Videotex in Europe

Butler Cox

Report Series

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THE BUTLER COX REPORT SERIES

VIDEOTEX IN EUROPE

Issued January 1985

This report, the nineteenth in Butler Cox's Report Series, provides

—A review of the current status and likely future outlook for videotex in Europe on a country-by-country basis

—An examination of the main developments in the North American videotex market, and their likely impact upon Europe

—A complete review of the videotex product and service supply industry in Europe, including product reviews and supplier market shares

—An analysis of the state of the industry in 1984, including shipments and installed-base statistics; the results of a major 'barometer' survey amongst users, to determine their attitudes, future plans and perception of key issues, and nine selected case histories

—Forecasts by product and country, for the period 1984 to 1988

The report, which is based on extensive and new research amongst suppliers, users and European PTTs, complements and extends the factual information and geographic coverage of Butler Cox's earlier report 'Private Videotex Systems — their Selection, Use and Future Prospects'.

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DEFINITIONS

Videotex

The term "videotex" means different things in different countries. Correctly, and as defined by the CCITT, videotex is the generic term for both a broadcast and an interactive text and graphic communication standard. They are respectively called broadcast (or one-way) videotex and interactive (or two-way) videotex. In the UK they are called teletext and viewdata; in France, Antiope and Télétel; in West Germany they are known as Videotext and Bildschirmtext, and in the US as teletext and videotex.

In this report, and in all the earlier reports in the Videotex Report Series, we have adopted the nomenclature used in the US, because, while it may differ from local usage in Europe, it is universally understood. So we use the term videotex to mean two-way, interactive videotex — in other words viewdata, Télétel or Bildschirmtext.

The first videotex systems in Europe were installed by the national PTTs and were designed to provide services for a mass residential and business market. They came to be known as public videotex systems. Later, in 1979/80, smaller versions of these systems were acquired and installed by other organisations, usually for private, in-house use. They were called private videotex systems.

Since then, public and private systems have tended to converge. Some PTTs are offering identical services to those available from independent computer bureaux running private videotex systems. And many private in-house systems are accessed by residential and business users outside the system operators' organisations, sometimes via gateways from public videotex systems, but often directly over the dialled telephone network.

In this report we use the term "private videotex system" to mean a videotex system that is not run by a national PTT. The report does not, however, confine itself purely to consideration of these systems. It also addresses related products and services, such as terminals and networking services, that have a direct bearing on the market for, and operation of, private videotex systems.

Europe

This report is written for a West European readership and describes the market for videotex in Western Europe. We include the following countries within Western Europe:

— Austria, Belgium, Denmark, Finland, France, Germany (F.R.), Ireland, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom.

BUTLER COX

Butler Cox has specialised in researching and analysing developments in information technology since 1977. It includes the fields of computing, telecommunications and office automation within its areas of interest.

Business activities
Butler Cox's main business activities are:

—Consultancy for individual information technology users and suppliers. This consultancy is generally of a strategic, management and marketing nature, rather than a technical nature.

—Multiclient research and analysis. This activity involves undertaking major projects for several organisations who share the costs and results of the projects. The number of organisations may be fewer than 100 (as was the case for a major research project into the market for office technology, conducted in 1980/81) or more than 100 as is the case with the Butler Cox Report Series.

—The Butler Cox Foundation and the Strategic Studies Programme. These are ongoing programmes of research and analysis for information technology users and suppliers respectively. They are funded on a subscription basis and are jointly managed by Butler Cox and the members of the programme.

Videotex activities
Butler Cox has had an active and continuing involvement in videotex since 1977 when it ran the first public conferences on videotex in conjunction with British Telecom.

In 1978, Butler Cox conducted a major multiclient research project to analyse the market for videotex in North America. The following year it completed a similar study in Europe.

The Butler Cox Report Series was launched in 1980. The original Series consisted of eleven videotex reports, produced during 1980 and 1981. It was followed by another Series of five reports (the Videotex Report Series '82) produced in 1982. In 1984, Butler Cox issued its landmark study, 'Private Videotex Systems — their Selection, Use and Future Prospects' which has had a significant impact on the industry's perception of videotex and its future role in the information technology market.

This report is the latest report in the Series, which has covered almost all aspects of videotex; from display standards to ergonomics, from telecommunications to access methods, and from applications to market forecasts. A brief description of all the reports in the Butler Cox Report Series can be found at the end of this report on page 140.

In addition to researching and producing its videotex reports, Butler Cox has undertaken confidential consultancy assignments for users and suppliers; for example to identify the likely applications of videotex in an organisation, or to advise suppliers on product design, market potential and marketing methods.

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INTRODUCTION AND MANAGEMENT SUMMARY

INTRODUCTION

This report is concerned with the current status of and outlook for videotex in Western Europe. It is written primarily with European readers in mind but it will also be of value to organisations outside Europe with an interest in videotex. It is a report intended for the non-technical reader but assumes a basic familiarity with computing and videotex terminology.

The report concentrates on describing the current status and future outlook for the videotex industry for the five-year time span 1984 to 1988. Most of our research was carried out between June and September 1984 and, unless otherwise indicated, our analyses refer to the status of videotex applying at that time. Our market forecasts and supplier market shares, however, are estimated for year ends to enable year-on-year comparisons to be made.

This report complements, rather than supersedes, Butler Cox's earlier report 'Private Videotex Systems — their Selection, Use and Future Prospects'. It updates and extends the factual information, and includes information on public videotex services and greater country-by-country analysis, but it does not reproduce the strategic insights relating to the nature of the videotex industry, its future evolution, and the forces underlying and predetermining that evolution.

Research methodology

Butler Cox has been researching videotex developments on an international basis since 1978 and has amassed a considerable library of material and a body of knowledge about videotex worldwide.

To ensure a comprehensive and factually up-to-date report we carried out an extensive programme of specific research between June and September 1984. We mailed over 300 detailed questionnaires to suppliers of videotex products and services throughout Western Europe. Many of these, and especially the larger well-established ones, were also interviewed on the telephone or face-to-face. National PTTs of each country also answered questionnaires or were interviewed face-to-face or by telephone. Our research of users of videotex is based on a number of sources. We mailed a questionnaire to 200 organisations throughout Europe who exploit the technology either as private system operators or as major service providers in their country. We received 52 usable replies in time to be included in our analysis. In addition, some 25 private videotex system users were interviewed by telephone to supplement data collected from PTTs and suppliers in the different countries. We selected a further nine organisations to feature as detailed case histories.

We also attended videotex conferences, seminars and exhibitions and obtained information from local contacts, including national videotex industry associations.

As a result of our research we have the names of some 400 organisations on file that have private videotex systems installed. This represents nearly a third of all private videotex systems estimated to be installed in Western Europe at the end of 1984. Of these about 280 are listed in Appendix 2 (for confidentiality reasons we cannot reveal all the names of private videotex system operators known to us).

Structure of the report

In addition to this Introduction and Management Summary, a short Concluding Comments section and four appendices, this report has five chapters.

In Chapter 1 we provide a description and analysis of the current status of videotex in Europe including individual country summaries. The report covers the following West European countries:

— Austria.

— Belgium.

— Denmark.

— Finland.

— France.

— Germany (FR).

— Ireland.

— Italy.

—Netherlands.

—Norway.

—Spain.

—Sweden.

—Switzerland.

—United Kingdom.

For each country we provide a brief historical perspective and a description of the current status of videotex, followed by an analysis of the key issues and outlook for the industry. Statistical information such as the number of terminals, private systems and the principal features of the supply industry are also given.

In Chapter 2 we examine key North American developments in the videotex field and how these will, in our opinion, affect the nature and direction of videotex developments in Europe.

Chapter 3 is concerned with videotex suppliers and their products and services. We describe key developments in the field of terminals, private systems, public and independent bureaux and networks. The many suppliers covered by our research are catalogued by type of product or service in tabular form.

Chapter 4 addresses the marketplace, and the users of videotex products and services. We first present the results of our survey of users. This includes an analysis of their current and planned involvement in videotex, expenditure levels, and the features and characteristics of products and suppliers considered important by our respondents. The chapter also provides detailed analyses of the experiences of nine organisations selected as case histories. A breakdown of the structure of the marketplace, in terms of applications and industry sectors, is also presented.

Our market forecasts are provided in Chapter 5 and cover the three principal types of videotex products: terminals, private systems and independent and public videotex bureau services. Geographic breakdowns of these forecasts are included. We conclude the report with an analysis of the changing nature of the industry in terms of its main revenue sources.

The four appendices provide:

—The names and addresses of European videotex product suppliers and their agents.

—The names of about 280 users of private videotex systems, with details about their country and industry, and the system used where this is known.

—The names and addresses of the videotex industry associations in those European countries that have associations.

—The names and addresses of PTTs operating public videotex services.

MANAGEMENT SUMMARY

This management summary highlights the most important findings and issues raised in this report. It is written for senior managers with little direct involvement in videotex and contains only as much hard fact as is required to give clarity and credibility to the issues discussed. References to the main body of the report are provided to facilitate selective reading.

Overview of European videotex developments

By mid 1984, PTT-operated videotex services were available or being developed in every European country covered by our report, with the exception of Ireland. By mid 1984 the total number of videotex terminals installed in Western Europe was around 300,000 (Figure 1.1 on page 7) and is estimated to reach some 520,000 by the end of 1984. The vast majority of terminals installed are in France, followed by the UK, West Germany and the Netherlands.

Two countries, West Germany and Switzerland, have implemented the CEPT standard during 1984. They are expected to be joined by Austria, Italy and Spain by 1985 or 1986. Norway and Belgium are in the course of developing their full commercial systems, and both envisage offering multiple standards, including CEPT. The remaining countries are in principle committed to introducing the CEPT standard but this is unlikely to be carried out until the end of the 1980s. France is expected to continue with its Antiope standard for the foreseeable future, and the UK is heavily committed to the Prestel standard.

Videotex developments in Austria have been dominated by the locally developed microcomputer based terminal, the Mupid. The uncertain regulatory position concerning home shopping and home banking are likely to be a major handicap for the future growth of videotex in Austria until it is resolved.

Belgium has for many years been one of the few countries in Western Europe not to have a PTT-run videotex service. But in 1984, the RTT (the Belgian PTT) awarded the contract for a network-oriented public service to BTM, ITT's Belgian subsidiary.

The Danish videotex service — Teledata — changed from trial service to full commercial service in Spring 1984. The announcement has stirred a lot of interest in Denmark, and Teledata is now being expanded to cater for the increase in users and external computer connections expected.

In Finland, the development of videotex has been influenced by the existence of many independent local telephone companies. Videotex services operated by private companies in conjunction with these telephone companies were the first to be introduced in Finland. More recently, the Finnish PTT has also established its own videotex service.

France has long been one of the major players in the international videotex scene. But the growth of videotex within France over the last 18 to 24 months has been spectacular by any standard. By mid 1984, monthly shipments of terminals had reached between 25,000 and 35,000, and by the end of the year some 400,000 terminals are expected to be installed in France. Nearly all of these are of the 'Minitel' type — the Minitel being a low-cost basic videotex terminal with integral monochrome screen — used to access the PTT's electronic telephone directory service as well as private videotex systems. The policy to supply these cheap terminals (with heavy subsidies) is one of the cornerstones of the French approach to videotex. Another is to use a distributed network approach, with external computers accessible to users over the public packet-switched network.

The West German videotex scene over the last two or three years has been dominated by the creation of a new videotex infrastructure to accommodate the change from the Prestel standard, used during the trial of the public service, to the CEPT standard. The new CEPT service was officially opened in June 1984 but the transition is not expected to be complete before Spring 1985. Despite many delays, the Bundespost (the German PTT) remains confident that subscriber numbers will rise rapidly once these problems have been overcome.

Ireland does not have a PTT-operated videotex service, but bureaux play an important role in the Irish videotex scene.

In Italy, SIP (a national telecommunications agency) has been conducting a trial of its Videotel public service since late 1982. By mid 1986, it is expected to move to a full commercial service, which will involve changing from the present Prestel standard to the CEPT standard. The private videotex market has been hampered in its development by the prohibition of private systems unless connected to the Videotel network.

In the Netherlands, videotex has developed fast compared to most other countries. Terminal penetration is relatively high and the private videotex system market is maturing rapidly.

In Norway, after an initial limited trial, the Norwegian PTT has decided to introduce a full commercial service by the end of 1985. The service is network oriented and will include an electronic directory service.

The Spanish PTT has been operating a trial since 1982 using its own standard, incompatible with all others. In early 1985 it plans to introduce a new service using the CEPT standard.

Switzerland became the second country in Europe after Germany to adopt the CEPT standard in 1984. But the new system will continue to have the status of an operational test until 1985 or even 1986 when governmental sanction of the new service is expected.

The United Kingdom is the country where videotex originated in the early 1970s. Early market forecasts proved to be grossly unrealistic and, in 1980, attention was switched from the domestic to the business market. The private videotex industry has grown rapidly in the UK and continues to be a major — if not the major — force in the development of the market.

The North American influence

Videotex developments in North America have traditionally lagged a few years behind Europe, although ASCII-based services such as Compuserve, The Source and the Dow Jones service have experienced phenomenal growth in the US.

By mid 1984, an estimated 300,000 home microcomputers were accessing these ASCII public services, though ASCII is not yet widely considered as a videotex standard.

North America has adopted its own videotex standard — NAPLPS, ratified in 1984 by ANSI and OSI, the main standards bodies in the US. By mid 1984 there were under 10,000 terminals accessing NAPLPS-based services. There are also trials and services using European videotex standards. Private systems have become more important since the early 1980s. In 1983 IBM enhanced its SVS/1 private videotex system to support NAPLPS and began to promote its immensely successful PC business microcomputer as a videotex terminal. DEC introduced a private system in 1984, and AT&T awarded a contract to Aregon International to develop one for its own range of minicomputers. In the US, microcomputers are widely recognised as the basis for videotex terminals.

The US videotex market is expected to grow very rapidly, creating opportunities for European software suppliers but also leading to US products being marketed in Europe. We believe that, as a by-product of these developments, NAPLPS-standard devices will appear in Europe over the next few years.

Suppliers and products

The private videotex system market has expanded steadily over the last twelve months. There are now more suppliers than ever before and the major suppliers, such as IBM, ICL, CAP-Gemini-Sogeti and Aregon International, are increasingly tending to dominate the market. We have reviewed 88 products on the market, compared to 50 twelve months ago. (Refer to Figure 3.1 on page 42). Of the products available, 53 are minicomputer-based, 28 are for mainframes and nine are for microcomputers (some products are available for both minicomputers and mainframes). A large increase in sales and installations by IBM in 1984 makes it the leading videotex system supplier for the first time. (Figure 3.4 on page 63 shows supplier market shares by installed base.) Further important developments are the entry of DEC into the videotex industry as a software supplier and AT&T's agreement with Aregon to jointly develop and market a new private videotex product to be called IVS-5.

The videotex terminal market has also seen many changes in Europe during the last twelve months. We review the terminals offered by nearly 100 suppliers in Western Europe (refer to Figure 3.9 on page 67). The UK still has the largest number of suppliers of videotex terminal equipment, with an estimated 32% of European suppliers by number. The number of West German suppliers has increased considerably and now represents some 21% of the total number of European suppliers. The French market, however, is still dominated by a relatively small number of suppliers, despite the very large numbers of terminals being sold.

The rapid increase in the number of installed terminals in France, to an estimated 400,000 by the end of 1984, is one of the most noteworthy developments in the European terminal market during 1984. Other important developments are the increasing availability and use of microcomputer terminals (Figure 3.13 on page 76 lists some of the microcomputers for which editing software and adaptors are available) and the growing number of CEPT terminal suppliers. (Figure 3.10 on page 72 shows a breakdown of terminal suppliers by display standard.)

The number of independent videotex bureaux in Europe has also increased substantially during the last year; rising from 65 to 125 and continuing to grow at a fast rate. In addition to these, there are 13 PTT-run videotex bureau services (listed in Figure 3.15 on page 82). (Figure 3.14 on page 79 lists independent bureaux.) Independent bureaux are especially important in France where there is no PTT-run videotex bureau service.

Videotex networking services vary widely from one European country to another, depending largely on the PTTs' philosophy towards videotex and the regulatory position. In most European countries, the national PTTs have a statutory monopoly over the provision of all telecommunications network services. In the UK, because of the government's policy to deregulate telecommunications, commercial organisations are now allowed to offer value-added network services (VANS) in competition with British Telecom, the national PTT. Of these, the most publicised are the networks offered by Baric (the computer bureau subsidiary of ICL) and Istel (the computer services arm of British Leyland). (Refer to Figure 3.18 on page 86 for a list of organisations in the UK that have announced VANS.) In general, however, it is the PTTs that offer videotex network services, except where PTTs permit the provision of services to third parties by a bureau or private network operator. (Figure 3.22 on page 89 lists the main networking services available in Western Europe.)

Users and the marketplace

Our survey of European private videotex system operators and major information providers (IPs) produced some striking results. Around 15% of our respondents already derived more tangible benefits from videotex than they were spending. Average annual spend on videotex was running at $210,000 per organisation during 1984. (Figure 4.2 on page 92 provides a detailed breakdown of present and planned expenditure levels.)

Our respondents also answered questions on a whole range of issues concerning practices, preferences and motivations when buying and using videotex products and services. Our survey showed that the average port capacity per private videotex system was just under 30 ports in 1984 and respondents expected it to increase to 133 by 1988. The most important feature of private videotex systems in the future is considered by our respondents to be system and transmission security. (Figure 4.3 on page 93 lists the features of private systems considered important by our respondents, in order of importance.) As regards the characteristics and marketing methods of suppliers, the most important one overall was considered to be the ability of a supplier to demonstrate his ability to provide technical support following a sale. (Figure 4.4 on page 94 lists the characteristics of suppliers considered to be important by respondents.)

As regards terminals, our respondents expected a substantial increase in the proportion of micro-

computer-based terminals. Amongst our respondents, microcomputer-based terminals constituted just over 1 in 10 of all installed terminals in 1984, and were expected to reach nearly 7 out of 10 in 1988.

The nine case histories of videotex users illustrate the different motivations and approaches to videotex and the interesting range of applications being developed. The companies reviewed as case histories are:

—Gruner + Jahr (West Germany).

—Bavarian State Ministry for Agriculture (West Germany).

—Air France (France).

—Barclays Bank (France).

—AGB/Fishnet (UK).

—Export Credit Guarantees Department (UK).

—Jetair (Belgium).

—Neckermann Amsterdam (Netherlands).

—ESCO Reisen (Switzerland).

Although these case histories illustrate some of the problems that can result from the application of videotex, they clearly identify the importance of interactive user-oriented services in the identification of successful applications for the technology.

Market forecasts

We estimate that the annual value of the videotex market — comprising spending on terminals, private systems and public and independent bureaux — amounts to just over $200 million in 1984 rising to nearly $1,300 million by 1988. (Refer to Figure 5.16 on page 115 for the market breakdown by product and service type.)

Terminal numbers in Western Europe will, we estimate, rise from an installed base of 520,000 at the end of 1984 to over 7.3 million by 1988. The installed base will grow most dramatically in France until 1986, when the market-saturation point will begin to be reached. But terminal numbers will also grow rapidly in the Netherlands, Belgium and the UK. (Refer to Figure 5.2 on page 110 for a country-by-country breakdown of market forecasts for installed terminals.) The number of terminals shipped each year will rise from 345,000 in 1984, to over 2.5 million in 1988, representing a value of $112.1 million and $633.8 million respectively. In 1984 most (around 78%) of European terminal shipments were in France. By 1988 this proportion will decline, but will still be dominant at 57%. (Refer to Figure 5.4 on page 111 for a geographic breakdown of annual terminal shipments and value.) CEPT terminals comprise only around 7% of terminals shipped in 1984, but this proportion will rise to 27% by 1988, by which time a significant number of terminals with alphageometric capabilities will also be shipped. (Refer to Figure 5.6 on page 111 for forecasts of market shares of terminals of different videotex standards.) Microcomputers will be increasingly important as videotex terminals and, by 1988, nearly half of all videotex terminals shipped will be microcomputer based. (Refer to Figure 5.7 on page 112 for our forecasts of market shares of terminals of different types.)

We forecast that the number of installed private videotex systems will grow from 1,240 in 1984, to 3,840 in 1988. In 1984 nearly a third of installed private systems were in the UK, but by end 1985 we envisage that France will overtake the UK in terms of the installed base of private systems. In West Germany the installed base of private systems will begin to grow significantly from 1986. (Refer to Figure 5.10 on page 113 for a country-by-country breakdown of our forecast for the installed base of private systems.)

The annual number of systems shipped will rise from around 580 in 1984, to 1,170 in 1988, while port capacity shipped will increase from 11,640 in 1984, to 84,150 in 1988. The value represented by these shipments will grow from $55.3 million in 1984, to $166.3 million in 1988, including hardware and software. (Refer to Figures 5.12 and 5.13 on pages 113 and 114 for a geographic breakdown of annual shipment volumes and values.)

We forecast that spend on bureaux (both independent and public) will increase from $34.1 million in 1984, to $482.4 million in 1988. Spend on independent bureaux will rise from $6.8 million in 1984, to $96.5 million in 1988. Spend on public (PTT) bureaux will grow from $27.3 million in 1984, to $385.9 million in 1988. (Refer to Figures 5.14 and 5.16 on pages 114 and 115 for the breakdown of bureau revenues by residential/business subscribers and by country, respectively.)

