage usage of the telecommunications infrastructure, in order to obtain a return on their high capital investments. The second aim is to discourage services from competing directly with the PTT. Against this background of conflicting aims and dual roles, the PTTs tend, naturally, to take a pragmatic, enlightened self-interest in considering applications to set up new VAN services.

Within an organisation, decisions on whether to use a VAN service as a general-purpose tool can be taken by the management services or the telecommunications manager because the issues are largely technical and economic. Information-sharing VAN services used co-operatively within a business sector are an altogether different issue, though. We attach great importance to this type of VAN services, because they will help businesses to respond positively to the changing business environment of the late 1980s and the 1990s. But there can be profound implications for the business, including the hidden second-order effects, arising from the use of these inter-organisational information systems. Decisions on whether to use these VAN services should be business-led rather than technology-led.

Some organisations are expanding an in-house network-based service so that it becomes a VAN service for their business sector. But, to be successful

as a VAN service provider, they need to be marketing and commercially minded, and they may need to upgrade their skills and their equipment.

Future trends in VAN services are towards more comprehensive, integrated and intelligent services, and away from general services and towards particular ones. In other words, as in most other parts of the IT market, there will be more choice. VAN services aimed at the consumer market are also emerging.

In mid-1978, in Foundation Report No. 5, we identified the emerging trend of the convergence of technologies, and used the term information technology. Six years on, in this report, we have described developments in an emerging area of IT where, at times, it is difficult to distinguish between the telecommunications and computing elements of the services and systems. In six years' time, at the end of the decade, we believe that VAN services will have become widespread throughout most of the OECD countries.

THE BUTLER COX FOUNDATION

Butler Cox & Partners Limited
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Objectives of The Foundation
The Butler Cox Foundation sets out to study on behalf of subscribing members the opportunities and possible threats arising from developments in the field of information systems.

The Foundation not only provides access to an extensive and coherent programme of continuous research, it also provides an opportunity for widespread exchange of experience and views between its members.

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The majority of organisations participating in the Butler Cox Foundation are large organisations seeking to exploit to the full the most recent developments in information systems technology. An important minority of the membership is formed by suppliers of the technology. The membership is international with participants from Belgium, Denmark, France, Italy, the Netherlands, Sweden, Switzerland, the United Kingdom and elsewhere.

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