CHAPTER 1

THE STATUS OF VIDEOTEX IN EUROPE

Since videotex was invented over a decade ago, every major country in Europe has adopted and begun to exploit the technology. Yet in every one of these countries videotex has developed along different lines. Although technological considerations, such as display standards and communications protocols, appear on the surface to have dominated the development of videotex in many countries, the key forces that have determined the direction and speed of developments lie much deeper. They constitute a complex web of interacting influences within each country. The technology chosen is usually a consequence of this interplay, and not the reverse. Political, regulatory, cultural, demographic and economic conditions vary greatly from one country to another. There is, therefore, no single factor governing the introduction, progress and ultimate success of videotex in any one country, let alone for Europe as a whole.

Because there is (despite the title of our report and the international standards-setting efforts of the CEPT*) no such single thing as 'videotex in Europe', this chapter is structured on a country-by-country basis, preceded by a brief European overview.

The overview summarises the position of the PTT-operated videotex services, the installed base of terminals, and the videotex standards position in each country. It also discusses the potential for, and implications of, possible future interconnections between national videotex networks.

Each country summary is accompanied by a table providing statistical information and lists the main product suppliers. The country-by-country reviews cover in some depth the issues facing the majority of industry participants, particularly those involved with the PTT-run public videotex service. In almost all countries these services continue to dominate the direction of the industry, even though private videotex system operators and suppliers are playing an increasingly important role.

*CEPT — Comité Européen des Postes et Télécommunications — one of the important European standard-setting bodies that has been active in the field of videotex standards.

EUROPEAN OVERVIEW

By mid 1984, PTT operated videotex services were available or being developed in every West European country covered by this report except Ireland. Figure 1.1 lists the PTT services and videotex standards, and shows the number of installed terminals in each country. The total number of videotex terminals in Europe was around 300,000 in mid 1984, of which two thirds were installed in France. By the end of 1984 the total is expected to reach some 520,000, due especially to the exceptionally high growth of terminals in France. In terms of terminal numbers, the UK is is placed second with some 20% of all terminals in Europe, West Germany is third and the Netherlands and Sweden are fourth and fifth respectively. These five countries account for 95% of the installed base of videotex terminals in Europe, and over 90% of the worldwide videotex terminal population.*

Our research confirms the widely held view that at least three videotex standards will dominate in Europe for much of the rest of the 1980s. These are the British-developed Prestel standard, the French Antiope standard and the standard drawn up by the CEPT, the European 'club' of PTTs, usually referred to as 'CEPT-level three', or more simply, the CEPT standard.

Two countries, West Germany and Switzerland, have implemented the CEPT standard, replacing the previously-used Prestel standard. Others, such as Austria, Italy and Spain, plan to introduce CEPT shortly. Norway and Belgium are in the course of developing their full commercial systems. Both countries' public videotex services will be in the Prestel standard until 1985 when CEPT is planned to be introduced (though multiple-standard operation is envisaged beyond that date). Although committed in principle to adopting the CEPT standard, France is unlikely to change from its Antiope standard for the foreseeable future, given the large number of Antiope-standard terminals already installed and being shipped. The

* This excludes ASCII terminals accessing such US services as Dow Jones News Retrieval, CompuServe and The Source. If these are taken into account, the share attributable to the top five European countries falls to around 55%.

remaining countries (Denmark, Finland, Ireland, the Netherlands, Sweden and the UK) are also committed in principle to introducing CEPT, but this is not likely to take place much before the end of the 1980s. The CEPT standard is inherently more expensive than either Prestel or Antiope, and the PTTs are tending to wait to see how successful CEPT is in Germany before introducing it.

This co-existence of different standards has important implications for any future interconnection of the different national videotex services. Interconnection has been the subject of inter-PTT discussion for a number of years. Plans to achieve interconnection are being prepared in West Germany, Austria, the Netherlands, Switzerland, the UK and Belgium, and in parts of Scandinavia direct access to information held on the British Prestel system has already been implemented.

Figure 1.1 Summary of videotex standards, PTT services and installed terminals in Western Europe

Country	*PTT system name*	*Standard of PTT system*[1]	*Total number of terminals at mid-1984*[2]
Austria	Bildschirmtext	Prestel (CEPT imminent)	1,300
Belgium	RTT system (name to be announced)	Prestel (CEPT and Antiope shortly)	200
Denmark	Teledata	Prestel (CEPT eventually)	750
Finland	PTT system plus 12 private Telset companies	Prestel (CEPT eventually)	2,000
France	Teletel	Antiope	200,000[3]
Germany (F.R.)	Bildschirmtext	CEPT[4]	14,000
Ireland	No PTT system	No standard announced. Most private systems use Prestel standard	200
Italy	Videotel	Prestel (CEPT shortly)	1,500
Netherlands	Viditel	Prestel (CEPT eventually)	10,000
Norway	Teledata	Prestel (CEPT shortly)	300-400
Spain	Ibertex	Spanish standard that is similar to Prestel (CEPT imminent)	500
Sweden	Datavision	Prestel (enhanced)(CEPT eventually)	6,000-7,000
Switzerland	Videotex	CEPT[4]	500-700
United Kingdom	Prestel	Prestel (CEPT eventually)	60,000
		Total: Approximately 300,000	

Notes: [1] 'CEPT imminent' means CEPT is planned to be introduced before mid-1985; 'CEPT shortly' means CEPT is planned to be introduced during late 1985 or 1986; 'CEPT eventually' means the introduction of the CEPT standard is not likely before 1987 and no firm plans have yet been made.

[2] The terminal numbers refer to the total number of videotex terminals in a particular country in July 1984. This may or may not coincide with the number of terminals registered on any one country's PTT system. Refer to individual country summaries for details

[3] The installed terminals figure for France is growing very rapidly and is expected to reach 400,000 by end 1984.

[4] Significant number of Prestel standard devices are still installed, resulting from earlier trial services using the Prestel standard.

The CEPT standards committee conceived a 'videotex standard' comprising five levels; with devices designed to the higher levels being able to access services conforming to the lower levels. In theory, the three European standards should already be compatible with each other, as both Prestel and Antiope are CEPT downwards-compatible standards. In practice, however, this is not the case. The German CEPT implementation uses 8-bit coding whereas both the other systems use 7-bit coding (with no parity bit)*. Nonetheless, such differences at the technical level could be overcome relatively easily (but not cheaply), for example, by modifying terminals.

A further drawback is the networking and operational difference between national PTT systems. Unlike many PTT services in Europe that are modelled on the 'centralised' British Prestel service, the French Teletel service is almost totally decentralised. The PTT does not perform any central billing on behalf of service providers, and the concept of a videotex frame as a basis for levying charges does not exist. And almost all the databases and services accessed are held on remote independent computer systems. (The French PTT has been accused of running a ghost service. Whether this accusation is fair or not, it is likely that Teletel's success has been noted, perhaps with some embarrassment, by other less successful PTT administrations.) In addition to the problems of compatible standards and operational procedures, the regulatory position governing such issues as copyright, data protection and consumer protection will need to be addressed at an international level before full interconnection of the different services becomes a reality.

The three existing European videotex standards are unlikely to remain unchallenged. There is a clear trend among private system suppliers and some PTTs to focus attention on the North American alphageometric standard, NAPLPS, and with integrated services digital networks being implemented in many parts of Europe over the next ten years, the acceptance of alphaphotographic videotex is a distinct possibility. (Both the UK and France have developed this

*The West Germans have been accused of creating their own standard to protect their indigenous videotex industry. In our view this accusation carries little weight since the main beneficiary of German developments are IBM who have developed the PTT service, and Mullard, a Philips subsidiary, who are manufacturing the key terminal components.

technology and intend to test it in the market during 1985 or 1986.)

Although, the standards issue is by no means resolved, the harsh commercial realities are forcing videotex operators and the PTTs to re-examine their priorities. Increasingly, there is a re-direction of resources away from technology issues and towards developing key applications that attract users and usage. Several of the PTTs (usually those with a number of years of videotex experience) have stopped measuring their success in terms of the number of frames held on their databases, or the number of service providers, or even the number of terminals registered. Instead their objective is to develop a high quality service leading to sustained and regular use and, in the long term, to commercial success.

AUSTRIA

The chief characteristics of the videotex situation in Austria result from three main factors. The first is Austria's proximity to, and co-operation with, its German-speaking neighbours, West Germany and Switzerland. The second factor is Austria's own technical developments in the videotex field. The third is the way in which it is approaching and solving the legal and regulatory issues surrounding the introduction of videotex.

Austria has decided to follow its German-speaking neighbours by introducing the CEPT standard in the course of the changeover from its trial service to its full commercial service. It is also placing great emphasis on telesoftware and the locally-developed microcomputer-based videotex terminal (the 'MUPID') which incorporates alphageometric capabilities. On the regulatory front, the Austrian position is surprisingly and uniquely restrictive, inhibiting the development of such transaction-based videotex applications as home shopping and home banking, which are generally recognised as being critical to the long-term success of videotex in the residential market.

Historical perspective and current status

Videotex started in Austria in 1981 when the Austrian PTT introduced a trial service — called Bildschirmtext as in neighbouring West Germany — using the Prestel standard and GEC hardware. The original configuration was based on a single videotex centre located in Vienna that was accessible at local-call rates from all over Austria. At first the system was designed to cope with 300 terminals (it had 29 ports) but this capacity soon proved to be inadequate and the system was enhanced to 41 ports in 1983.

Sensing that the 'dumb' videotex terminals, which were and largely remain prevalent in other countries, had comparatively little potential for the type of applications (and especially telesoftware) that the Austrians believed to be important, they began developing their own microcomputer-based terminal in 1981. The Austrian Federal Ministry for Science provided substantial funds for the development of this terminal which was jointly undertaken by the Institute for Information Processing at the University of Graz and the Austrian Computer Society. The results of their work was the MUPID terminal (Multipurpose Universally Programmable Intelligent Decoder) which is supplied by the Austrian PTT to users. It is a microcomputer-based terminal (described in more detail in Chapter 3) capable of down-loading and running a variety of programs accessible over the PTT service. Of these, one of the most interesting is text-editing (word processing) software, used to compose letters or messages which are then distributed using the PTT's central print-out and mailing service. Every user is able to rent a few frames from the PTT in order to use this electronic mail service. Thus every user is a 'de facto' information provider (IP).

The MUPID terminal is undoubtedly a major technical innovation, all the more remarkable because it was developed at a time when the potential benefits of using microcomputers as videotex terminals had only just begun to be perceived in Europe. The MUPID terminal accounts for well over 90% of the videotex terminals installed in Austria and it is distributed, under its own or other names, in several European countries.

In parallel with the development of the MUPID terminal, the Austrian PTT prepared the plans for the country's changeover from a trial to a commercial service. The hardware for the new service will continue to be supplied by GEC, with the software developed by Siemens Austria. The plan envisaged an implementation in six stages. The first of these was scheduled for early 1984 and was intended to coincide with an announcement of a full commercial service. However, the unsolved regulatory issues surrounding videotex (which are discussed below) led the Austrian PTT to postpone the official start of the commercial service. Despite this, the technical side of the six-stage plan is being implemented. Stage 1 involved the installation of a dual-computer system in Vienna and a further increase in port and storage capacity. Stages 2 and 3 involved the introduction of videotex centres in Salzburg and Klagenfurt and a further increase in capacity. Stage 4, currently planned for late 1984 or early 1985, includes the changeover to the CEPT standard. This is expected to incorporate an alphageometric capability. Because of the high proportion of MUPID terminals installed in Austria that already have an alphageometric capability, this facility will be easier to implement in Austria than in any other European country. Stages 5 and 6, planned for 1985 and 1986 respectively, will further extend the system's capacity and add new facilities.

The six stages are closely related to the types of terminal connection that the system can support, and the data transmission speeds at which the terminals can operate. During stage 1, user terminals use the established videotex connection, operating at 1200/75 bits per second in asynchronous mode. Later stages will see the introduction of 1200/1200 bits per second transmission speed in full duplex*.

The principal reason for this planned introduction of higher transmission speeds derives from the need of MUPID-users for faster transfers of large volumes of data. This renders the usual 75 bits per second return channel too slow for many users' information and telesoftware applications.

Principal issues and outlook

Although on the technical front, Austrian videotex is now set for a relatively rapid development, the key factors retarding market and application development arise from the unsolved regulatory situation governing videotex. At present, home banking and home shopping are specifically prohibited and the regulations require that users of electronic media are guaranteed anonymity, a condition that is clearly incompatible with the provision of many transactional services, and with any information services based on the sale of information, other than on a subscription basis.

These seemingly archaic, if well intentioned, regulations arise from consumer and data protection laws which the Austrians are well aware need to be amended before the videotex market can achieve rapid growth. A revised law governing new media will begin to be drafted towards the end of 1984 but it will no doubt take some time before it is passed. Although we believe that a liberalisation of the laws governing transaction-based videotex applications is likely, this is by no means certain. It remains possible that the regulatory conditions relating to such applications as teleshopping and telebanking could still restrict their market appeal.

Austrian legislators are also insisting that videotex systems must be designed to prevent system operators having access to information concerning the identity of users on the system. This problem arises from the fact that the videotex system used for the market trial incorporated log-on and log-off procedures designed to enable the system operator to charge users on the basis of connect-time and frame accesses. This meant that the system had the capability to collect data that could be used to identify the personal characteristics and habits of users from the services that they accessed. The six-stage plan described above includes changes to the system that will protect the anonymity of users.

Figure 1.2 Summary of the status of videotex in Austria[1]

Videotex standards:	Prestel, CEPT by 1985[2]
PTT system:	Bildschirmtext
Number of terminals:	1,300, all registered on the PTT system, split approximately 50/50 between business and domestic subscribers
Number of information providers:	275
Number of external computers accessible from the PTT service:	30
Number of private systems:	30-35
Main terminal suppliers:	MUPID, Loewe and Philips
Main private system suppliers:	IBM and Siemens
Main videotex bureaux:	None known

Notes: [1]Status as at July 1984.

[2]Alphageometric capability is available on the MUPID intelligent terminal, and will be catered for in the CEPT implementation adopted.

This restrictive regulatory environment, and the consequent lack of experience of interactive videotex applications (other than those relating to the use of telesoftware), should cause the Austrian PTT's forecasts of installed terminals to be viewed with some scepticism. At the time of writing, the PTT was forecasting 12,000 users by the end of 1985, and 100,000 by the end of 1987. The MUPID terminal, in its CEPT version, is expected to remain the dominant terminal, and its flexibility should make the changeover to the CEPT standard somewhat less difficult in Austria than it has been in West Germany. However, Austria needs to match its technical achievements with a more liberal regulatory environment and genuine market experience before the Austrian videotex industry can hope to achieve rapid growth.

BELGIUM

For many years, Belgium has been one of the few countries in Western Europe not to have a PTT-run videotex service, even on a trial basis. Other factors inhibiting the development of videotex were the PTT's reluctance until very recently to make any policy statement, and its refusal to allow low-cost videotex

*'Asynchronous' operation means that information is transmitted a character at a time. 'Full-duplex' operation means that data can be transmitted both to and from the terminal simultaneously. '1200/75' bits per second transmission means that information can be transmitted to a terminal at about 120 characters a second, but can only be transmitted from the terminal at 7 to 8 characters a second. This latter speed is too slow where text is being prepared at a terminal and then transmitted once ready to be sent.

modems to be attached to the public telephone network. But the PTT has now announced its plans to implement a public videotex service, and Belgium is in a good position to exploit the lessons learnt by the videotex industry in other countries over the past five years.

Historical perspective and current status

Until the middle of 1984, and with the only exception of Ireland, Belgium was the only country in Western Europe covered by our report that had not implemented, or announced plans to implement, a PTT-operated videotex service of any kind. The resulting 'videotex-vacuum' was filled by a small number of independent videotex bureaux of which the first was BTM (Bell Telephone Manufacturing Company — an ITT subsidiary), which has offered a full bureau service from 1981, based on GEC hardware and Prestel software. Other bureaux began offering services shortly afterwards.

In 1982 the RTT (the Belgian PTT) issued invitations to tender for a public videotex system, but the system specification proved to be so complex that none of the prospective suppliers felt able to comply with it. A revised invitation to tender was issued in 1983, and in July 1984 the contract was finally awarded to BTM, in stiff competition with several other suppliers including SAIT (offering the Modcomp system) and Telemedia (offering the Aregon system). The UK company Microscope, acting as a subcontractor to BTM, will supply the videotex access points for the new network. The contract is reported to be worth $2 million to BTM.

The new Belgian public videotex service (at the time of writing it did not yet have a name) will be based on DEC VAX minicomputers and Oy Softplan's Mistel software which BTM has been distributing in Belgium and elsewhere as a private videotex system since 1981. The new system is being introduced in stages, starting with a capacity of 72 ports and three videotex centres in 1984, rising to 204 ports and eight videotex centres by March 1985. Initially the service will be based on the Prestel standard, but access for CEPT and Antiope-standard terminals is planned. By 1985, 85% of Belgian users will be able to access the RTT videotex network at local call charges.

The RTT sees its role as providing the communications infrastructure and regulatory control mechanisms felt to be necessary for the successful development of videotex services. It will not be concerning itself directly with service operation. The service will be heavily network oriented and modelled more on the French PTTs 'decentralised gateway' strategy than the 'centralised' architectures prevalent in the UK, the Netherlands and several other European countries. However, the system will provide central billing, statistics, routeing and indexing services. BTM will provide consultancy, software development and training services, and it will have its own service computer connected to the network as a videotex bureau service.

Figure 1.3 Summary of the status of videotex in Belgium[1]

Videotex standards:	Prestel in 1984, CEPT and Antiope in 1985 and/or 1986
PTT system:	Name of RTT operated system to be announced
Number of terminals:	200 (on non-RTT systems) 50 expected on RTT system by end 1984
Number of information providers:	20 expected on RTT system by end 1984[2]
Number of external computers accessible from the PTT service:	A few expected on RTT system by end 1984, and 15 by end 1985
Number of private systems:	About 12-15
Main terminal suppliers:	Barco and Philips
Main private system suppliers:	BTM (Softplan), Modcomp, Aregon International and CAP-Gemini-Sogeti
Main videotex bureaux:	BTM, Orda-B and Telemedia

Notes: [1]Status applies to July 1984 except where otherwise stated.
[2]Approximately 30 information providers are using bureau services.

Principal issues and outlook

The key issue now confronting the videotex industry in Belgium is the extent to which the introduction of the RTT service will stimulate the market.

The RTT plan envisages an extension of the system to 300 ports by the end of 1985, by which time it expects about 1,000 to 2,000 users and 15 external computers to be connected to the system. The RTT has plans for the international interconnection of its service, particularly with the French, British, Netherlands and German systems, but these are still subject to the achievement of agreement on standards, inter-networking and tariffing.

The Belgium experience indicates that PTT commitment to videotex is a necessary (although not the only) prerequisite for videotex to develop beyond the embryonic stage in a country. Although videotex services became available in Belgium relatively early through bureaux and a handful of private system operators, the market has not been able to develop as quickly as it might have done, given the uncertainty over the RTT's plans. Now that these plans have been laid, the Belgian videotex market is at last in a position to achieve sustained growth.

DENMARK

During the spring of 1984, the Danish public videotex service formally changed from the trial stage to a full commercial service. The transition was smooth, mainly because the system operators decided to switch to the commercial service using the technology and infrastructure developed during the preceding two-year trial, rather than to introduce radical changes. The market is now expected to develop more rapidly, building on and expanding applications developed during the trial phase.

Historical perspective and current status

The Danish videotex service — Teledata — started as a trial in March 1982 and was developed in four stages over a two-year period. The Prestel standard was adopted for the trial, 200 terminals were placed with specially selected users, and 200 information providers were invited to participate, although rather fewer did in fact take part. Usage was low initially but it increased as new services were developed. Three services in particular proved to be the key to developing interest among users: the telephone directory enquiry service provided by the Danish telephone companies, the telebanking service offered by Handelsbanken, and the legal databases available from the Datacentralen database. Other industries, including the motor, travel and real-estate trades, have now begun to show keen interest in videotex. By mid 1984, the number of users had reached over 700, mostly in the business sector.

Teledata is based on two videotex centres, one in Copenhagen and one in Aarhus. The centres use Christian Rovsing CR80D computers and software. Each computer has 256k bytes of main memory and 600M bytes of disc storage. At the end of 1984, port capacity was increased from 72 to 104 ports with a further increase to 144 ports planned for 1985.

Principal issues and outlook

Now that Teledata is a commercial service, the achievement of rapid market development, and a decision on future videotex standards are the key issues requiring to be faced.

The principal issue concerning videotex in Denmark is how best to develop the additional applications needed to attract some 3,000 new terminal users by the end of 1985. Telebanking applications, along the lines of the pioneering Handelsbanken service, are likely to be amongst the most important applications, together with other transaction-based services, mainly for travel agents and the motor trade (especially for second-hand car dealers). There are a small number of private systems in Denmark — about six in total — some of which may link their systems to Teledata over its gateway connections. So far Teledata can only offer users access to three external computers. The Danish regional telephone companies, covering the Copenhagen area, Northern Jutland, Funen and Southern Jutland, which run the Teledata service in conjunction with the Danish PTT, offer consultancy and frame-creation services to prospective information providers and operators of private systems connected to Teledata.

Figure 1.4 Summary of the status of videotex in Denmark[1]

Videotex standards:	Prestel, CEPT in the long term
PTT[2] system:	Teledata
Number of terminals:	750, over 90% in business
Number of information providers:	100
Number of external computers accessible from the PTT service:	3
Number of private systems:	About 6
Main terminal suppliers:	Bang & Olufsen, Tandata and Luxor
Main private system suppliers:	Christian Rovsing[3] and Aregon International
Main videotex bureaux:	None known

Notes: [1]Status applies to July 1984.
[2]Teledata is jointly run by the Danish PTT and the four regional telephone companies.
[3]Christian Rovsing went into liquidation in late 1984. At the time of writing its future remains unclear, though it is unlikely, given the PTT's commitment to its videotex system, that its videotex interests will be totally lost.

Like many other European countries, Denmark carried out its videotex trial using the Prestel standard, and although it has decided to keep to this standard for the commercial service, a decision on how and when to introduce CEPT will need to be taken at some stage, since the Danish PTT is formally committed to do so. Opinion amongst Danish industry observers is that CEPT will be introduced later rather than sooner, because the key priority is now market development, rather than refining the technical infrastructure. 1988 has been suggested as the earliest date for the introduction of the CEPT standard, by which time the Danish videotex industry will have had four years to develop the market, and the technology should by then be well established in countries such as Germany that have adopted the CEPT standard, with terminals in volume production.

FINLAND

The development of videotex in Finland has been influenced by the existence of many small local telephone companies offering communications services in particular towns and districts. As a result, video-

tex has developed in an unrestrained but fragmented way, with private companies taking the lead in videotex developments rather than the national PTT, which has responsibility for providing long distance (interconnect) services, and data networks. Recently, however, the Finnish PTT (the General Directorate of Post and Telecommunications) has decided to be more directly involved in the provision of videotex services.

Historical perspective and current status

Videotex services, operated by publishing groups in conjunction with the local telephone companies, were the first to be introduced in Finland. The PTT was not involved. The first service, called Helsinki Telset, was introduced by Sanoma Corporation (a major publisher) in 1978 and was accessible in the telephone area operated by the Helsinki Telephone Company. Full commercial operations started in 1980. The service is operated by a joint-venture company owned by Sanoma, Nokia Electronics and the Helsinki Telephone Company. Helsinki Telset has been followed by other local Telset videotex operations, reaching a total of 12 by mid 1984. All the Telset companies use DEC hardware and Mistel software developed by Oy Softplan, a Nokia subsidiary. The 12 Telset services are local operations, with no physical telecommunication links between them. Although the Telset system operators have been negotiating with the PTT to install such links for several years, the PTT did not — at least until its own videotex service had been developed — feel in a position to permit the services to interconnect. This lack of networking capability has caused problems, such as the duplication of databases and multiple commercial relations with information providers. But the most significant problem is that (with the possible exception of the Helsinki Telephone area) the size of the potential market covered by any one telephone company is not large enough for a videotex operation to achieve profitability rapidly. This has proved to be the case despite the fact that all the Telset videotex operations concentrate on servicing the business sector. As a result, some of the smaller Telset companies are experiencing financial difficulties and there seems a strong possibility that two out of the 12 will shut down their videotex operations shortly.

While the Telset companies were pioneering the videotex service market, the Finnish PTT had been developing and implementing its own videotex system, based on a networked gateway architecture. The PTT's system was developed by the Finnish State Research Centre and uses Hewlett-Packard hardware. It is offered as a commercial service but is, in reality, still in an experimental stage of development. The intention is that it should provide the communications infrastructure, both for the Telset services, and for the two dozen or so private videotex systems operating in Finland. Gateway connections to the Swedish Datavision and the British Prestel service are also available. In addition to gateway access to external computers, the PTT also offers space on its own database to information providers. As is the case with the Telset companies, almost all of the PTT's videotex users (numbering some 200) are business users. This is despite the fact that domestic users are offered special tariffs for access to the system during off-peak hours.

Both the PTT and Telset systems use the Prestel standard. It is intended to introduce CEPT, but no date has as yet been fixed. More immediate issues than the adoption of the CEPT standard confront the Finnish videotex industry in the short term.

Principal issues and outlook

The most urgent problem facing the Telset system operators is the need to rationalise and integrate the many different systems now operating independently. Although the Finnish PTT's system can provide the technical basis to achieve this, there are regulatory problems involved in permitting the different telephone companies to co-operate with each other and the PTT, and these still need to be resolved. The possible withdrawal of two Telset videotex services is one indication that the situation is reaching a critical point. In addition, the rumoured intention of Nokia and the Helsinki Telephone Company to withdraw from the Helsinki Telset joint venture may leave Sanoma as the sole operator of the Telset videotex services.

Figure 1.5 Summary of the status of videotex in Finland[1]

Videotex standards:	Prestel, CEPT in the long term
PTT system:	Finnish PTT plus 12 private Telset systems[2]
Number of terminals:	200 on the PTT system plus 1,600-2,000 on Telset and private systems. Over 95% of terminals are installed in businesses
Number of information providers:	More than 50
Number of external computers connected to Telset and PTT services:	A few on Telset systems (but not Helsinki Telset). Gateways on the PTT system are awaiting implementation
Number of private systems:	20-25 in addition to Telset companies
Main terminal suppliers:	Salora, Lohja, Nokia, Philips and Sony
Main private system suppliers:	Softplan, PG-Yhtiot and the State Research Centre (VTT)
Main videotex bureaux:	Telset and PG-Yhtiot

Notes: [1]Status applies to July 1984.
[2]Although the Telset services are not PTT-run, they have historically fulfilled the role of systems run by PTTs in other European countries.

FRANCE

France has been one of the major players in the international videotex scene since the 1970s. While maintaining a heavy commitment to developing overseas markets for French videotex technology, during the last two to three years the PTT has concentrated on stimulating the growth of videotex in France. The results of this effort are spectacular by any standard. The growth in the number of Teletel terminals and external service computers connected to the PTT's videotex network has risen dramatically since mid 1983. Three quarters of all videotex terminals in Europe are installed in France, and the number of operational private videotex systems is second only to the UK.

Historical perspective and current status

French videotex technology for both interactive and broadcast services (teletext) was first developed by the CCETT (Centre Commun d'Etudes de Telediffusion et des Telecommunications) in 1973. A common standard — Antiope — emerged. As a result of a specially commissioned market report, it was decided in 1978 to proceed with two principal experiments using the new technology:

- The Teletel 3V trial just outside Paris was designed to give information providers experience with the new medium and to establish the regulatory and commercial environment under which a full commercial service could operate. The trial ran from June 1981 to December 1982, but the trial system was in fact not closed until July 1984, by which time the PTT had implemented its videotex network in the area. The trial is reported to have cost FF150 million ($17 million).
- The Telephone Directory project at Ile-et-Vilaine was designed to explore the use of videotex to give access to electronic telephone directories using cheap terminals. This trial ran from August 1980 to February 1983.

The decision to proceed with a national networked videotex service was announced in October 1982. The two trials had confirmed the French PTT's view that, if the market were to take off rapidly, two requirements needed to be met: very low cost terminals, and a large number of information services, must be provided.

These two key requirements have governed the PTT's approach to the development of videotex in France. The cheap-terminal policy has resulted in the development of the 'Minitel' terminal, a basic videotex terminal with an integral monochrome screen intended for business and domestic use, that can be used to access both the electronic directory and private videotex services over a national Teletel network. The Minitel terminals are manufactured in very large quantities for the French PTT, which issues them free to domestic subscribers (instead of paper telephone directories) in those regions where the telephone directory service is available. Business users, and telephone subscribers in other areas, can rent Minitel terminals from the PTT for FF70 ($7.50) a month. The very low terminal costs are a result of the 100,000-plus unit manufacturing runs that the programme allows. By summer 1984, six regions, including the Paris region, were included in the programme. (Although the PTT-supplied Minitel terminal is a basic device, Minitels with enhanced features, TV adaptors and microcomputers emulating or interfacing to Minitels can be purchased directly from private suppliers or, in some cases, rented from the PTT.)

The second major element in the French approach to videotex is a national Teletel network to link Minitel users to distributed videotex databases and transactional services. These are held on separate external service computers run by information providers or independent computer bureaux. The PTT does not hold any databases of its own (except the electronic telephone directory databases), nor does it handle service billing, except for use of its network. The hardware for the electronic telephone directory (Annuaire Electronique) is based on Bull Mini-6 computers front-ended by TRT CP8 communication processors. The retrieval software is very complex, yet it is simple to use. It permits text searching, and a number of user-friendly features have been incorporated to help inexperienced users. These include spelling checks, synonym choices and prompts.

All other videotex services are held on non-PTT-operated external computers which the users request over the PTT's videotex network. When a user wishes to access databases held on external service computers a separate user identification and password is required for each computer he wishes to access. To establish the connection to the service computer, he uses the public switched telephone network (PSTN) to access a local videotex access point (called a 'Service d'Acces Teletel' or SAT) on the public packet-switched network, Transpac, which provides him with an index of the databases accessible via the network. Once the user has made his selection, he is then routed to the computer of his choice. Alternatively, users can have direct access to service computers via the PSTN.

Another feature of the French approach is that Teletel does not charge for database access or undertake any invoicing for IPs. The PTT charges only for use of its telephone and packet-switched service networks. It offers users and service providers a range of charging options. Some users pay only for the local call to the Teletel access point and the service provider pays the packet-switched network charges.

In other cases the user pays both charges. Alternatively the service provider pays for all charges. Service providers may charge for access to their services, but every service provider is responsible for billing his own clients.

To overcome the complications, administrative costs and confusion resulting from this multiplicity of tariffing and billing procedures, a French company, Fastel, has recently been established to offer a billing and subscription service to Teletel service providers. This service enables users to access a number of Teletel services with a single subscriber contract and a single password, and receive a single bill. Fastel also takes responsibility for all debt collection on behalf of its client organisations.

Principal issues and outlook

During 1984, the French videotex industry has experienced the most remarkable success and growth. By mid 1984, the French PTT had ordered over 1 million Minitels of which over 200,000 were in place. By September this number had increased to 300,000. Shipments to users were reported to be running at 25,000 to 35,000 a month. Some 200 external computers were connected to the Teletel network by mid 1984, offering 400 to 500 different services. New services are reported as being added at a rate of five a week on average. The number of installed private videotex systems has more than doubled during 1984, evidence of the stimulus that the Minitel distribution programme has provided for the whole French videotex industry.

The PTT has committed itself to install 3 million videotex terminals by the end of 1986. Current forecasts are that, by the end of 1984, some 400,000 terminals will be installed and, if the current installation rate can be maintained, this figure appears achievable. There are, however, suggestions* that the French PTT has cut its orders of Minitels. If this is true, it could be for one or several reasons. It could mean that demand is slowing and that market saturation is being reached earlier than the PTT expected. On the other hand it could mean that the PTT is cutting back its scale of investment in terminal shipments, until the provision of services catches up with available demand, or that a more sophisticated terminal is to be introduced in 1985, or simply that it is concentrating on meeting business demand from which it earns rental revenue, while slowing shipments of free terminals to residential users.

Regarding the adoption of the CEPT standard, the French PTT's view is that almost all the information that users require is text based and that there is very little demand for better graphics than are currently provided. It therefore considers the Antiope standard and simple monochrome terminals to be adequate for most applications. It feels that its cheap-terminal policy has been proved correct, as evidenced by the large number of terminals already installed and the numbers being shipped every month. For these reasons and the massive investment already made by the PTT in Antiope-standard equipment, it seems unlikely that the PTT will introduce CEPT for the foreseeable future, and certainly not before the late 1980s, if at all.

To cope with demand for better graphics by some business users, the PTT is exploring the possibility of linking videotex to videodisc. It is also examining alphageometric and alphaphotographic display technologies which should become practicable and commercially viable by 1986 when the French digital telephone network is planned for introduction.

Another major innovation that the PTT is investing heavily in is the 'smart card'. The smart card (carte a mémoire) is a credit-card-sized plastic card incorporating an embedded microprocessor. It was used commercially and in large numbers first in 1983 as a telephone credit card. A 'multi-service' payment card is now being developed and tested. This multi-service card is seen as vital in the videotex context as it facilitates teleshopping and telebanking. From 1985, the French PTT plans to offer an optional smart-card reader on the Minitel terminal. The multi-service

*Suggestions which the PTT has neither corroborated nor denied.

Figure 1.6 Summary of the status of videotex in France[1]

Videotex standards:	Antiope
PTT system:	Teletel network and electronic telephone directory
Number of terminals:	200,000 of which 50,000 are in businesses. Most are Minitel terminals.
Number of information providers:	400
Number of external computers connected to the Teletel network:	200
Number of private systems:	280
Main terminal suppliers:	Matra, Telic and Radiotechnique
Main private system suppliers:	CAP-Gemini-Sogeti, Stéria, Télésystèmes and IBM
Main videotex bureaux:	CAP-Gemini-Sogeti, CGI, CTL (over 50 bureaux in total)

Note: [1]Status applies to July 1984 but the number of terminals is increasing rapidly and is expected to reach 400,000 by the end of 1984. The number of private systems and service providers is also increasing rapidly.

card is being tested in the town of Blois during 1984 using 1,000 prototype Minitel smart-card readers.

GERMANY (FEDERAL REPUBLIC)

The West German videotex scene over the last two or three years has been almost totally dominated by the creation of a new videotex infrastructure to accommodate the change from the Prestel standard, used for the initial videotex trial, to the CEPT standard. The transition has taken much longer, and has been more costly and painful to the industry, than even the most pessimistic local observers and participants had anticipated. It has led, in effect, to a two-year moratorium in the development of the videotex market, even though the number of equipment and software suppliers and information providers has increased substantially over that period. The new PTT service is now officially launched, but the complete changeover from the old service is not likely to be complete before early 1985. Despite these delays and problems, the Bundespost (the German PTT) remains confident that subscriber numbers will rise rapidly, and that a mass videotex market will be created before the end of the 1980s.

Historical perspective and current status

Videotex, called Bildschirmtext in West Germany, was first introduced by the Bundespost as a trial service in 1980. The system was based on GEC computers and Prestel software from the UK. The Bundespost commissioned a number of changes to the software, of which the most significant was the facility to provide access to external computers from the PTT service over 'gateway' links. The trial involved nearly 6,000 terminals, 3,000 in each of the two trial areas of Düsseldorf and Berlin.

The trial was considered a major success by virtually all participants and, in 1981, after a competitive bid, the Bundespost awarded the contract for the development of the new CEPT-based system to IBM. A number of factors, of which the size and sophistication of the new system were not the least, led to development delays. The original launch timing of Autumn 1983 was not fully met. From September 1983, the old GEC and the new IBM system have, therefore, been running in parallel, while development work and testing continued on the new system. The Prestel-based system was the only one practically available until June 1984, when the IBM system was officially made available. (The Prestel computer is expected to continue to operate until early 1985, by which time the transfer of terminals and external computers to the new system is scheduled to be complete.) IBM is reported to have made significant penalty payments for the delays. Some observers estimate that the cost to IBM has been at least double its original contract value of $20 million.

The new Bildschirmtext system

The design of the new Bildschirmtext system is based on the principle that only a small proportion of the total information contained in a database — typically 10% — will be accessed frequently. A system configuration based on a dynamically-distributed and networked database is theoretically the most efficient in terms of communications, processing and storage resources. The new system has, therefore, been designed so that the 200,000 frames most frequently accessed are held in local videotex centres, based on IBM Series 1 minicomputers, with a capacity to handle up to 100 simultaneous calls. If a frame that is requested by a user is not held at the local videotex centre, the request is automatically routed to the nearest regional videotex centre, equipped with more powerful IBM 4341 mainframe computers. If the request is still unsuccessful at this level it is routed to the central videotex control computer, located in Ulm, that contains the whole database. The Deutsche Bundespost expects that the central control computer will be required to handle no more than 2% of frame access requests.

The Bundespost has always placed great emphasis on gateway facilities to give access to external computers. In the new system, external computers are not connected to the local videotex centres but link in to the control centre in Ulm. The links will be effected over X.25 interfaces to the national Datex-P packet-switched network, using communications protocols (called EHKP in Germany) that enable the transfer of data between different types of computer. The new gateway-interface standards specified by the Bundespost are very complex, and system suppliers wishing to offer a gateway interface are likely to need to invest $200,000 or more in the development of the interface software. This has inevitably delayed the availability of gateway interface systems.

The delay in introducing the new system was not the only problem the West German videotex industry has had to face. Even had the system been available on schedule, delays in producing CEPT decoders for terminals would have meant that few users could have accessed it, since the installed Prestel terminals and software were incompatible with the new system. (Although the Prestel standard is in principle a subset of CEPT, the German CEPT implementation, using 8-bit character coding, renders the 7-bit Prestel terminals incompatible.) By mid 1984, the new CEPT-standard terminals were beginning to reach the market. They are, however, still expensive, and add 1,000DM to 1,500DM ($300-$450) to the cost of a TV receiver. The consensus of opinion is that they should add no more than 250DM to 300DM ($75-$90) to the price of a colour television, if extensive penetration of the residential market is to be achieved. A new VLSI chip — the EUROM — is being produced by VALVO and Mullard, the Philips companies, and this

chip is expected to reduce costs significantly. But it is likely that it will be 1986 or even 1987 before decoder prices fall to the levels required. Not withstanding these disappointments, limited mass production of decoders is underway and the new terminals are planned to reach the market before Christmas 1984. Adapted microcomputers are likely to become increasingly important as videotex terminals, but this development is also dependent on either the availability of CEPT decoders or the development of special CEPT software for microcomputers. This software will, however, be more difficult and expensive to develop than Prestel-standard microcomputer software. Further, the Bundespost's approval procedures are reported to be especially stringent for videotex-adapted microcomputers.

The impact on installed private videotex systems

The delay in implementing the new Bildschirmtext system has also meant a delay in the development in the market for private videotex systems. In Germany, virtually all private systems are accessed over the Bildschirmtext network via gateway connections. This is because of the Bundespost's policy of only allowing users to rent modems at favourable tariffs where the terminal is used to access a videotex system connected to the Bildschirmtext network*. The old GEC system had a maximum capacity of 120 gateways, which in effect set an upper limit to the number of private systems. (Bureau services and other shared gateway connections solved the capacity problem in some instances.) Gateway connections to the new system are now gradually being implemented and, by mid 1984, 12 systems were connected. Each connection must be individually approved by the Bundespost before it can become operational. The new gateway software from private system suppliers, including IBM's proprietary software, is only just becoming available. As a consequence, the majority of external computers connected to the Ulm computer centre are those for which the system operator has written his own gateway software. But with off-the-shelf software now becoming available, the Bundespost expects the transfer of external computers from the trial to the new system to be complete by Spring 1985.

Principal issues and outlook

Until mid 1985 at the earliest, the West German videotex industry will continue to be preoccupied by the technical and organisational requirements and problems associated with the introduction of the new Bildschirmtext system. Beyond that date, however, it is hoped that the development of the market will proceed rapidly.

*It has recently been reported that the Bundespost is relaxing this restriction. From late 1984 it has been possible to connect videotex terminals directly to private systems over the PSTN, without incurring cost penalties for modem rental.

Figure 1.7 Summary of the status of videotex in West Germany[1]

Videotex standard:	CEPT
PTT system:	Bildschirmtext
Number of terminals:	14,000
Number of information providers:	3500-4000
Number of external computers connected to the PTT's gateway network:	120, of which 12 are on the new system
Number of private systems:	170
Main terminal suppliers:	Loewe, Blaupunkt, Telefunken, Philips, plus many suppliers of editing terminals
Main private system suppliers:	IBM, Siemens, IDO (Nova) and Aregon International
Main videotex bureaux:	Compas, Siemens and IBM

Note: [1]Status applies to July 1984.

In many ways the opening of the new system has merely meant the end of one set of problems and the beginning of another. Much of the equipment and software, originally developed for the trial, cannot now be used without considerable and expensive modifications. In addition, the new CEPT standard presents special problems of creating and editing information, especially for frames containing graphics. The more complex graphics frames may take up to two man-days to create, and conventional editing aids, even graphics tablets, are of relatively little help. In addition, there is a temporary shortage of CEPT editing skills that may last for a year or more. The industry is learning to cope with these problems and the more sophisticated editing workstations now reaching the market incorporate special software and digitising cameras to help with the editing process. These are, however, too expensive for many of the smaller information providers and it is likely that specialist agencies (the so called 'Umbrella IPs') and bureaux will play an increasingly important role. As well as the problems associated with editing CEPT frames, the industry is learning that good graphics alone do not create a viable and profitable videotex market. Finally, to use the more advanced CEPT graphics facilities requires that a special character set* must be transmitted to the terminal before the graphics can be displayed. This can take several seconds, a delay that some users feel is unacceptable. Some industry participants are beginning to question whether all the delay, inconvenience and expense associated with the change to the new CEPT system has been worth-

*Dynamically Redefinable Character Set (DRCS). This character set temporarily replaces the standard graphics character set built into the terminal.

while. Much of the valuable information available is textual anyway, and few potential users are likely to buy terminals just because of the more attractive graphics.

Despite the delays and problems already (and still to be) experienced, the Bundespost expects a rapid increase in installed terminals. It anticipates that three million terminals will have been installed by 1990. (The Bundespost had originally hoped to reach this number by 1986.) The Bundespost is taking a number of major steps to accelerate terminal growth:

- Access at local call tariffs will be available throughout Germany by mid 1985.
- Most Bildschirmtext tariffs will be waived until mid 1985 and only half the tariffs will be charged during the first half of 1986.
- An electronic telephone directory service is scheduled to become operational by 1986.
- Interfaces to the telex and teletex systems are planned.
- Provision for terminals operating at 2400/2400 is planned.
- Interconnection of Bildschirmtext with other national videotex systems, especially those of the German-speaking countries of Switzerland and Austria, is also being considered.

The Bundespost is insisting that, from 1985, all videotex equipment and software used in conjunction with Bildschirmtext must be to the CEPT standard. It has adopted a policy that in effect prevents other types of system from being used cost effectively. This policy, combined with heavy subsidies for CEPT modems, is one way of encouraging the development of a single, high-standard, nationwide videotex system. But some industry participants are becoming increasingly concerned about the power of the Bundespost to enforce a technology and implementation strategy in which they are having increasing doubts.

Despite these doubts, it is widely acknowledged that the Bundespost has provided the German videotex industry with the most sophisticated videotex infrastructure in the world. It is now up to the industry to exploit it by developing the applications needed to attract a mass user market. The rate of adoption of the CEPT standard throughout Europe hinges, to a considerable extent, upon the German videotex industry's ability to rise to this challenge.

IRELAND

The development of videotex in the Republic of Ireland has been primarily influenced by two factors. The first is its small size. In terms of its population, Ireland is the smallest country covered in this report. The second factor is the country's geographic proximity and linguistic and communication links with the UK. Largely as a consequence of these two factors there is no PTT-operated videotex service in Ireland, and the demand for videotex services is being met by bureaux and private system operators using videotex technology imported mostly from the UK.

Historical perspective and current status

Videotex was evaluated in the late 1970s by the Irish PTT and a group of semi-state agencies, including the Confederation of Irish Industry and the Irish Institute for Industrial Research. The latter ran a videotex bureau service on a trial basis for the participants in the evaluation. This service has now effectively ceased operating. The PTT decided that it would not develop and run its own videotex system because it felt that the small size of the country did not warrant it. The PTT does, however, encourage independent system operators to offer videotex services using the Irish packet-switched service, Eirpac, as the networking medium.

As a consequence of the PTT's policy not to involve itself directly in the provision of videotex services, the Irish videotex industry in 1984 comprises only a few private systems and two principal bureau services. The private system operators are developing sector-specific applications, principally in the fields of agriculture, transport and library information systems. The two bureaux, Patric Videotex and Cognotec, offer generally-available videotex services, fulfilling, in effect, the role adopted by the PTTs in other countries.

Patric Videotex began offering videotex services in 1980 using videotex hardware and software supplied by Rediffusion computers. Subsequently, Patric Videotex enhanced the software to introduce new features demanded by its clients, especially messaging. Patric Videotex also makes terminals available to its clients. These are mostly Tandata and Plessey Vutel terminals, but the use of adapted microcomputers is increasing. In mid 1984, around 60 users were registered with Patric Videotex and the company expects continuing steady growth into the future. It is exploring the possible introduction of the CEPT standard, but is unlikely to take this step for the foreseeable future.

Cognotec is owned partly by the Confederation of Irish Industry (CII) and partly by a number of private shareholders. Given the involvement of the CII, it is perhaps to be expected that the Cognotec bureau concentrates on providing financial information services. The CII provides information such as economic indicators. Banks and financial institutions act as IPs and input information directly onto the system. Their

Figure 1.8 Summary of the status of videotex in Ireland[1]

Videotex standards:	None specified by PTT. Most private systems use Prestel
PTT system:	None
Number of terminals:	200
Number of information providers:	N/A
Number of external computers:	N/A
Number of private systems:	5
Main terminal suppliers:	Tandata, Sony, Philips
Main private system suppliers:	Rediffusion and DISC International
Main videotex bureaux:	Patric Videotex, Cognotec

Note: [1]Status applies to July 1984.

applications include foreign exchange, company information and tax advice. The Cognotec system is based on DEC VAX hardware and Mistel software. In mid 1984, the bureau had 80 subscribers. Sony user terminals and Philips editing terminals are the most commonly used.

Principal issues and outlook

Because of its traditional business links with the UK, the Irish market has tended to be served by UK-based videotex suppliers. This is likely to continue. The small population and mainly agricultural economy of Ireland inevitably means that few, if any, large videotex systems are likely to be justified in the short term. Slow but steady growth in the market for bureaux, terminals and small private systems can, however, reasonably be anticipated.

ITALY

Political and regulatory confusion and ambiguities have characterised the development of videotex in Italy to date. These are coupled with uncertainty about the future role of the CEPT standard. Despite this confusion and uncertainty, a videotex trial is being conducted and there is considerable interest in the potential of videotex. The country is now gearing itself up to begin to exploit videotex seriously from 1985 or 1986.

Historical perspective and current status

After a series of small-scale experiments from early 1981, the Italian national videotex service operated by SIP, the telephone authority responsible for local telephone services, was officially introduced in November 1982 on a trial basis. The trial service, known as Videotel, was scheduled to run for two years and to involve 1,000 participants (20% in the domestic sector and 80% in the business sector) in the cities of Milan, Rome, Turin, Bologna, Naples and Venice. The Videotel centre is based in Milan and uses Prestel software and GEC hardware with a capacity of 208 ports. Provision for the connection of external computers via gateway links was made from the start of the service.

The number of users in the trial was increased in 1983 by a further 1,000, in order to provide a better user base for the research group studying the trial. These users were mostly drawn from the business sector. The original capacity of eight gateway connections is likely to be extended to cope with anticipated demand. At the time of writing, however, only six gateway connections had been implemented. Of these the best established were the external computers of the Agenzia Giornalistica Italia (a publishing group also offering bureau services to the Italian national state bodies of the ENI group), SEAT-Sarin (another bureau service) and SITEL-FARMAVIDEOTEL (offering services to the chemical and pharmaceutical industries).

The trial was originally scheduled to continue for two years, ending in late 1984. It is now likely to continue as a 'pre-service' stage until the first half of 1986. (The opening of the commercial service is scheduled for June 1986.) The expectation is that the CEPT standard will be introduced during the 'pre-service' stage towards the end of 1985 or early 1986. However, the industry is monitoring the experience with CEPT in other countries, especially West Germany, before formally committing itself to implementing CEPT.

In 1984 Videotel was available in the six telephone districts covered by the trial at local call charges. During 1985 local call access will become available in a further ten towns (enabling 60% of Italian telephone subscribers to access the service at local call rates).

Figure 1.9 Summary of the status of videotex in Italy[1]

Videotex standards:	Prestel, CEPT shortly
PTT system:	Videotel
Number of terminals:	1,500 (85% business)
Number of information providers:	170
Number of external computers accessed via Videotel:	8
Number of private systems:	10 to 15
Main terminal suppliers:	Olivetti, Philips, Zanussi and Italtel
Main private system suppliers:	Italtel, Enidata, IBM and Philips
Main videotex bureaux:	AGI, SEAT and Philips

Note: [1]Status applies to July 1984.

The Videotel trial is being run by SIP (Società Italiana per l'Esercizio Telefonico). However, in Italy the telecommunications monopoly is distributed amongst a number of organisations, each responsible for different types of telecommunications services. SIP is responsible for local telephone communications and other telecommunications authorities are responsible for inland long-distance communications, international links, radio communications, and other telecommunication services. The situation has led in the past to a certain degree of confusion as regards the respective responsibilities for operating the national videotex network, which may re-emerge if and when Videotel is connected to other national videotex systems.

Principal issues and outlook

The change from the trial to a commercial service is one of the key events that will give the Italian videotex industry the opportunity to develop further. Thus, one factor retarding the development of the industry in Italy is the regulatory position, which includes a legislative ban on all private videotex systems, except those accessed over the public videotex gateway links available on the Videotel system.

The legislation, which currently makes all independent private videotex systems illegal, is difficult to enforce in practice and a small number of private systems have been installed despite it. Pressures to abolish this legislation have been mounting and it is hoped that this will happen during 1985. The repeal of these laws is crucial to a rapid development of the private videotex market.

Notwithstanding the uncertainties, interest in videotex is high amongst information providers and users and SIP is expecting an increase in the number of subscribers to between 5,000 and 7,000 in 1985. As one of the larger countries in Europe, Italy has the population and business infrastructure to create a viable videotex industry fairly rapidly once the restraining factors are overcome and SIP launches its full commercial service.

THE NETHERLANDS

The Netherlands was one of the first countries in Europe to introduce videotex. After careful experimentation and a market trial, the PTT service — called Viditel — was launched as a commercial service in 1981. Since then the PTT has changed its Viditel marketing approach. It has abandoned its earlier common-carrier role, and is placing greater emphasis on promoting its services to specific target-market groups. The PTT is adopting a 'wait-and-see' attitude with regard to the possible introduction of the CEPT standard.

Historical perspective and current status

An experimental videotex service was first introduced in the Netherlands in 1978. A market trial was not, however, formally begun until 1980. It ran officially for one year. Selected subscribers from both the business and the domestic sector participated. Based on the encouraging results of this market trial, the Dutch government was advised to sanction the official continuation of the service, but it was not until late spring of 1984 that the government finally authorised its full introduction. Despite this delay in obtaining legislative approval for the service, Viditel has in effect operated as a commercial service since the end of 1981, and subscriber numbers and available services have increased slowly but steadily.

The 1980/81 field trial demonstrated, amongst other things, that there was relatively little interest in videotex amongst residential subscribers and that the key to the success of Viditel would lie with business users, at least for the first few years.

As a consequence, a greater emphasis has been placed on the Viditel gateway facility (Vidipoort), and a marketing approach designed to exploit key business applications in targeted sectors features strongly in the Dutch PTT's marketing policies. In this, as well as in a number of other technical respects and historical experience, the Dutch situation is very similar to that of the UK.

The specific industry sectors at which Viditel is now targeted are:

— Travel: The plan is that by the end of 1984 all travel agents should have access to Viditel.

— Transport: By early 1985 it is planned that most transport companies, and especially freight forwarders should be connected to Viditel.

— Medical: Videotex services for the medical sector are under trial now and are expected to become operational by 1985.

— Agriculture: Penetration of this sector is planned, but not until problems associated with managing a multiplicity of information services are overcome.

— Finance/banking: The finance and banking sector is recognised to be important in the development of videotex, and a number of major banks have been involved in Viditel and several have private systems accessed over Vidipoort. Interest in videotex among banks is, however, likely to remain relatively low so long as the PTT pursues a policy of addressing the business market before attacking the residential market.

— Professions and education: Another recent development is a telesoftware service (though so far only available for the Philips P200T microcomputer) targeted at professional and educational users.

Figure 1.10 Summary of the status of videotex in the Netherlands[1]

Videotex standards:	Prestel, CEPT eventually
PTT system:	Viditel
Number of terminals:	10,000 on Viditel plus a few hundred on other systems
Number of information providers:	750 (including 600 sub-IPs)
Number of external computers connected via Vidipoort:	8
Number of private systems:	About 40-50
Main terminal suppliers:	Philips
Main private system suppliers:	Perkin Elmer, Nova and Modcomp
Main videotex bureaux:	AAAA and Central Beheer

Note: [1]Status applies to July 1984.

The PTT network is based on two videotex centres equipped with GEC minicomputers, one in Amsterdam covering the northern half of the Netherlands and one in The Hague serving the south. A separate editing-only centre for database creation and maintenance is to be installed in The Hague by October 1984. Originally, the PTT supplied all modems, which had to be external to the terminal, but in 1983 terminals with built-in modems, were authorised. These can be purchased direct from terminal suppliers.

Principal issues and outlook

Although formal approval for the Viditel commercial service by the Dutch government was not granted until 1984, the Dutch videotex industry has made steady progress in the three years since the formal end of the market trial. One reason is that Viditel has been relatively unencumbered by onerous regulatory problems. Indeed, the Dutch government decided that there would be no need for separate regulatory provisions governing the use of videotex, although information providers are bound by the existing advertising code, their contract with the PTT (which governs IP practices), and various codes of conduct drawn up by the Dutch association of information providers. Another reason for the continuing progress is the decision by the Dutch PTT to continue with the existing Prestel software and GEC hardware for the time being, rather than to introduce a completely new system infrastructure. This could have disrupted the relatively well developed Dutch videotex industry and could have led to a temporary standstill in market development such as has occurred in West Germany. Finally, the PTT's emphasis on developing key business sectors has led to a sharper focus for new videotex activities, although many of these sectors are still far from fully developed. The current forecast by the Dutch PTT is for 60,000 terminals to be connected to Viditel by the end of 1985, though, with only 10,000 terminals installed by mid 1984, this appears a very ambitious target.

The PTT is reserving its position on the possible introduction of CEPT. Officially, it plans to incorporate the CEPT standard at some point in the future, but it is still monitoring the introduction of CEPT in West Germany and other countries before making a final decision. The PTT considers display standards to be of secondary importance compared to the need to develop the market, and sees no need for an urgent decision. A more important issue is the future networking philosophy that it should adopt. It feels that a more decentralised service, possibly along the lines of the French Teletel service, could in many ways be more attractive than the centralised system on which Viditel is now based. The PTT would like to attract more private videotex systems to Viditel by offering a more comprehensive service. Achieving this goal is high on their priority list.

As the Viditel service grows, legal and regulatory issues are likely to become more important. In particular, the problems of information ownership, copyright and data protection will need to be addressed.

NORWAY

After an initial limited trial, the Norwegian PTT has decided to introduce a full commercial service during 1985 and 1986. The contract for the implementation of the full service has been awarded to the French systems and software house CAP-Gemini-Sogeti and its partner in the tender for the contract, Tandem Computers.

Historical perspective and current status

The trial videotex service in Norway — called Teledata — started in 1979 and has involved only a few hundred terminals and no gateway connections. Nevertheless, a relatively large number of information providers — around 130 — have experimented with the service. The trial service was based on DEC-hardware and software developed by AU-Systems.

In August 1984, having gone to competitive tender, the Norwegian PTT awarded the contract for its commercial videotex service to the French company CAP-Gemini-Sogeti (CGS), through its Norwegian subsidiary Data Logic, and the minicomputer supplier, Tandem Computers. The software is a specially adapted version of CAP-Gemini-Sogeti's private videotex system, Multitel. The CGS/Tandem bid was

awarded in competition with several others, including IBM Germany and Steria/Bull. The contract is reported to be split roughly 50:50 between CGS and Tandem. (The award has given a boost to the French videotex export industry as this is the first time that a French company has been responsible for developing a European national videotex service outside France.)

The new system will initially (for the first few months) use the Prestel version of CAP-Gemini-Sogeti's Multitel software, modified to suit Tandem's computers and the Norwegian PTTs specification. The CEPT standard will, however, be adopted for the commercial service (scheduled to open at the end of 1985), although the Prestel standard will continue to be available, and the Antiope standard will be added. However, the full technical specification will not be complete before the end of 1984.

The whole implementation is scheduled to take 15 months, with a service for the business community launched in October 1985, and access by residential users is scheduled for 1986. A capacity to handle 200 simultaneous users is planned.

The architecture specified envisages a network of external computers connected via intelligent PADs (Packet Assemblers/ Disassemblers) on the Norwegian packet-switched network, Datapak, and will provide gateway access to other Scandinavian countries in 1986, and to other countries in 1987. The Norwegian PTT will also run its own service computers on the system offering database capacity to information providers on a bureau basis. The PTT will also be responsible for central billing and indexing, and it is planning to offer an electronic telephone directory service.

Figure 1.11 Summary of the status of videotex in Norway[1]

Videotex standards:	Prestel. CEPT shortly.
PTT system:	Teledata
Number of terminals:	300-400 (including terminals registered on bureaux and private systems)
Number of information providers:	130
Number of external computers connected to Teledata system:	None
Number of private systems:	About 4
Main terminal suppliers:	Philips, Barco, Luxor and Salora
Main private system suppliers:	Softplan, Aregon International and AU-Systems
Main videotex bureaux:	Norsk Centre for Informatics

Note: [1]Status applies to July 1984.

Principal issues and outlook

The key issue in the short term is the implementation of the new system according to schedule. For prestige as well as contractual reasons, CAP-Gemini-Sogeti and Tandem are expected to make every effort to ensure that the agreed schedule is met. On this assumption, the Norwegian PTT is forecasting around 1,200 terminals connected to the new system by the end of 1985, with the terminal base increasing to 25,000 by the end of the 1980s, and 40,000 by 1993. This would appear to be an achievable target. The residential market will be addressed from 1986 but initially the PTT's emphasis will be on developing the business market for videotex services. The electronic telephone directory is planned for 1986 and home banking services for late 1985 or 1986. Telesoftware services will be considered, but the PTT as yet has no plans for its introduction. Until 1985, charges for both users and information providers have been waived.

SPAIN

After some years of experimentation with videotex, which include the development and trial use of Spain's own videotex standard, the Spanish PTT has now decided to follow the pattern of several other West European countries and introduce a public videotex service — Ibertex — using the CEPT standard.

Historical perspective and current status

The Spanish national telephone authority (CTNE-Compañiá Telefónica Nacional de España) began experimenting with videotex in 1978. By 1981 it had developed its own videotex system, including a unique standard that is incompatible with other European standards (although it shares certain characteristics with both Prestel and Antiope). Using this standard, CTNE ran a trial that started during the 1982 World Cup football games in Spain. Almost all the 500 terminals currently installed conform to the Spanish standard, though there are a few terminals connected to private systems that use other standards.

Following a number of surveys and a specially commissioned market study, CTNE decided to introduce a new service from the end of 1984, called Ibertex. This will use the CEPT standard. The networking philosophy to be adopted will be a decentralised system, similar to that in France. Initially, however, CTNE will also provide a central database, partly for promotional purposes, and partly to get the service off the ground faster. The services will be targeted exclusively at the business market for the foreseeable

future. National coverage will be provided via the Iberpac Spanish packet-switched service. The service will operate as a trial until the spring of 1985, when it is scheduled to be launched as a full commercial service. Industry observers expect that the CEPT system and the original trial system using the Spanish standard will initially be run in parallel.

It is likely that CEPT terminals will initially be imported from Germany until local production builds up. CTNE believes in an open and competitive market for terminals but it expects to develop and market a business terminal itself in competition with other suppliers.

Principal issues and outlook

The two key issues the Spanish videotex industry is concerned about are the suitability of Iberpac for videotex services, and the CTNE's delay in announcing tariffs for the Ibertex service.

It is CTNE's policy to encourage use of the packet-switched network for videotex services. To make its policy effective, CTNE will charge those users wishing to use the Iberpac network only $30 a month for modem rental, compared to $80 a month for modems that use the telephone network for videotex transmission. Local industry observers do not believe that Iberpac is suitable for videotex, and the Spanish association of information providers is lobbying CTNE to abandon this policy.

The other issue confronting Spanish industry participants is the matter of Ibertex tariffs. CTNE is not planning to publish its service tariffs until October 1984. Industry participants consider this to be too late for service providers to make commercial decisions about their participation before the service starts. This is likely to result in delays in the provision of services, and hence in the growth in the number of installed terminals.

Figure 1.12 Summary of the status of videotex in Spain[1]

Videotex standards:	Spanish standard. CEPT shortly. Some Prestel terminals installed.
PTT system:	Ibertex
Number of terminals:	500
Number of information providers:	100
Number of external computers:	None
Number of private systems:	About 5
Main terminal suppliers:	CECSA (Spanish standard); Philips and Bishopsgate (other standards)
Main private system suppliers:	Modcomp and Aregon International
Main videotex bureaux:	Prysesa and Visualdata

Note: [1]Status applies to July 1984.

SWEDEN

The videotex industry in Sweden has developed steadily since the Swedish PTT's videotex service — Datavision — became a full commercial operation in 1982. The market is very active and the PTT and local observers expect a rapid increase in available services and terminals over the next few years.

Historical perspective and current status

In Sweden, videotex started with two separate services: a service introduced by Televerket, the Swedish telecommunications administration, and a second service run as a pilot system by Philips' Swedish subsidiary.

The telecommunications and postal administrations in Sweden are run as separate enterprises: Televerket and Postverket respectively. Televerket introduced a trial videotex service in 1980/1981. The service, called Datavision, came into full commercial operation in Spring 1982. In parallel with the PTT initiative, Svenska Philips set up its own pilot trial system. This resulted in the formation of a separate company, Viewdata AB, in which Datema (a large Swedish systems house) took a controlling interest. In 1983, Viewdata AB was acquired by Postverket, the postal administration. Some of the information held on the Postverket system was transferred to the Datavision service and today, Postverket's services, called Postel, are the most important on Datavision. Postel now also markets Systel software and runs a Systel bureau on Perkin-Elmer hardware.

Umbrella information providers play an important role on Datavision. In addition to Postel, prominent umbrella information providers are Telebild (a joint venture between Svenska Dagbladet, a major newspaper publisher, and Ericsson), Esselte, the paper and publishing group, and the Dagus Nyheter, another newspaper group.

Televerket has adopted a variant of the Prestel standard which it calls Prestel Plus. Datavision runs on Eclipse minicomputers and uses software developed by Ericsson (Avi-Net). It is available throughout Sweden at local call charges. The system only supports a very basic gateway architecture, and this has proved to be unsatisfactory for many prospective operators of external databases. This dissatisfaction is the main reason why only three gateway connections had been implemented by mid 1984, although a further 12 or so are planned by the year end. Televerket has plans to make substantial changes to Datavision's gateway architecture but these changes

Figure 1.13 Summary of the status of videotex in Sweden[1]

Videotex standard:	Enhanced version of Prestel. CEPT eventually
PTT system:	Datavision
Number of terminals:	6,000-7,000
Number of information providers:	400 umbrella information providers
Number of external computers connected to Datavision:	3
Number of private systems:	25-30
Main terminal supplier:	Luxor
Main private system suppliers:	Ericsson, Softplan and IBM
Main videotex bureaux:	Postel and Liber

Note: [1]Status applies to July 1984.

are unlikely to be introduced before 1987. The current inability of Datavision to cater adequately for the requirements of external computers is one reason why the number of bureaux and independent private videotex systems is increasing in Sweden.

Principal issues and outlook

Although the Swedish videotex industry is relatively healthy and active in the market, this level of activity will need to be maintained if current installed terminal forecasts are to be achieved. A decision on the implementation of the CEPT standard will also need to be made.

The Swedish videotex market has shown a lot of activity over the last two years and major applications are being developed. The market is seen as being almost exclusively business, and the financial and automobile sectors are likely to be the most important over the next few years. For example, Postverket already has a direct private-line link to the commodities and financial information database held by ICV in London. Links to the Stockholm and Oslo stock exchanges are planned. Another link that has been implemented is to the state vehicle licensing centre, so that second-hand car dealers can have access to the history and ownership details of vehicles for sale. The travel business is seen as less promising than in some other countries because most travel agents are already using (non-videotex) online availability and reservation systems. Although the main emphasis is on the business market, the increasing numbers of home computers in Sweden has created considerable interest in the provision of telesoftware services. These are expected to become available before the end of 1984.

Teieverket anticipates a five-fold growth in the number of terminals by the end of 1985, to around 30,000. Local observers are sceptical about this forecast and believe that 20,000 is a more realistic, though still challenging, target.

Televerket has agreed in principle that the CEPT standard should be implemented, but no date for its introduction has yet been set. Some of the private and bureau systems are, however, expected to begin offering CEPT in parallel with the existing standards in 1985.

SWITZERLAND

After a careful evaluation of videotex, which included a pilot trial over a number of years, the Swiss PTT inaugurated a 3,000-user operational test of its service — called Videotex — in late 1983, although in effect it only started in 1984, when the pilot trial ended formally. The operational-test system uses the CEPT standard. A final governmental decision relating to the role of the service is not expected before 1985. In the interim, the Swiss videotex industry, and suppliers and service providers from other countries, will be developing the equipment, software and application services necessary to attract subscribers.

Historical perspective and current status

Videotex services in Switzerland have been developed gradually, methodically and with great care over the past eight years. The first demonstrations of videotex took place in 1976, and in 1978 the Swiss PTT commissioned a pilot system.

The pilot system was a first step towards a full, commercial service. Based on Prestel, the pilot system became operational in the autumn of 1979, but was only available to business organisations, not private households. The objective of the pilot trial was to obtain basic experience of the technology, and of the problems and opportunities associated with videotex. Some 200 companies were providing information services on the pilot system. The pilot trial officially ended on 30 September 1984.

An operational-test system, the second step towards a full service, was initiated in September 1983. The system is based on the CEPT standard. The operational test is planned to support about 3,000 private and business users. 2,000 of the users will be in the regions around Zurich and Lausanne, and the remaining 1,000 will be drawn from anywhere in Switzerland. Although the operational test was inaugurated in September 1983, by August 1984 only about 500 users had been connected. However, the Swiss videotex industry hopes that almost 2,000 users will be online by the end of 1984.

A study report, based on the results of the operational test, is expected to be available in the autumn of

1985. The study will be one of the inputs to the decision on whether to take the third and final step to a full commercial public videotex service. This decision will be made by the Swiss government.

The operational test has been developed by Standard Telephone and Radio AG (STR), a subsidiary of ITT, with assistance from Infomart, the largest Canadian videotex system supplier and service operator. The first videotex centre was installed in Bern, and it was operational by March 1984. A second centre is being tested in Zurich, and STR plans to hand it over to the PTT in autumn 1984. The videotex centres are based on dual VAX 11/780 minicomputers. It is planned that they should be able to support up to 192 ports, of which 24 are for information providers. STR believe they can significantly increase this capacity as demand increases, by interconnecting three VAX minicomputers and by installing front-end processors.

The system architecture reflects the statutory role of the Swiss PTT, which is only responsible for transmission services, whereas the service providers are responsible for all the information on the videotex system. The PTT runs both the communications network, based on Telepac (the Swiss packet-switched network) and the public telephone network, and the videotex centres. Users connect to local videotex centres using the public switched telephone network and are then routed via Telepac to databases held on external host computers. The main task of the videotex centres is to support the videotex network. No information is stored at the centres, although users can access service providers' indexes to their services.

The number of information providers (IPs) in the operational test has been growing steadily since the videotex centre at Bern was introduced in March 1984. At present, most of the organisations involved are in the German-speaking part of Switzerland, and it is feared that there may be a shortage of information relevant to the French and Italian speaking areas. This may impact the study findings and delay the government decision on the future of the service.

Although the operational-test system is designed primarily to support connected external computers, some organisations may not wish to operate their own private videotex systems. A number of co-operative ventures and bureau services are appearing to cater for these organisations. One example of such a service organisation is Radio-Schweiz AG (RSAG). The Swiss PTT has commissioned RSAG to operate an external computer as a videotex bureau. The purpose of this agreement is to increase the range of information available during the operational test by including organisations that cannot afford to operate a computer or do not wish to do so until the Swiss government authorises a full public videotex system.

Figure 1.14 Summary of the status of videotex in Switzerland[1]

Videotex standards:	CEPT. Some Prestel-standard devices installed
PTT system:	Videotex
Number of terminals:	500-700
Number of information providers:	200 on pilot system, 25 on external computers using gateway links on the operational test system
Number of external computers:	10
Number of private systems:	12-15
Main terminal suppliers:	Loewe, Autronic, Autophon
Main private system suppliers:	STR, Nova, Siemens, IBM and NCR
Main videotex bureaux:	Radio-Schweiz and Agentur 1818 (Ringier)

Note: [1]Status applies to July 1984.

A variety of information is already available or is planned on the operational-test system. Although many IPs have confined themselves to general information, others have targeted their services at more clearly definable user groups. These include an application for booksellers run on the RSAG computer and applications planned for doctors. Home banking is seen as another promising application, but its introduction is being delayed because of concerns over data security.

The need for videotex to be clearly targeted is being increasingly recognised, and a programme called 'market basket' (Marktkorb) has been defined. This programme aims to identify specific market sectors, such as insurance and retailing, and bring together information from many service providers in one unified and consistent 'basket' of information relevant to each sector.

Principal issues and outlook

The problems faced by the videotex industry in Switzerland are no different from those being faced in other countries. The key problem is how to reach 'critical mass': IPs need users to whom they can sell information before they can afford to provide that information, and users need a range of relevant information to choose from before they will invest in terminals. In Switzerland, the situation is complicated by two other factors. These are:

— Uncertainty over whether the government will give the go-ahead for the full commercial service in 1985.

— A relatively small and multi-cultural national population, which makes it harder for IPs to achieve

commercial success from selling information to the general public.

Many potential users and information providers are waiting to see how the market develops. This wait-and-see attitude may make it difficult to attract sufficient participants for the operational test within the necessary timescales. The government's decision on the future of the public videotex service may therefore be delayed until late 1985 or even 1986. Any delay increases the uncertainty surrounding videotex and further compounds the problems currently being experienced. It is still too early in the operational test to predict its outcome. However, it does seem clear that the public videotex system faces an uphill struggle.

There are several successful private videotex systems using Prestel-based software in Switzerland, running similar applications as in other countries. Although not directly affected by the problems facing the PTT and public service providers, private system operators are indirectly affected. They will need to decide whether, and when, to convert their Prestel-based systems to CEPT. Some private operators, such as Telekurs, may wish to offer some of their information over the public network. Other operators, such as the tour operator ESCO that runs a service for travel agents, may find that its competitors offer CEPT-based services, and that it may need to do the same for competitive reasons.

THE UNITED KINGDOM

Videotex originated in the United Kingdom and much experience with the technology has been accumulated — often the hard way. Early market forecasts proved to be grossly unrealistic and, by 1980, attention had switched from the domestic to the business market. As a consequence, the role of the public PTT-run Prestel service underwent a radical reappraisal by both British Telecom and service providers. The marketing emphasis today is on exploiting selected and promising market sectors and on offering applications that trigger terminal installations and increase demand for services. The private videotex system industry has grown rapidly in the UK and continues to be a major — if not the major — force in the development of the market.

Historical perspective and current status

Videotex was invented in the research laboratories of British Telecom in the early 1970s. Much interest and enthusiasm greeted the new technology and, after experimentation and trials, the British public videotex service — Prestel — was officially launched in late 1979. Conceived as a mass market medium, some forecasters produced what have subsequently turned out to be wildly optimistic market forecasts — half a million terminals installed by 1983, and two million terminals by 1985.*

Prestel has been unable to attract a mass residential market. There are a number of reasons for this. The first is cost. Terminal prices and usage costs are too high for most domestic consumers, and the tariff structure was, and to some extent still is, too complex and confusing (though it has been drastically simplified). Secondly, the rapid penetration of teletext, with around 2 million units installed in homes by the end of 1984, has absorbed the most immediate demand for electronic information services in the home. Also, teletext set and service costs are well below those of videotex services. The crux of the problem is that Prestel offers very little that domestic consumers really want, and much of what it does offer can be obtained elsewhere more cheaply, and usually more easily.

In early 1980, British Telecom (BT) decided to change Prestel's marketing direction fundamentally. First, it redirected its marketing effort towards the business market and abandoned all attempts to penetrate the residential market, until it could offer unique and valuable services such as telesoftware, home banking and teleshopping, that it felt would appeal to home consumers. Second, it abandoned its traditional 'laissez-faire' common-carrier policy, in favour of one involving the creation of total-package services aimed at key target user populations. BT's original role was that of a common carrier; it was only responsible for storing and transmitting information, but took little direct part in the provision of the information itself, or in marketing and selling it. The changed approach has yielded impressive results. It has resulted in some noticeable improvements in the quality of the services on offer, and during 1984, new-user registrations were running at between 1,000 and 2,000 a month.

The targeted marketing approach adopted by Prestel usually takes the form of joint ventures with organisations able to offer both attractive service packages for specialised sectors, and also the necessary investment to get the services successfully launched.

By 1984 the principal specialised services offered by BT and its joint-venture partners, were:

— Financial: The 'CitiService' venture is the result of co-operation between the London Stock Exchange, ICV Information Systems and British Telecom. It offers three levels of service, positioned and priced according to the needs of specific user groups. The most basic level of service is aimed at the

*It is interesting to note that, even with the benefit of hindsight, the Deutsche Bundespost is making broadly comparable forecasts for its CEPT-based Bildschirmtext service in West Germany.

general business community and comprises mainly company information. The second level is targeted at private investors, in the form of a closed user group, and comprises a database of share-price information updated five times a day. The third level provides continuously updated stock and share price information and is aimed at brokers and other investment professionals.

—Travel: The travel and tourist business was the first industry sector to take videotex seriously in the UK. Today most UK travel agents have access to travel information offered by tour operators and airlines, though not all the private videotex systems that hold much of this information are connected to Prestel.

—Farming: Specialised information services for the farming community were launched on Prestel in 1984. Called 'Farmlink', this service provides farmers with information to assist in efficient farm management. The service is provided by a number of organisations, including the Ministry of Agriculture, Fisheries and Food, the Meat and Livestock Commission and the Meteorological Office. There is also a link to 'CitiService' to provide farm commodity prices.

—Banking: 'Homelink' is a banking service offering home banking facilities. It is provided as a joint venture between the Nottingham Building Society, the Bank of Scotland and British Telecom. Subscribers are issued with free or subsidised terminals. By mid 1984, 'Homelink' had around 3,000 subscribers. Although 100,000 Homelink subscribers by the end of 1986 were originally forecast at the time of its launch, it now seems unlikely that this target will be met. (This is generally attributed to the loyalty of the banking public to its traditional high-street banking services.)

—Telesoftware/Home computing: Telesoftware has been the major application encouraging growth in the number of domestic subscribers to Prestel. 'Micronet' was the pioneer telesoftware service launched by EMAP and British Telecom, and it has proved sufficiently successful to attract other information providers. Despite Micronet's initial success and rapid growth — it now has over 10,000 users — it is reported to be experiencing difficulties in sustaining its early growth rate.

Other specialised videotex services are being developed for a variety of sectors including estate agents, doctors, insurance brokers and educational establishments. Prestel's user-to-user message service called 'Mailbox', which includes an interface to the telex system, has also proved successful. Messages sent from videotex terminals can be delivered as normal telex messages at their destination.

In parallel with the development of these specialised services, the more general database on Prestel is also being developed. The general database is, however, likely to be used significantly only once subscribers are attracted onto the system by the specialised services.

Figure 1.15 Summary of the status of videotex in the United Kingdom[1]

Videotex standards:	Prestel. Picture Prestel service available from 1985. CEPT in 1987/88 as well as Prestel
PTT system:	Prestel
Number of terminals:	47,000 on PTT system (60% business, 40% domestic) plus 10,000-15,000 on private systems
Number of information providers on Prestel:	1,200 (including sub-IPs)
Number of external computers accessed over the Prestel gateway:	17, plus an estimated 6 using other videotex networks
Number of private systems:	375
Main terminal suppliers:	Philips, Sony, Tandata and Prism
Main private system suppliers:	Aregon International, Rediffusion, IBM and ICL
Main videotex bureaux:	Baric, Istel, IBM and Datasolve

Note: [1]Status applies to July 1984.

In terms of Prestel's technical development, BT has introduced a number of improvements over the last two years, and GEC was awarded a contract to upgrade Prestel's computers. By mid 1984 there were six regional computers supporting user access and one database-update centre. The network had also been extended and over 90% of UK telephone subscribers were able to access Prestel at local call charges.

In parallel with the growth of British Telecom's Prestel service, the number of private systems in the UK has grown dramatically since 1980. In 1984, with around 400 installed systems, there were more private systems in the UK than in any other country in the world. A few of these systems are connected via a gateway link to Prestel but the majority are accessed directly over the public telephone system or private data networks. A relatively high proportion of terminals in the UK — some 20% to 25% — do not use the public Prestel service.

Principal issues and outlook

The UK videotex industry is now relatively mature: Prestel's policies are understood and are delivering results; and many organisations now recognise the role for private videotex systems.

One key issue concerning videotex in the UK is the increasingly competitive communications environment resulting from the British government's policy to liberalise the UK telecommunication industry. This policy allows other organisations to exploit a market that has traditionally been the exclusive preserve of British Telecom. A number of major computer bureaux are already offering videotex network services in competition with BT's Prestel gateway.

Another issue is the growth of Prestel. British Telecom is under pressure to bring its Prestel service into profit, and its revised marketing approach appears to be paying off, despite some inevitable disappointments. But increasing competition from private videotex systems and independent bureaux and network services will ensure that the next few years will not be easy for Prestel.

BT will be introducing a photographic videotex system during 1985, by which time the integrated services digital network (ISDN) will start to become available. (The ISDN is virtually a prerequisite for photovideotex, because it can support the very high transmission speeds required before photovideotex becomes an acceptable technology.) Photovideotex terminals will consist of adapted IBM personal computers, and although only monochrome displays will be offered initially, colour displays will be available later.

BT is committed to introduce the CEPT standard but this is unlikely to be before 1987 or 1988. By that time, access to Prestel over residential cable television systems, and an increasing use of interactive videodiscs in conjunction with videotex services are likely to be other important developments.

CHAPTER 2

THE NORTH AMERICAN EXPERIENCE AND ITS INFLUENCE ON EUROPE

"Videotex is the way that the majority of Americans will first put their hands on and use computer-related devices, both at home and at work. Therefore, videotex will represent a major behavioural and cultural change in our society, and it will become a very, very large industry"*.

These words, published in April 1984, are remarkable not for their originality but for their source: William W. Seelinger, Manager of Videotex Market Development for IBM Corporation, White Plains, New York. They represent a clear and public endorsement of videotex by IBM; an endorsement that American Telephone and Telegraph (AT&T) made in 1982 when it presented its videotex Presentation Level Protocol (PLP) for adoption as the North American videotex standard. (This standard was formally accepted in 1984 as the North American Presentation Level Protocol Syntax — NAPLPS**.)

These two corporations between them account for over 80% of the North American telecommunications and computing industry. Their clear commitment to videotex will have profound long term implications for the development of videotex, both in North America and Western Europe. It is for this reason that we present a brief review of the state of the videotex industry in North America: its overall perspective; the main issues facing the industry; the market and its prospects; the main players; and the implications of developments in North America for the European videotex industry.

NORTH AMERICAN VIDEOTEX IN PERSPECTIVE

Videotex emerged in North America some five years after it appeared in Europe: Prestel, Europe's first videotex standard, was defined in the early 1970s, whereas Telidon (the Canadian forerunner to NAPLPS) was first proposed in the late 1970s; and the first public videotex conferences in Europe and North America were held in 1977 and 1982 respectively. In some respects, the videotex industry in North America is still four or five years behind that in Europe, despite the opportunities for technology and expertise to flow from Europe to North America. The reasons for this are both basic and complex, and are addressed in this section.

Historical perspective

The adoption of Telidon as the Canadian videotex standard in 1979 can be taken as the starting date for videotex in North America. The next three years represented a period of intense activity in Canada: in the development of trials aimed initially at the residential market; and later, when the problems of residential market penetration became clear, of services for targeted user groups, such as farmers and tourists. In the US, the focus of attention was on the establishment of an accepted videotex standard. The Canadian, British and French videotex industries, led by their telecommunication authorities, attempted to persuade the market and the Federal Communication Commission (FCC) to adopt their respective videotex standards. At the same time, intense lobbying was conducted, primarily by US newspaper interests, to ensure that AT&T's potential to dominate the US videotex market was adequately restrained by regulatory mechanisms. These activities culminated in the FCC refusing to rule on a single standard, and AT&T being restricted, until mid 1989, from being able to offer a full range of services over its telecommunication network.

Since 1982, activity in Canada has been more muted. This has resulted from a reduction in the level of Government financial support for the industry, and the uncertainties over the short-term commercial viability of videotex in a market the size of Canada. The centre of activity has shifted to the US. AT&T announced its PLP standard in 1982, and by 1984 this standard (renamed NAPLPS) had been ratified by ANSI and OSI, the main standards bodies in the US. AT&T participated in a residential market trial in Florida in conjunction with Knight-Ridder, a major newspaper publisher. AT&T supplied the hardware and software for the trial and Knight-Ridder managed the information services, local marketing and system operation. The trial proved sufficiently promising for

*"Videotex in the United States", W M Seelinger, Telephony, April 1984

** Pronounced "Naplips"

a full commercial service to be launched in October 1983. AT&T has also been active in developing hardware and software to support its videotex standard, especially frame creation and user access devices.

Other public trials aimed predominantly at a residential user population, especially Times Mirrors' trial in Los Angeles, were conducted by publishers, and a number of banks, notably Chemical Bank in New York and Bank of America in California, launched home banking services, preceded by trials, though these were mainly based in ASCII* protocols, not NAPLPS.

Other ASCII-based public services that were predominantly targeted at home microcomputer users, especially Dow Jones News Retrieval, Compuserve and The Source, experienced very rapid growth as microcomputer sales accelerated. By mid 1984, an estimated 300,000 home microcomputer users were accessing these ASCII public services, compared to under 10,000 accessing NAPLPS-based services. There have been many other initiatives, trials and services, some based on ASCII, some on NAPLPS and some on European videotex standards. But none, even the potentially very significant Trintex joint venture between IBM, CBS and Sears Roebuck, have clearly demonstrated the direction videotex will take over the next five years.

The in-house use of videotex systems by major US corporations was pioneered by UK and French suppliers, especially Aregon International and Telesystemes. By 1982, IBM had introduced its UK-developed SVS/1 private system. All these systems used European videotex display standards, and this has emerged as a factor slowing the development of the private system market; the main problem being the unavailability of suitable terminals from credible suppliers. In 1983, IBM enhanced SVS/1 to support NAPLPS, and began to promote its immensely successful PC business microcomputer as a videotex terminal. These moves emphasised the importance of NAPLPS and microcomputers in the North American videotex market. In 1984, Digital Equipment (DEC), Sperry and Honeywell announced private videotex systems in the US. This has inevitably stimulated the market further.

In conclusion, the last five years have seen videotex in North America move from its early trial phases to first commercial implementations, though compared to the situation in much of Europe, the industry is still confused, confusing and immature.

*ASCII can legitimately be viewed as a videotex standard in so far as (especially in the context of the US market) it is used to address similar audiences. That it lacks colour and graphics is, to most observers, a superficial difference.

Differences and similarities between videotex in North America and Europe

Superficially, videotex in North America and Europe has pursued a different development path. Underneath these superficial differences, however, are underlying trends and forces that show strikingly similar patterns. In the rest of this section we analyse the main differences under the headings of:

—Government involvement and commercial motivation.

—Public and private videotex systems.

—Local, targeted and financial public services.

—Videotex standards.

—Videotex terminals.

—Telecommunications infrastructure.

We then go on to focus on some of the more striking similarities.

Government involvement and commercial motivation

The most striking difference between the development of videotex in North America and Europe is that government involvement and regulation has been almost totally absent in North America (with the exception of limited pump-priming funding by the Canadian government). The sole motivation for the development of videotex has been profit. As a result, publishers, especially newspaper groups, have emerged as the main system operators of public videotex services. Their dominant motivations have been fear — of the potential loss of advertising revenue — and long-term commercial gain from adding electronic publishing and advertising to their paper-based activities. Although telephone companies, especially AT&T, have played an important enabling role, their involvement has been relatively low key.

This is in direct contrast to the situation in Europe, where the PTTs have almost universally been the main instigators of public videotex services, and publishers have tended to adopt relatively cautious wait-and-see tactics. Perhaps the main reasons for this are that advertising is considered of less importance in Europe than in North America: it is more strictly regulated in Europe, and the European alphamosaic videotex standards are considered much less suitable for advertising than NAPLPS.

Public and private videotex systems

Another clear difference is the preponderance of services aimed at the residential user, compared to those targeted at business users. Whereas in Europe the ratio of business to residential services is now

approaching 100:1, in North America it is nearer 2:1. This can be explained by a number of factors:

— Online information services for the business user, based on conventional computer technology, were well established in North America before the arrival of videotex. For example, even in 1980, almost all US travel agents had ASCII terminals that could access airline reservation systems. This was not the situation in Europe.

— Videotex was (and to a large extent still is) seen as a new advertising medium, rather than an information-dissemination medium. By contrast to the potential of the residential advertising market, the business market is relatively insignificant. In Europe, advertising is still considered relatively unimportant for the success of videotex.

— The retail banking business is, arguably, much more competitive and dynamic in the US than in Europe. A high proportion of early US videotex systems were electronic banking systems aimed at home microcomputer users. In Europe, the banking industry has, with some notable exceptions, been much more cautious about offering home banking services.

— The explosive growth in business microcomputer sales started in the early 1980s in the US. This focused corporate data processing managers' attention away from investment in videotex. Microcomputers were (and will be for the foreseeable future) a much more important innovation than videotex in the business market. In Europe, the microcomputer boom started only after videotex had become relatively well established in the business environment.

Local, targeted and financial public services

In Europe, public as well as many private videotex services are aimed at a national market. In North America, however, most services are designed to meet the needs of a single city, or a narrowly defined target population, such as farmers.

This is both a reflection of the difference in size and population between the US and European countries, and the differences between the laws and regulations in different states. With the main emphasis on exploiting videotex as an advertising medium, and with local newspapers and local banks acting as the most important system operators, it is understandable that services generally have a strong local content. Services aimed at farmers also need to meet local needs: the needs of farmers in the fruit-growing San Joaquin valley of California bear little resemblance to those of farmers in Canada's mid-west. With some exceptions, the only videotex services that have addressed a national market are the specialist services, offered on Dow Jones News Retrieval, Compuserve and The Source, such as financial news, electronic mail, services for computer hobbyists, CompuCard's branded-goods teleshopping service, and the Official Airlines Guide. Even these services are increasingly being delivered over local videotex services via gateway links. It should be borne in mind, however, that many US states have populations exceeding all but the larger European countries, and that the potential market represented by a large city in North America may exceed that in one of the smaller European countries.

Videotex standards

The videotex standards adopted in North America also differ radically from those adopted in Europe. Whereas European videotex systems use alpha-mosaic videotex standards, those in North America use either ASCII (a basic monochrome text-only standard) or NAPLPS, with its sophisticated alphageometric high-resolution displays. The European standards tend to fall between these two extremes, combining the cheapness of ASCII with some of the colour and graphic capabilities of NAPLPS. In hindsight, it is clear that the European standards would have been largely inappropriate for the North American videotex market: ASCII was already well established by 1980 and adequately met the need for low-cost text-only information services and, with the arrival of a volume market for microcomputers capable of supporting NAPLPS at a small incremental cost — usually around $300 for the full* NAPLPS implementation, but under $100 for a workable subset for home microcomputers such as the Commodore 64 — NAPLPS could be offered at affordable prices, at least to those likely to be early adopters of videotex. Although a small market still exists for systems based on European videotex standards it is likely to disappear over the next two years.

Videotex terminals

The early North American videotex terminals — such as those produced by Norpak, Electrohome and EAL Microtel in Canada, and AT&T's Spectre — were purpose built 'dumb' videotex terminals or TV set adaptors similar to those available in Europe. The high costs of these early terminals encouraged the development of services, such as Informart's Teleguide, based on the use of public-access terminals. Many ASCII terminals, for example DEC's VT100, are also low-cost dumb devices. The trend, however, is strongly towards the use of microcomputers enhanced with modems (and special software and colour boards in the case of NAPLPS) as the standard videotex terminals of the future. Indeed, the three large ASCII-based public videotex services and home banking services owe their success largely to

*Defined as the Standard Reference Model (SRM) for NAPLPS. The lower-cost subsets lack some of the SRM colour choices and graphic display options and can distort displays of frames constructed to the SRM standard.

the penetration of microcomputers into homes and businesses. IBM is gearing itself up to exploit videotex aggressively as a vehicle to sell its PC and PCjunior microcomputers, and AT&T acknowledges that future versions of its Sceptre videotex terminal will be microcomputer-based. Few videotex industry participants believe that dumb videotex terminals have a significant role to play beyond the next two years.

Telecommunications infrastructure

Finally, the telecommunication infrastructure in North America differs greatly from that in Europe. Telephone companies, although strictly regulated, are not government-owned monopolies, and have little part to play in achieving the economic or social objectives of the government, as many PTTs have in Europe. They can, within the limits of the regulatory controls, engage in a wide range of commercial telecommunication activities. They are also required to generate an adequate return to their shareholders, and most telephone companies would be reluctant to engage in the level of investment in videotex (given the inherent risks) that have been undertaken by the European PTTs. They are also restricted from some activities more severely than their European counterparts; for example AT&T was forced to abandon its plans to launch an electronic telephone directory service that was broadly similar to that now offered by the French PTT. Another difference is the prevalence for free or flat-rate local-call telephone charges*. This has enabled the development of local advertising services that are free or low-cost to users. By contrast, long-distance telephone tariffs tend to be higher than in Europe, though the more widespread availability of packet-switched data networks, such as Tymnet and Telenet, goes some way to reduce the costs of providing access to remote services. Both these factors have reinforced the arguments in favour of the provision of local videotex services, especially those that are advertising-based, that minimise access costs for residential users.

Similarities between Europe and North America

Underlying these striking differences between the North American and European videotex markets are a number of fundamental similarities. The reactions of residential users to videotex, and the profiles of early residential adopters of videotex are very similar. Residential users on both sides of the Atlantic respond enthusiastically to the concept — the promise — of videotex, and then show the same reluctance to spend more than $10 to $15 a month on terminals and to access services. Trial users react in essentially the same way: they use the services heavily for the first three months — often on accessing games — then their usage falls away markedly. They demand services that meet their personal needs and can deliver tangible, useful benefits in terms of lifestyle improvement, enjoyment and cost saving. Early adopters tend to be affluent young married couples who set a premium on their leisure time.

The problem of overcoming critical mass — both of users and services — is equally acute in North America and Europe. No public system operator on either side of the Atlantic has yet achieved profitability, and few yet know the scale of investment required to reach the break-even point with any certainty. Nevertheless, the long term promise of videotex is such that new entrants feel obliged to test the market, despite a growing number of false starts and failures.

The inability of most suppliers and system operators to learn from the mistakes and successes of others is as prevalent in North America as in Europe. Given the four to five year lag between videotex in the two continents, North American participants have an invaluable opportunity to study the application of the technology in Europe, notwithstanding differences between the respective environments and technologies. Perhaps nowhere is this more striking than in the market for private videotex systems. The opportunities for US computer manufacturers and systems houses that might have been grasped if the lessons of the European market had been learnt are far from insignificant. Had IBM or DEC in the US been faster to learn from, and act on, the successes of their European subsidiaries they would each, by mid 1984, almost certainly be able to claim an installed base of many hundreds of systems, instead of 20 or 30. The four leading European suppliers have all sold more systems in Europe than have been sold in the whole North American market, and over 20 suppliers have sold more systems in Europe than either DEC or IBM in the US.

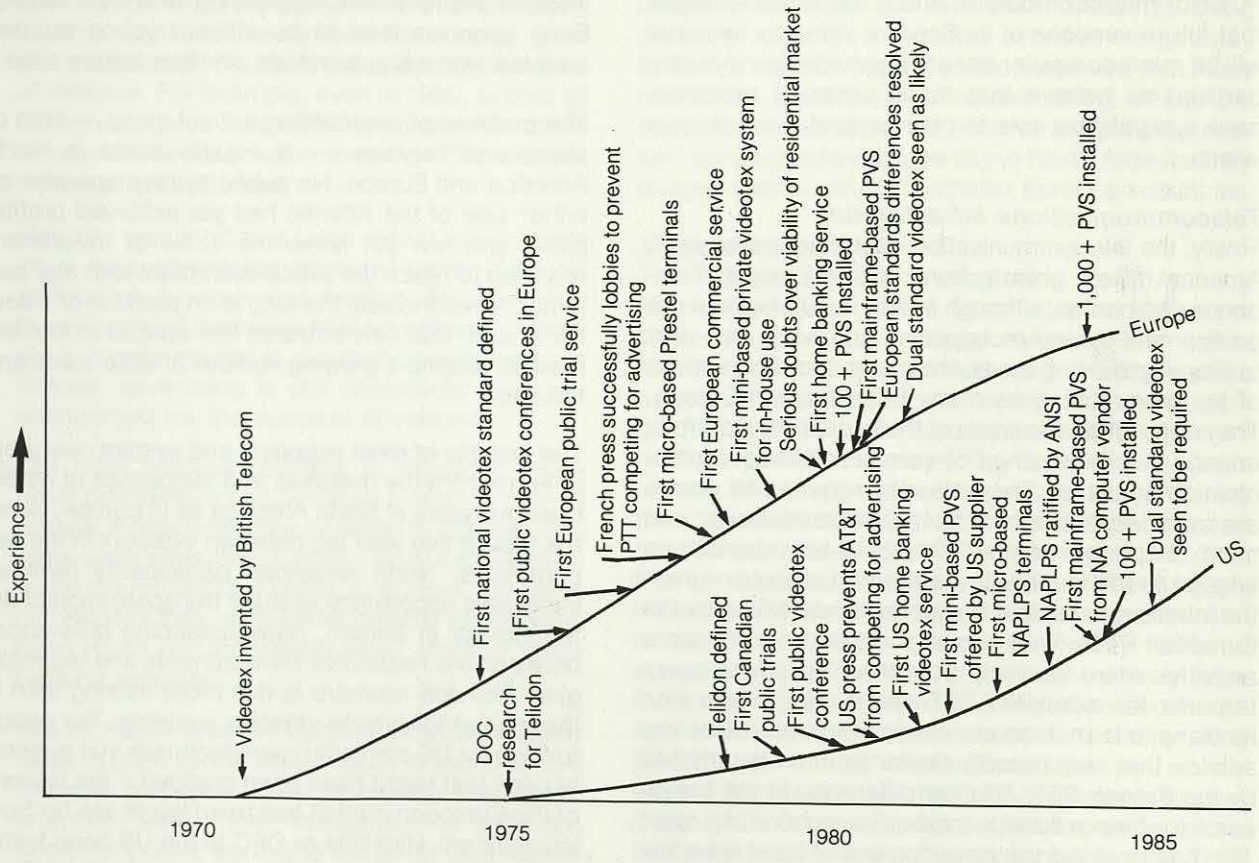
Finally (and this is shown schematically in Figure 2.1), the overall pattern of learning about videotex in the two continents shows striking parallels. Although there are inevitably differences in timing, the similarities far outweigh these differences. This points to the probability that the future development of the videotex market in North America will follow a broadly similar pattern to that of Europe. Given the greater dynamism of the North American market, however, it is certain that the gap will narrow until, by the late 1980s or early 1990s, the profiles of the videotex markets in both continents will converge.

THE MAIN ISSUES FACING THE NORTH AMERICAN VIDEOTEX INDUSTRY

Although confidence in, and commitment to, videotex is a characteristic of the North American indus-

*There are, however, strong economic pressures forcing local telephone companies to abandon these local call pricing policies.

Figure 2.1 The Videotex Learning Curve in Europe and North America



try, many important issues remain to be resolved before it achieves the same level of maturity as exists in Europe. These include:

—Clarity over the roles of AT&T and IBM.

—An understanding of the roles of NAPLPS and ASCII in the development of videotex.

—Understanding the importance of private videotex systems.

—Establishing the commercial viability of advertising-based services.

—Learning how to achieve high penetration of the home market.

Each issue is reviewed in greater detail below.

The roles of AT&T and IBM

Although both AT&T and IBM appear to have made tactical mistakes in the past (and will inevitably continue to do so in future), few would doubt their commitment to videotex as a technology that has long term strategic importance, nor their determination to achieve the dominant position in the videotex market. Both are positioning themselves to provide a range of products and services that cover all aspects of the industry. Both are seeking joint venture partners to complement their respective strengths and weaknesses and to commit important allies to their cause. Both are investing tens of millions of dollars annually, and are prepared to continue to do so and to increase their investments as they become more confident about market opportunities. Both are taking long term views about market prospects, and both, understandably, have national and international aspirations.

No one yet knows what roles and objectives each is seeking, nor when they will begin to reveal their strategies, though it is likely to be over the next two years. They will undoubtedly shape the future development of the industry in North America. Although IBM would appear to be best placed to emerge the more successful participant, at least over the next five years, it is probably of little real importance to most other industry participants as to which company becomes dominant in the long term. Between them they will almost certainly dwarf all other participants.

The roles of NAPLPS and ASCII

To many industry participants, ASCII and NAPLPS appear to be competing, rather than complementary, display technologies. So far ASCII has proved to be by far the most successful, measured in terms of its user base. But ASCII has been an established protocol since the mid 1960s (and shows its age in its lack of colour and graphics); whereas NAPLPS has only just been ratified. ASCII terminals are cheap; and NAPLPS terminals are still relatively expensive. There will be a very large market for ASCII-based services for the foreseeable future; but, with the inevitable improvement in the price/performance of microcomputers over time and its inherently greater attractiveness and versatility, NAPLPS is a standard that can only grow in importance. Indeed, it is possible that NAPLPS will become the de facto microcomputer graphics standard, provided it is aggressively promoted as such by IBM. (There are some indications that IBM may promote NAPLPS in this capacity from late 1984 or early 1985.) Once the most popular business microcomputer packages (such as Lotus 1-2-3) offer a NAPLPS graphics capability, and NAPLPS starts being used for home computer games programs, it is guaranteed widespread penetration of the microcomputer market in businesses and homes.

The importance of private videotex systems

Although in one sense all videotex systems in North America are private — in the sense that they are not run by public (state-owned) corporations — the use of videotex systems by organisations to provide services to their staff, agents and existing customers is still in its infancy. (There were almost five times as many private videotex systems of this type installed in the UK in 1984 than there were in North America, although the latter has a population five times as large.)

It has become clear from our research that few North American system suppliers yet fully understand the market for these systems, nor their importance in the development of the videotex market. Those that appear to understand it best (such as Aregon International, Videodial, DISC International and DEC) are either subsidiaries of European companies or have worked closely with European suppliers in North America over several years. Most suppliers are two to three years behind their European equivalents in their understanding of the application of private videotex systems, which suggests that volume shipments of systems are unlikely to occur much before late 1985.

The commercial viability of advertising services

In our view and that of some other industry observers, advertising services accessed from terminals in public places appear to have a greater chance for achieving early profitability than services based on terminals in the home. They require a smaller investment in terminal hardware, and in some respects are more complementary to the advertising activities of local newspapers than the residential videotex services. They also fulfil an important role in educating the market. Once established and commercially viable, they can then provide the basis for services offered in the home.

With the exception of videotex systems accessed from terminals in public places, there is still great uncertainty over when, even whether, videotex will become a commercially viable residential advertising medium. The subscription price for Times Mirror's Gateway and Knight-Ridder's Viewtron is around $30 to $40 a month*. This appears to many observers on both sides of the Atlantic to be too high a charge to attract a large enough audience to justify multi-million dollar advertising revenues. These substantial revenues are required to allow subscription costs to be cut fast enough to generate an upward market penetration spiral. But the case is not yet proven one way or the other, and the major system operators are likely to have the financial commitment to weather the lean years — just as the European PTTs have been forced to do.

Penetration of the home market

The final issue we have identified concerns the optimum strategy to achieve home penetration. The experience to date in Europe (which is broadly corroborated by experience in North America) is that there are only** three viable strategies:

- To provide attractive services to home microcomputer owners, such as electronic mail, home banking and shopping, financial services, telesoftware and high-interest personal information (for example for hobbyists and other enthusiasts).
- To provide high-value services for home-based business people, such as farmers and independent sales agents.
- To give videotex terminals away free, or sell them at subsidised prices (sometimes justified as being in the interests of employers that their employees should have terminals in their homes).

The first strategy has been adopted successfully in North America by the three large ASCII-based public services, as well as some 20 to 25 home banking

*The price includes a NAPLPS adaptor, service access for a limited but not ungenerous time and, in the case of Viewtron, also the local telephone call .

**This does not mean that other viable alternatives do not exist — only that they have not yet been discovered.

services, and the second by Infomart with its Grassroots service for farmers. The third strategy is likely to be dependent on the development of the private videotex system market before it has any significant impact on home penetration.

In our view, the first strategy is likely to be the most important over the next five years. If we are correct in this judgement, then the penetration of NAPLPS terminals into the home may depend more on the success of microcomputer and software vendors in positioning NAPLPS as a viable microcomputer graphics standard, than on the providers of NAPLPS advertising and information services. There is as yet no clear evidence that services using NAPLPS justify the added terminal cost over ASCII-based services in the minds of users.

THE OUTLOOK FOR THE NORTH AMERICAN VIDEOTEX MARKET

The videotex market in North America is going through a period of reappraisal and change, and 1985 is likely to be a watershed year. Before 1984, most participants saw videotex exclusively as a means of unlocking the mass residential advertising, transactional and electronic publishing market.

This is now perceived as being difficult and expensive (but not impossible) using the strategies, products and services applied before 1984. Service providers are reconsidering their strategies, their options and their available resources. Questions are being asked about the respective merits of ASCII and NAPLPS, and about dumb and microcomputer-based videotex terminals.

1984 was also the year when the industry began to commit substantial resources to the development of the business videotex market. The main players, such as AT&T and IBM, acknowledge that the long term potential of the residential market far exceeds the potential for selling private videotex systems, software and microcomputer-adaptors to Fortune 1000 corporations. But that market is available now and can be exploited over the next five years to help fund the investment needed to break into the larger, more ephemeral, residential market.

To a European observer, this period of reappraisal is very understandable. The European videotex industry went through exactly the same phase in 1980/1981, and emerged both stronger and with a clearer sense of direction and purpose.

In this section we chart the approximate size of the North American videotex industry in late 1984, and make some tentative predictions about its rate of growth over the next ten years. We do not attempt to cover all aspects of the market's size and shape, and focus on the numbers of systems and terminals likely to be installed in different market sectors.

The size of the North American videotex market in 1984

To all intents and purposes it is reasonable (if grossly unfair given the contribution Canada has made to videotex in North America) to state that the Canadian market consists of 2,000 NAPLPS terminals and two major and successful services, Grassroots and Teleguide. Other services do exist in Canada, but they are small and generally experimental. A few private videotex systems have also been installed, and this number will inevitably grow.

For simplicity, the US market can be subdivided as is shown in Figure 2.2. The ASCII-based residential services (which also serve business users) dominate the market. They support some 300,000 users and are continuing to grow rapidly, by between 60,000 and 80,000 users a year. By way of comparison, the NAPLPS-based residential services support some 4,000 users.

The public-access market has yet to be realised in terms of operational systems.

The targeted services segment, which at present consists mainly of farming and telebanking services, is almost exclusively in the ASCII-based services group, though one Grassroots-based service has now gone live. It has been estimated that there were 48,000 users of home banking services in mid-1984.

The only sector where videotex systems have sold in relatively large numbers is the private system sec-

Figure 2.2 A classification of the US videotex market

	ASCII-based	*NAPLPS-based*	*Prestel/ Antiope-based*
Residential services	Dow Jones News Retrieval Compuserve The Source	Knight-Ridder's Viewtron Times Mirror's Gateway	None
Public-access services	None	None yet but many planned by Videotex America and Chicago Tribune	None
Targeted services	About 15 services aimed at farmers. About 25 telebanking systems	Videotex America's Grassroots-based services	One service using Antiope for telebanking
Private systems	About 30 systems sold by DEC (can also support NAPLPS)	About 50 systems sold by DEC, IBM, AT&T and Videodial	About 20 trial systems in total; most using Prestel

Note: The figures relate to the end-1984 installed bases.

tor. Around 100 to 120 systems are installed (one estimate puts it as high as 150 systems), split between ASCII, NAPLPS and European-standard systems. All are experimental and almost all are for in-house use.

The ASCII-based systems are supplied mainly by DEC, and most of these also support NAPLPS. The NAPLPS-based systems are primarily from IBM and DEC, and are estimated to support no more than 1,000 NAPLPS terminals. The European-standard systems are likely to be upgraded to support NAPLPS during 1985.

Industry observers in the US expect that rapid growth will take place in the private system sector from mid to late 1985. It has been estimated that by 1988 there will be around 1,700 systems installed, and by 1993 this figure is likely to have increased tenfold.

The targeted services sector will also experience rapid growth. One estimate is that, by 1991, 75% of all commercial banks will be offering home banking services and that they will support 10 million users.

The public-access services market is likely to start growing rapidly from 1986 onwards, and by 1990 it is estimated that at least 50 cities will have operational public-access services, supporting 50,000 terminals in public places and perhaps twice that number in hotel bedrooms.

The roll-out of NAPLPS-based residential services is likely to be relatively slow. One estimate is for one new service in 1985, two new services in 1986 and ten new services in 1987, giving a total number of about 20 services five years after the start of the Viewtron trial in 1982.

Examining forecasts for systems can only be meaningful in the light of likely US user numbers. Link Resources Corporation* has estimated an installed base of 37.5 million home computers by 1987, which represents just under 40% home penetration. It further estimates that 50% of home computers will have modems, giving 21 million communicating home computers. If a third of these support NAPLPS it means a potential market of 7 million terminals, representing 7% home penetration. We believe that this rate of penetration is achievable provided NAPLPS is positioned to meet the needs of the home computer user, for example, if it is used to produce computer-generated graphics rather than simply to access remote services such as telebanking and teleshopping. (If accessing NAPLPS-based services is the only motive for home users to upgrade their microcomputers, then it is unlikely that home penetration will exceed one million users.)

Assuming the above analysis to be valid, there will be at least 14 million home computer users who have ASCII communication facilities — at least twice the number that support NAPLPS. This ratio appears intuitively correct given the large numbers of ASCII devices already installed, the lower cost of ASCII communication facilities and the large number of applications that require no graphics capability. Our conclusion, therefore, must be that ASCII will remain an essential standard for all successful videotex system operators for the foreseeable future, and that ASCII-based residential videotex services will be considerably more successful than those based on NAPLPS.

THE MAIN PLAYERS IN THE VIDEOTEX MARKET

The main players in the North American videotex market are AT&T and IBM (including Trintex). Other important players are Times Mirror and Infomart (including their joint venture, Videotex America), Digital Equipment, Dow Jones and Knight-Ridder, as well as other organisations. In this section, we review their main product offerings and possible future direction.

AT&T

Since 1980, AT&T has been investing heavily and consistently in videotex, and clearly has its sights set on the mass business and residential market. As well as being the main advocate of NAPLPS, it has developed the necessary hardware and software to allow NAPLPS to be implemented. This includes frame creation systems (FCS) for $32,900, user terminal adaptors (Sceptre) for $600 to $900, and a 16-port microcomputer-based private videotex system (VIS) sold as a bundled package, including the frame creation system and 10 Sceptre terminals, for $140,000. AT&T is developing a private videotex system to run on its 3B5 and 3B20 Unix-based minicomputers, and a NAPLPS board for its Safari business microcomputer (which is manufactured by Olivetti). Both products will become available during 1985. AT&T has also agreed to market a NAPLPS-based version of Aregon International's private videotex system, initially on DEC hardware but later on its own minicomputers. AT&T has been heavily involved in Knight-Ridder's Viewtron trial and the commercial service launched in October 1983, and it has developed a packet-switched data network and processors to reduce telecommunications costs for local videotex services. This system is called Local Area Data Transport (LADT) and is used in Florida at present, though other local telephone companies have shown some interest in using it.

*"Impact of Microcomputers on Videotex: Information Providers, System Operators, Users", Link Resources Corporation, New York, November 1983.

Finally, AT&T has recently launched a real estate service, Realtex, which makes use of many of its product offerings. Realtex consists of a real estate database run by AT&T in a local area, but maintained by local estate agents. The importance of the service is primarily that it is the first clear indication of how AT&T is likely to adopt a system-operator role within the regulatory constraints imposed on it until 1989. So long as AT&T relies on third parties to provide the information and offers a local service, using local telephone company lines and the long distance data networks of such independent operators as Telenet and Tymnet (as opposed to the AT&T trunk network), it is free to exploit any opportunities it considers appropriate, and to replicate successful services throughout the US.

IBM

IBM's first visible involvement in videotex in North America was its announcement in 1982 that it would market its UK-developed SVS/1 private videotex system running on Series 1 minicomputers. At the time of its launch, this system only supported the Prestel standard, and terminals (mainly Wolfdata's PC adaptor board and software) were not supplied by IBM. In 1983, IBM announced that SVS/1 had been enhanced to support NAPLPS and that a major order for 50 systems had been placed by Anacomp, a systems house specialising in the banking market*. IBM is marketing its private videotex system through its general salesforce and had installed an estimated 30 systems by mid-1984. IBM has developed NAPLPS software and boards, costing between $200 and $250, for its PC, PCXT and PCjunior microcomputers. These products were launched in late 1984. US industry observers believe that IBM is developing a mainframe-based private videotex system for launch in 1985 (though IBM does not confirm this) and it is expected that its main marketing push will commence in that year.

Of equal significance is IBM's involvement in Trintex, a joint-venture company formed with CBS and Sears Roebuck with an initial phase 1 investment of $250 million. Trintex aims to provide highly-targeted national electronic transactional and distribution services for both business and residential markets, starting in 1986 or 1987. Telesoftware distribution is expected to feature as an early service. Although formed only in 1984, Trintex employs over 100 staff and has identified a large number of specialist market sectors that it could address. It is currently undertaking the research necessary to prioritise these sectors and develop the necessary infrastructure to exploit its chosen markets. It believes that trials are an inappropriate market entry vehicle, because alternative ways to test the market exist that offer less competitive exposure.

IBM is, like AT&T, seeking a very wide involvement in videotex and is not confining its activities to the supply of private videotex hardware, software and terminals to its existing corporate customers. It may seek to establish NAPLPS as the graphics standard for personal computers. Given the dominant position that IBM now has in the business microcomputer market, the level of marketing and R&D resources committed to maintaining that position, and its commitment and investment in videotex products and service, it is likely to be able to achieve this objective over the next few years, should it decide to do so. This would certainly have very profound and beneficial consequences for the development of the North American videotex market.

Infomart and Times Mirror

Infomart is Canada's leading videotex software and service provider, and its two main service products, Grassroots and Teleguide, have been well received in Canada*. Teleguide is an information and advertising service based on public-access terminals placed in hotels, shopping malls and other public places. It was originally installed in Toronto. Grassroots is an information and transactional videotex service for farmers. The Canadian Grassroots service is based in Winnipeg. Its involvement in the US is channeled through Videotex America which it jointly owns with Times Mirror.

Informart's NAPLPS videotex system ITSS is the basis for all its products. It is used for Times Mirror's Gateway residential videotex service in Los Angeles. This service aims to earn $2 million in advertising revenue in 1985 (Times Mirror claims that over $1 million has already been committed), and Times Mirror recognises that it will need to attract some 25,000 users before it has a truly viable business. This number represents under 5% of the target 'early adopters' user market at which Times Mirror is directing its marketing, and can be achieved with less than 2% household penetration.

In its earlier trial of the service, Times Mirror experimented with both telephone and cable delivery of its services. It concluded that telephone delivery was certain to be by far the most important delivery medium over the next five years, mainly because of the technical limitations of cable delivery. It also believes that the key to successful marketing into the home is with a no-fuss, no-risk, bundled offering involving terminals and service access, for a $30

*Anacomp experienced financial difficulties in 1984 and it is unclear whether the full order will be taken up.

*Both Teleguide and Grassroots are described as case histories in Butler Cox's Videotex Series Report "Videotex Applications and the Market Response", December 1982.

monthly fee (though this price is likely to fall as terminal prices drop and user volumes increase).

Videotex America is marketing Informat's Teleguide and Grassroots services in the US. Teleguide is being sold to local newspaper groups, and by mid 1984 three sales had been made, to:

—The San Francisco Chronicle.

—The Phoenix Republican Gazette.

—The Sacramento Bee.

Negotiations are underway with 15 other newspaper groups. Videotex America is providing a national advertising salesforce to support these services, as well as Grassroots and Gateway, in return for a share of local advertising revenues.

Grassroots is being sold on a different basis. Joint venture companies are being established with regional agricultural co-operatives, with Videotex America retaining a minority shareholding. The co-operatives include Agway, Cenex and Southern States Co-operative, with the first service starting in August 1984 north of Washington D.C. These services will be offered in the North East, the South East, and Northern mid-West states, and a fourth, starting in early 1985, in the San Joaquin valley in California. This last service also involves local newspaper groups as shareholders.

Digital Equipment Corporation

Digital Equipment Corporation (DEC) has traditionally been the main beneficiary from the spread of private videotex systems, since the majority of systems (estimated at 60% worldwide in 1983) are based on DEC minicomputers. In North America, both Informart's ITSS and Aregon International's IVS videotex systems, which between them account for almost 50% of the installed base of videotex systems, run on DEC VAX minicomputers. In April 1984, DEC launched its own private videotex system, VTX (which bears a close resemblance to IVS in terms of features), using a radical, multi-standard (ASCII and NAPLPS) distributed architecture based on Decnet. It has positioned VTX as a part of its integrated 'All-in-One' office automation system. DEC shipped 20 VTX systems in the first four months after its launch and, by the end of 1984, it expects to have more private videotex systems installed than any other supplier. DEC launched its system in Europe in September 1984. It supported ASCII, NAPLPS and Prestel at the time of its launch, with Antiope supported before the end of the year, and CEPT during 1985.

It remains to be seen whether DEC can maintain its leading position through 1985, if and when IBM launches a mainframe-based system. DEC software is modular and competitively priced ($25,000 for the full software suite); DEC has a sound grasp of the market for private videotex systems and is investing heavily in training its salesforce; it is marketing VTX as part of its office systems strategy; and it can configure the system to run on anything from a single MicroVAX microprocessor to a cluster of 18 top-of-the-range VAX minicomputers. But it lacks IBM's marketing muscle, its immensely loyal customer base and its domination of the business microcomputer and mainframe markets.

Dow Jones News Retrieval

Dow Jones News Retrieval Service is the leading national ASCII-based public videotex service in the US*. It has more than 150,000 subscribers and this number is growing at around 2,000 a month. It is oriented towards the provision of business and financial news and information for microcomputer users. It is significantly larger than its main competitors, CompuServe and The Source, and has about half the market for services of this type.

Dow Jones' objective is to provide valuable services to those who already have microcomputers or terminals, thereby avoiding the need to achieve terminal penetration. It uses a variety of telecommunication channels to reach its subscriber base, including telephone, packet-switched and cable networks, and it is investing in the development of its own national network to reduce the cost to subscribers, and to increase its share of total subscriber spend. Although most of its subscribers use ASCII devices, Dow Jones is not committed to any one standard. As and when large numbers of users adopt alternative standards, Dow Jones will adapt its services to meet their needs. It has, for example, started to offer its services to Viewtron subscribers with NAPLPS terminals. As the proportion of the total market using NAPLPS increases, Dow Jones is well placed to capture a major share of this market.

Knight-Ridder

Knight-Ridder's Florida-based Viewtron service was the first local residential text-and-graphic videotex service in the US. Working closely with AT&T over the past seven years, Knight-Ridder has invested $20 million, has pioneered new services and has, inevitably, suffered many of the pains and problems associated with being a pioneer. Its commercial Viewtron service was launched in October 1983, and has attracted over 2,000 local subscribers, somewhat fewer than was anticipated. Knight-Ridder hopes that bundling the cost of the Spectre terminal, telephone-call and access charges into a single $40 a month

*Reviewed in detail as a case history in the Videotex Report Series report, "Videotex Applications and the Market Response", December 1982.

charge will overcome this problem, but many observers in the US remain sceptical. Knight-Ridder is laying plans to introduce its videotex service in other large cities, in association with local publishing groups, starting, in all probability, in 1985 or 1986. It has already negotiated joint-venture agreements with publishers in 17 cities and plans to offer Viewtron in a further five cities where it owns the local newspaper.

The US videotex industry will undoubtedly be watching closely a new public-access advertising service, called Videoguide, to be introduced shortly in Florida by a subsidiary of the Chicago Tribune. It will be the first instance when both public-access and residential services are offered in the same area, and will demonstrate the relative commercial merits of the two approaches to entering the advertising-based videotex services market.

Other players

This short review of the main players clearly fails to do justice to the many other important organisations and services active in both the US and Canada. Companies such as CompuServe, The Source, Keycom, Honeywell, Sperry, Videodial, Aregon International, Disc International and many large service-provider organisations are likely to be successful contenders for a share of a rapidly growing and intensely competitive market.

IMPLICATIONS FOR THE EUROPEAN VIDEOTEX INDUSTRY

Videotex in North America has, to a large extent, evolved quite independently from videotex in Europe, and the impact of participants in each continent upon the other has been marginal. The British and especially the French PTTs have both invested millions of dollars in attempting to influence the US videotex industry, largely without success, and only a handful of European terminal and system suppliers have established viable market bases in the US.

In Europe, NAPLPS has been rejected as a serious videotex standard by all but a few far-sighted suppliers and system operators. And with the European subsidiaries of US computer companies usually four to five years ahead of their US parents in their understanding of videotex, they have generally been left to develop their own products and approaches to the market.

Over the next two years, however, we anticipate that this situation will change:

— The US market is growing more rapidly than before, creating opportunities for European software suppliers and to a lesser extent service providers.

— Products developed in the US, and in Europe to serve the US market, will start to be marketed in Europe, and the US-derived policies of the parents of US subsidiaries in Europe will start to be applied.

— NAPLPS will, as a by-product of the first two factors, appear in Europe.

It is still too early to predict with confidence how far and how fast these influences will change the nature of the European videotex market. By the 1990s, however, it is likely that the changes will be significant. We examine each of the three main directions of change in greater detail below.

Opportunities in the North American market for European suppliers

By 1990, the US videotex market will be approximately the same size as the European market. By 1987 or 1988, US vendors will have come to understand the application of videotex as well as it is understood in Europe, and the range of products on the market will be adequate to meet the market's needs. European suppliers now only have a 'window of opportunity' of two years to become established in North America. Once that window closes, new entrants either will be forced to invest heavily to break into a maturing market, or will achieve entrance only by specialising in small 'niche' markets.

The main opportunity for European suppliers is in the provision of private videotex system software. Of the European suppliers, Aregon International and Telesystemes have been most successful to date. In early 1984, Aregon International had captured an estimated 30% of the US private videotex system market (by volume) and by the middle of the same year had concluded a multi-million dollar deal with AT&T to supply videotex software to support AT&T's marketing efforts. Télésystèmes, through its US subsidiary Videodial, had concluded a major deal with Honeywell Information Systems to supply its TS'V5000 private videotex software for Honeywell and IBM mainframes, and ASCII-standard Minitel terminals. It had also sold the same system to a number of major organisations. Other European system suppliers such as DISC International, Torch Computers, SDL, CAP-Gemini-Sogeti and Stéria have established a foothold in the market and have a realistic chance of becoming successful over the next two years. They all have innovative and proven products, they have time to adapt them to the needs of the US market and are starting to build the marketing links necessary to achieve credibility and volume sales.

A minority of service providers (as opposed to system suppliers) will find opportunities in the US, provided they operate services for which there is a

real market in North America. For example, the London Stock Exchange's TOPIC system is likely to be well received in the US, European travel and tourist reservation systems are also likely to be accessed, and European telesoftware services such as Prestel's Micronet 800, are equally applicable in the US and in Europe.

Finally, the US is likely to provide an attractive job market for Europeans with a thorough grasp of videotex service development.

The impact of US products on the European market

Before 1984, the only North American products sold in the European videotex market were the computer systems, mainly minicomputers from DEC and IBM, needed to run European-developed videotex software*. The launch of DEC's VTX software in 1984 marks the arrival in Europe of the first US developed system, involving US hardware, software and terminals, and designed to support NAPLPS as well as European standards in a multi-standard operating environment.

Aregon International, Télésystèmes, DISC International and some other European private system vendors already have, or are developing, systems that support NAPLPS (as well as European videotex standards) in order to penetrate the US market. US microcomputer software suppliers have NAPLPS adaptors for microcomputers that are popular in Europe, such as the IBM PC, Apple IIe and Commodore 64. IBM has US-developed private videotex systems (that could be marketed in Europe if and when IBM felt it was expedient to do so), and it will very shortly have its own videotex software for the PC. AT&T owns a 25% share of Olivetti and has concluded a deal with Aregon International to develop and market videotex systems worldwide. Inevitably, more and more products developed for the US market will begin to win market share from European suppliers, especially private videotex system suppliers.

Another important influence will be the policy directives of US multinationals upon their European subsidiaries. Major system users in the US will decide to adopt videotex and will wish their European subsidiaries to do the same. This will both stimulate the market and influence the types of systems purchased. If a US company decides to standardise, for example on NAPLPS and DEC's VTX, it may be difficult for its European subsidiaries to argue that they should implement a different standard on a different supplier's system. It will also influence suppliers, for example IBM, to offer the same systems in Europe as in the US, so that it can genuinely claim to be able to meet the needs of its multinational customers on a worldwide basis.

Successful service providers in the US are likely to offer their services in Europe, as CompuCard has done in the UK. This will increase the range of services on the market, thereby stimulating terminal penetration. It will also spur European organisations to offer competing services and, where services already exist in Europe, will compete with them.

Adoption of NAPLPS in Europe

The most visible manifestation of the development of videotex in the US will be the adoption of the NAPLPS standard in Europe. In our view, this will be an inevitable consequence of the traditional flow of computer technology from the US to Europe that will be welcomed by many participants in the industry.

Our reasons for this view are as follows:

- Private videotex system suppliers who support NAPLPS as well as European standards will offer this standard as an option, because it gives them a competitive advantage. Provided the suppliers are reputable and their prices are reasonable, their customers will prefer to buy systems that support NAPLPS as an option. They will value and use the added graphics capability, for example for presenting management information, for sales presentations and for special applications requiring complex graphics. If systems offering NAPLPS are seen to sell, then other system suppliers will be forced to support this standard.

- As microcomputers replace dumb terminals as the most common videotex terminal over the next five years, the cost differential between different protocols will narrow and eventually disappear. The NAPLPS standard is a viable and attractive standard that is superior to European alphamosaic standards for many applications requiring graphics, especially for computer-generated business graphics such as complex histograms, pie charts and graphs. We have postulated earlier in this chapter that NAPLPS could become the graphics standard for business and home microcomputers in North America, and that applications software will be developed to exploit the colour and graphics facilities offered. If we are right, then NAPLPS will enter Europe whether or not the microcomputers using it are accessing remote videotex services. How fast this will happen will largely depend on IBM. If IBM decides to promote NAPLPS on its PC and to offer this facility in Europe, NAPLPS could arrive very rapidly, even as early as the end of 1985.

* Exceptions include Poulter Compuvision's Genesys system developed in Canada, Infomart's design influence on the Swiss PTT's videotex service, and the alphageometric facility available from Oy Softplan AB and Nokia Electronics.

—As discussed earlier, US multinationals operating in Europe will want to give access to their US-based NAPLPS systems from Europe and will prefer to buy from suppliers who support NAPLPS in Europe as well as the US.

Some European governments and PTTs may wish to resist the arrival of NAPLPS, partly because North America and AT&T rejected European videotex standards, and partly because of their heavy investment in services based on existing standards. But they cannot realistically prevent NAPLPS being used on free-standing microcomputers and cannot prevent these microcomputers accessing in-house systems and private computer bureaux using approved modems, even the same modems that support European videotex standards or ASCII protocols.

One possible exception to this is in West Germany. The German Bundespost has historically adopted a videotex modem pricing policy that effectively forces all videotex users to use the Bildschirmtext gateway to access videotex systems. The Bundespost could, therefore, prevent NAPLPS from being used cost-effectively in a communications environment. However, the continuance of such a policy in the face of strong market demand would be likely to provoke charges that the Bundespost was infringing the EEC's free competition rules. We do not believe it would be in the Bundespost's interest to let such a situation arise. We conclude from our analysis that it is only a matter of time before NAPLPS becomes one of Europe's de facto videotex standards.

CHAPTER 3

VIDEOTEX PRODUCTS AND SUPPLIERS

The structure of the videotex supply industry is changing rapidly. So are the number and type of products and services available on the market. This chapter discusses the nature and extent of these changes, lists suppliers in Europe, and describes their products and services as well as their market shares.

The chapter comprises four sections each addressing a major type of videotex product or service:

—Private videotex systems.

—Videotex terminals.

—Videotex bureau services.

—Videotex networking.

The data contained in this chapter is the result of a most extensive international research effort undertaken amongst suppliers, including the mailing of detailed questionnaires to over 300 suppliers followed up by telephone and face-to-face interviews.

PRIVATE VIDEOTEX SYSTEMS

The private videotex system market has expanded steadily over the past twelve months. The French market has been particularly buoyant because of the encouragement provided by the PTT's Minitel distribution programme. In Germany, and in some other European countries, PTT activity is stimulating the development of the private videotex system market.

For the software suppliers, however, competition is becoming fiercer. There are now more suppliers than ever before and, importantly, the major suppliers such as IBM, ICL and CAP-Gemini-Sogeti are increasingly tending to dominate the marketplace. Some suppliers of minicomputer-based systems, such as Rediffusion Computers and Aregon International have seen their share of the European market decline.

In this section we review the videotex software industry: the suppliers, the products and the marketplace. We focus on the following important developments:

—The large increase of sales and installations by IBM in 1984, making it the leading videotex system supplier.

—The entry of DEC and AT&T into the videotex industry as software suppliers.

—The DISC/Microdata deal by which purchasers of Microdata computers automatically receive videotex software.

—The expansion of the French videotex market.

—The use of alternative networks for videotex.

—The practical problems for users and suppliers caused by the development of the new European videotex standards.

Suppliers of private videotex system software

The suppliers and their products included in this year's survey are shown in Figure 3.1 (overleaf). The table in this figure has been compiled from interviews and questionnaires and is, we believe, the most up-to-date and comprehensive review of suppliers of private systems and their offerings. Of course, the industry changes rapidly and the table can, therefore, not be totally comprehensive. It does however, include all the major suppliers of videotex software, together with many of their agents, and these account for well over 90% of installed systems.

New entrants and withdrawals from the industry

A number of new suppliers have entered the videotex system software market in the past year, of which the most notable is Digital Equipment Corp (DEC), who began marketing its videotex software product in Europe in September 1984.

The main implications of DEC's move into the European videotex market are:

—In the past, the majority of private videotex systems ran on DEC hardware. But DEC had never supplied videotex system software directly. DEC only supplies software where it believes there is a significant and strategic market for a particular product.

—The effect of DEC's entry into the market will undoubtedly have a significant impact on some,

Figure 3.1 Private videotex system suppliers in Europe[1]

Supplier name	System name	Developed by	Marketed in	System type	Hardware supplier(s)	Operating system(s)	Software prices ($k)[2]	Hardware prices ($k)[2] 8 port	32 port	64 port	Operating system costs ($k)[2]	Comments on prices	Number of installations claimed worldwide[3]	Number of installations claimed in Western Europe[3]
Air Call Videotex	Betex Viewdata 3000	Vicorp	U.K. (agent for Vicorp)	Mini	Hewlett Packard (HP3000) Tandem (Nonstop)									
Aregon International	IVS-3 IVS-100	Aregon	UK Worldwide	Mini	DEC (PDP-11, VAX 750, VAX 790, VAX Clusters)	RSX, VMS	Once-off Licence: 33 for 32 ports	From 26	65	130	Included in hardware price	Hardware costs are standard DEC terms	99	79
Aria	Arcom Article Arimage Artel Ardoise	Aria	France	Mainframe	IBM (34,36,38)									
Assyst	Videotex 100	VTT Finland	UK (agent for VTT Technology)	Mini	Hewlett Packard (HP1000 A Series)									
AU-System Network AB	AviNet	AU-System Network	Scandinavia, UK	Mini	Data General (Eclipse)	RDOS	Once-off Licence: from 20	From 35	50	100	From 5		14	14
Augur GmbH	Novum	Augur	West Germany	Mini	Data General	AOS/VS	Once-off Licence: 15	44	—	340	Included in hardware price		0	0
AVS Intext	Mistel	Softplan	UK (agent for Softplan)	Mini	DEC, Honeywell, Bull (PDP-11, VAX, LEVEL 6)	RSX, VMS, MOD 400	Once-off Licence: 43 32 ports.	20	26	45	6.5	Software price dependent on number of ports. $522-849 for additional facilities		
Bee Systems	Bee Information Network	Bee Systems	UK	Network for Micro-computers	Bee Systems (Fileserver) + any MS-DOS Micro	MS-DOS	On application	21	52	83	On application	Approximate guide: Fileserver is $10K plus $1.3K per port	0	0
Bell Telephone Manufacturing	Mistel	Softplan	Belgium and elsewhere in Europe (agent for Softplan)	Mini	DEC (PDP-11, VAX 700)	VMS RSX		PDP-11 13	15	34	Included in hardware prices	Keyword search, and other facilities are extra	14	14
								VAX-700 29	40	79				
Bergens Tidende	IVS-3 IVS-100	Aregon	Norway (Agent for Aregon)	Mini	DEC (PDP-11, VAX 750, 790 Clusters)									

Notes

1. The survey covers European suppliers only, North American suppliers have only been included where they have an agency or installed systems in Europe. We do not claim that every European supplier has been included in the report. However, we are confident that we have at least 90% of the total number of European suppliers. Most agents have been included in this table; however, in most cases the full details of the product concerned are given in the manufacturer's entry. In some instances product names may vary from country to country.
2. Prices have been converted into US$ at the exchange rates quoted on the 1st of August 1984. These prices can only serve as an indication because of fluctuating exchange rates and price differentials in different European countries.
3. In certain cases suppliers have been unable to reveal the number of installed systems. Where several agents market a system, the total number of installed systems is given in the main supplier's entry. A 'system' is classed as a computer running videotex software rather than an organisation or a site.
4. D = Dumb terminals.
   E = Intelligent editing terminals.
   A = Automatic database formatting software.
   B = Bulk offline output of frames to update other videotex databases.
   T = Data input offline from tape or disc.

Names of some reported sales	Videotex display standards supported	Database access methods supported	Editing options supported[4]	Wind-owing: Same system	Wind-owing: Host system	Programming language options[5]	Networking options	Front-end to	Application facilities[6]	Security features[7]	Comments
											For details see Vicorp
Istel (UK), ICI (UK), Telemedia (Belgium)	Prestel, NAPLPS, CEPT, ASCII	Menu, Keyword, user own programming	D, E, A, B	•	•	C, B, P, F	UK and German gateways, PSTN, X.25 SDLC, SNA, DECNET, NET 1000	IBM: BSC, SNA, SDLC, HDLC ICL: C01, C02, C03 Sperry: UTS 200/400 DEC: VT100 Burroughs: POLL SELECT	V, M, D, C, N, DM, TP	P, CUG, E	Agents include: Sat Schrack, Telemedia, ISS Data, Tietovyva, Compas, Enidata, A.S. Emma, Bergens Tidende, Visualdata, A.R. Bolaget, Zellweger Uster. Single host can support multiple standards. Other gateways being developed. Frames can be converted between standards.
											A range of software modules for different functions.
											For details see VTT Technology
Televerket (Swedish PTT), Norse Televerket (Norwegian PTT), Stock-holm Stock Exchange	Prestel, NAPLPS, (CEPT '85)	Menu, Keyword, user own programming	D, E, B	•	•	F	PSTN, leased lines, X.21	IBM: BSC, SDLC Sperry: U100	V, M	P, CUG	Used for the public 'Datavision' network in Sweden
	CEPT	Menu, Keyword (being introduced)		•	•	P	PSTN, various gateways	Data General	DM (optional)	P	Modular expandable system. Joint venture with Data General. As the software is written in Pascal, implementation on other hardware is straightforward.
British Telecom Research Laboratories (UK)											For details see Softplan.
	Prestel, ASCII	Menu, Keyword	D, E.	•	•				V, M		Can operate on IBM PC, Sirius and Sanyo micros.
Belgian PTT											For details see Softplan.
											For details see Aregon.

5. C = Cobol.
   B = Basic.
   P = Pascal.
   F = Fortran.
6. V = Standard videotex facility; easy to use, retrieval of information, etc.
   M = Messaging.
   D = Diary management.
   C = Data collection.
   N = Noticeboard.
   DM = Database management.
   TP = Transaction processing.
7. P = Password.
   CUG = Closed user group.
   E = Encryption.
8. The company formerly known as Computex Limited is now called Viewtext Limited.
9. Nova Automation is now an agent for Vicorp, the company which supplies the Betex software formerly known as Nova 3000.

Continued on next page

Figure 3.1 Private videotex system suppliers in Europe[1] (continued)

Supplier name	System name	Developed by	Marketed in	System type	Hardware supplier(s)	Operating system(s)	Software prices ($k)[2]	Hardware prices ($k)[2] 8 port	32 port	64 port	Operating system costs ($k)[2]	Comments on prices	Number of installations claimed worldwide[3]	Number of installations claimed in Western Europe[3]
A. R. Bolaget	IVS-3 IVS-100	Aregon	Sweden (agent for Aregon)	Mini	DEC (PDP-11, VAX 750, 790 Clusters)									
Browns Operating Systems	Browns Box	Browns Operating Systems	UK	Micro-computer front-end processor	Connects to IBM mainframe									
Burroughs	Burrotel	Burroughs	France	Mini	Burroughs			System price up to 47 ports: 64						
	Applitel			Mainframe	Burroughs									
Butel Business Systems	AviNet	AU-System	UK (agent for AU System)	Mini	Data General (Eclipse)									
CAP-Gemini-Sogeti	Multitel 10 (Stand alone)			Micro Mini Mainframe	IBM (Series 1, 43XX, 303X, 5370) Bull (Mini 6, 66/DPS8, 64/DPS7) Reality 200, IN 200, IN 500, Micro 16		Once-off Licence: 36					Prices exclude messaging and diary management except for Multimail which cannot run in isolation		
	Multitel 20			Mini	IBM (Series7) Bull (Mini 6)		42 to 49							150 (all types)
	Multitel 30	CAP-Gemini-Sogeti	France, Germany, USA, elsewhere	Mini	IBM (Series1) Bull (Mini 6)		42 to 49							
	Multitel 40			Mini	IBM (Series1)		10	37						
	Multitrans			Mainframe	IBM (43XX, 303X)		10							
	Multimail			Mini, Mainframe	All of the above		14 to 25							
	Multitel Micro 16			Micro	Micro 16			37 ⟷ 48						
	Electronic directory			Mini	Mini 6, Solar 16 Mitra 225									
C.E.O.I.	SyFAtel	Computer Automation	Spain (agent for Computer Automation)	Mini	Computer Automation (SyFA)									
Christian Rovsing A/S (see comments column)	CR Videotex System	Christian Rovsing A/S. Specified by Danish PTT	Scandinavia, UK, Germany and elsewhere	Mini	Christian Rovsing A/S (CR30 Series)	XAMOS	Once-off Licence: 11-47	38	76	114	7-19	Software prices quoted are initial fees, followed by annual fees followed by 20% of initial fee	2 public 2 private	3
Comdial	Mascots	Viewtext, Comdial	UK	Mini	DEC (PDP 11)							Prices on application	2	2
Compas	Vidas	Aregon	Germany (agent for Aregon)	Mini	DEC (PDP 11, VAX)									

Footnotes see page 42

Names of some reported sales	Videotex display standards supported	Database access methods supported	Editing options supported[4]	Windowing: Same system	Windowing: Host system	Programming language options[5]	Networking options	Front-end to	Application facilities[6]	Security features[7]	Comments
											For details see Aregon.
CCN (UK), LRC (UK)											Sold as a separate unit. Requires specially written application software on mainframe.
	Antiope										For Burroughs CP9500 or front end to B5925-B7900 running APPLITEL.
											For details see AU-Systems.
		Menu, Keyword, user own programming	D, E, T	●	●						Stand-alone system.
French PTT, La Redoute (France), CDC Institute (West Germany)				●	●		All systems = X.25, Transpac, Btx gateway, Tymnet, Telenet	IBM, Honeywell			Protocol converter for host.
	Antiope, CEPT, Prestel	Menu, Keyword, user own programming	D, E, T	●	●			IBM, Honeywell			Facilities of Multitel 10 and 20
											SNA access point
			D, E, T	●	●			IBM			Mainframe software
		Menu, Keyword, user own programming	D, E, T	●	●			IBM			Messaging, diary management
		Menu, Keyword, user own programming	D, E, T		●			IBM			Stand-alone, front end.
		Keyword	D, E, T								
											For details see Computer Automation.
Teledata (Denmark)	Prestel, CEPT ('85), NAPLPS ('85)	Menu, Keyword	D, E, T, B	●	●	C, P, SWELL (system programming language)	PSTN, X.25, X.21 (Danish and German gateways '85)	**IBM:** 2780, 3270, BSC, SNA **ICL:** C02, C03, TC500	V, M	P, CUG	Christian Rovsing were taken over in November 1984 by ITT. Because of Christian Rovsing's commitment to videotex it is likely that this software will continue to be available.
	Prestel	Menu	D, E	●	●	B Assembler	PSTN, X.25	**IBM:** 3270, SNA **ICL:** C03	V, M, C	P	A communications system including videotex and voice response.
											For details see Aregon

Continued on next page

Figure 3.1 Private videotex system suppliers in Europe[1] (continued)

Supplier name	System name	Developed by	Marketed in	System type	Hardware supplier(s)	Operating system(s)	Software prices ($k)[2]	Hardware prices ($k)[2] 8 port	32 port	64 port	Operating system costs ($k)[2]	Comments on prices	Number of installations claimed worldwide[3]	Number of installations claimed in Western Europe[3]
Computer Automation	SyFAtel	Computer Automation	UK, Europe, North America, Elsewhere	Mini	Computer Automation (SyFA)	SyCLOPS	Once-off Licence: 7	12	25	74		Prices include maintenance: $65 per month, or $715 per month for 64 ports	37	31
Computex (see Viewtext)														
Cosys Services BV	PVS-990 PVS-NET PENVIEW SYSTEM-10	MGS Computer Services	Netherlands (agent for MGS)	Mini	Texas Instruments (DX10 DNO5)									
Cognotec Systems Limited	Videogate	Microscope	Ireland (agent for Mircoscope)	Micro Front end processor	Microscope									
CTK	CTK 6HM-4HM	Heinz Mann Software	Germany	Micro	Fortune	UNIX	Once-off Licence: 3 to 4	Turnkey System 23				Maintenance extra		
CTL	XTL	CTL	France	Micro Mini	Bull (Mini 6) or any 16 or 32 bit minis/ micros running UNIX.	UNIX	15 to 27							
Danet	Dabit	Danet	Germany and elsewhere	Gateway Interface	IBM, DEC, Tandem, Philips, Nixdorf		Once-off Licence: 13 to 24				Needs hardware microcode, for Tandem 10			
Data General	DG/Novum	Augur	Germany (Joint venture with Augur)	Mini	Data General									
Data Logic	Multitel and associated products	CAP-Gemini-Sogeti	Norway (agent for CAP-Gemini-Sogeti)	Mini Mainframe										
Digital Equipment Corporation	VAX VTX	DEC	Worldwide	Micro, Mini, Mainframe	DEC (PDP-11, VAX, Micro's)	VMS	Once-off Licence: 25	20	65	100	Included in VAX	Software price is reduced by 80% for Micro VAX		
Digitek Computer Systems	Videogate	Microscope	Netherlands (agent for Microscope)	Micro front-end processor	Microscope									
DISC International	Viewbase	DISC International	UK, Europe, USA and elsewhere	Mini Mainframe	Microdata (Reality and Sequoia) PICK operating system environment	PICK	Once-off Licence: 6 to 31 (eg for 32 ports 10)	26	65	156	Variable	No monthly rental available. Maintenance extra	32	24
D. M. England and Partners	Miracle Viewdata	D. M. England	UK	Mini	Prime (50 series) DEC (PDP-11, VAX)	PRIMOS, RT-11, RSX, RST S, VMS	Once-off Licence: 3 to 26	23	130	326	1 to 10	No rental options. Price dependent on host processor and operating system.	11	11
Dornier Systeme	Dornier Btx-Zentrale	Dornier	West Germany, Switzerland	Mini	Dornier		On application			50				

Footnotes see page 42

Names of some reported sales	Videotex display standards supported	Database access methods supported	Editing options supported[4]	Windowing: Same system	Windowing: Host system	Programming language options[5]	Networking options	Front-end to	Application facilities[6]	Security features[7]	Comments
Allied Breweries (UK), Booker, Belmont Wholesale (UK)	Prestel	Menu, Keyword, user own programming	D, E, B	•	•	SyBol	PSTN, X.25	IBM: BSC, SNA	V, M, D	P	Available from Computer Automation companies in many countries, also in Spain from C.E.O.I. and in Italy from H. H. Sarl.
											For details see MGS.
											For details see Microscope.
	Antiope	Menu, Keyword, user own programming	D, E, T	•			X.25		M		A range of modules (20 in all).
Philips, CAS, Daten, Zeda (West Germany)	CEPT, Prestel			•	•		Gateway	Bull	Standard application software for homebanking and home shopping is available		Dabit is a gateway software package.
											For details see Augur.
											For details see CAP-Gemini-Sogeti.
	Prestel, NAPLPS, Antiope and CEPT under development. ASCII	Menu	D,E	•	•		PSTN, X.25, DECNET	IBM: BSC, SNA CDC (Burroughs)		P, CUG	
											For details see Microscope.
Debenhams, British Home Stores (UK)	Prestel, NAPLPS, ASCII	Menu, Keyword, user own programming	D, E	•	•	B	PSTN	IBM: 2780, 3780, 3270	V, M, TP	P	Now also supplied by Microdata. Suitable for a range of computers with the PICK software. Multi-standard systems can be supported.
University of Surrey, Manpower Services Commission, Datasolve (UK)	Prestel	Menu	D, E, B				PSTN, Prestel gateway				
	CEPT, Prestel, ASCII	Menu, Keyword, user own programming	D, E, T, G	•	•		X.25, Btx gateway	IBM			Stand-alone or front end, modular design. Capable of being used in very large systems. Also supports telex and teletex.

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Figure 3.1 Private videotex system suppliers in Europe[1] (continued)

Supplier name	System name	Developed by	Marketed in	System type	Hardware supplier(s)	Operating system(s)	Software prices ($k)[2]	Hardware prices ($k)[2] 8 port	32 port	64 port	Operating system costs ($k)[2]	Comments on prices	Number of installations claimed worldwide[3]	Number of installations claimed in Western Europe[3]
DTA Computer Systems	ND Videotex	DTA Computer Systems	UK, Europe and elsewhere	Mini	Sperry (V77) Norsk Data (all types)	VORTREX SINTRAN XENIX/UNIX	Once-off Licence: 10	32	45	78			15	7
Elanders Videotex AB	PIII	Langton	Scandinavia (agent for Langton)	Mainframe	IBM (4300, 3030, 3080 series)									
A. S. Emma	IVS-3 IVS-100	Aregon	Norway (agent for Aregon)	Mini	DEC (PDP-11, VAX 750, 790, Clusters)									
Enator	PVS-990 PVS-NET PENVIEW SYSTEM 10	MGS Computer Services	UK (agent for MGS)	Mini	Texas Instruments (DX10 DNOS)									
Enidata	IVS-3 IVS-100	Aregon	Italy (agent for Aregon)	Mini	DEC (PDP-11, VAX 750, 790, Clusters)									
Ericsson Information Systems	Videogate	Microscope	Netherlands (agent for Microscope)	Micro front end processor	Microscope									
G. CAM	Dialogue – Arouste – Armel – Lexipro – Multie – Sophie	G. CAM	France	Mini	Bull (Level 6)	GCOS								
GFI	Télésource	GFI	France	Mini	Bull (Level 6)	GCOS 400 DSS								
GEC Computers	Viewdata 4000	GEC	UK and elsewhere	Mini	GEC (4000 series)	GEC OS 4000	Once-off Licence: 33 to 58	18	36	46	Included in software costs	Prices based on smallest processor suitable for no. of ports.	6	4
	Prestel	British Telecom & GEC	UK and elsewhere	Mini	GEC (4000 series)	GEC OS 4000		26	46	59		Software prices on application. Hardware prices based on smallest suitable processor	17 installed 2 on order	15
Genesys	Gene-System (20-70)	Genesys	UK and elsewhere	Mini	DEC (PDP)		Once-off Licence: 25		80	200				
H. H. Sarl	SyFAtel	Computer Automation	Italy (agent for Computer Automation)	Mini	Computer Automation (SyFA)									
Honeywell Bull	Bull Btx	Bull	France, Switzerland, Austria, Sweden Germany (agents for Danet and Softplan)	Mini	Honeywell Bull (Mini 6)	GCOS 6 MOD 400	Once-off Licence: 32	12 ports 99					3	3
	Dabit	Danet					86						4	4
	Mistel	Softplan					42 to 52	6 ports 61	12 ports	94			13	13
	Micral 90													
Honeywell Information Systems	Themis	Thorn-EMI	UK	Mini Mainframe	Honeywell (DPS-6,8,66)		50		12+	24+				
	Incotel	Honeywell	UK	Micro	Honeywell (SPD 20/20)			22						
IAL Gemini	Multitel and associated products	CAP-Gemini-Sogeti	UK (agent for CAP-Gemini-Sogeti)	Mini Mainframe										

Footnotes see page 42

Names of some reported sales	Videotex display standards supported	Database access methods supported	Editing options supported[4]	Windowing: Same system	Windowing: Host system	Programming language options[5]	Networking options	Front-end to	Application facilities[6]	Security features[7]	Comments
Thorn Video TV (Sweden), DER A/S (Denmark)	Prestel, CEPT, ASCII	Menu, Keyword, user own programming	D, E, A, B	•	•	F, PLANC, ASSEMBLER	PSTN, X.25, Danish gateway	IBM: SNA, Sperry Norsk Data	V, M, C	P, CUG	Micro version planned.
											For details see Langton.
											For full details see Aregon.
											For details see MGS.
											For details see Aregon.
											For details see Microscope. Ericsson system software described under AU-Systems
											A number of different modules for such facilities as Keyword search, tree search, mail, etc.
											Basic videotex software.
Export Credits Guarantee Department (UK)	Prestel, CEPT (under development), Alpha-geometric (Mupid)	Menu, Keyword	D, E, B User update frames	•	•	F, B, C, P ALGOL, APLG	PSTN, X.25	IBM 3270, Prestel gateway	V, M, D Calculation frames report	P, CUG Bar-coded input	NAPLPS and Antiope access can be supported by modifications made to order
British Telecom, Telecom Australia, JTM Malaysia	Prestel, Alpha-geometric, (Mupid)	Menu, Keyword	D, E, B			N/A	PSTN, X.25	IBM 3270, BSC	V, M generator	P, CUG	
Empire Savings (US)											An alphageometric system, used in UK for graphic design. (Poulters are UK agents).
											For details see Computer Automation.
Kreditkassen (Sweden), Svenka Handelsbanken Stockholm (Sweden), Ideta (Holland)	Prestel, CEPT, Antiope, ASCII					C, F, and others	PSTN, X.25 (Prestel, Teletel and Btx gateways)				For details on Dabit and Mistel, see Danet and Softplan respectively.
Associated Dairies, Strathclyde Regional Council (UK)	Prestel Prestel	Menu, Keyword, user own programming Menu	D, E, T, A D, E	•	•		PSTN	Honeywell, IBM, ICL Honeywell, IBM			Small low-cost system
											For details see CAP-Gemini-Sogeti.

Continued on next page

Figure 3.1 Private videotex system suppliers in Europe[1] (continued)

Supplier name	System name	Developed by	Marketed in	System type	Hardware supplier(s)	Operating system(s)	Software prices ($k)[2]	Hardware prices ($k)[2] 8 port	32 port	64 port	Operating system costs ($k)[2]	Comments on prices	Number of installations claimed worldwide[3]	Number of installations claimed in Western Europe[3]
IBSI-TBS	Moniteur-TBS Genetrans		France	Mini Mainframe	IBM (4300, 3000 series) Bull (DPS 7, 8)	PA/VTAM/ CICS GCOS								
IBM	SVS 1.1	IBM	UK, USA, Europe and elsewhere	Mini	IBM (Series 1)	EDX	Once-off Licence: 16	72	202	N/A		Other optional software may be required	10 300 +	10 250
	VTF/VTM	IBM	Europe	Mainframe	IBM		3 (per port)							
	VTX Gateway	IBM	Europe	Mainframe – Gateway software	IBM		75							
	GTM/MVS	IBM	France	Mainframe	IBM (4300, 3000, 370)	MVS/DOS VSE with GTM	Once-off Licence: 11							
	VDS/GTM	IBM	France	Mainframe		GTM (see above)	6							
ICL	Bulletin	ICL	UK, France, West Germany and elsewhere	Mainframe Mini	ICL (VME 2900, ME29, France only —System25)	VME TME	Monthly rental: 3 to 4	5	21	42			124	114
								Plus cost of computer						
ICR	IBTX	ICR	West Germany	Mainframe	IBM	CICS								
IDO	Betex 3000	Vicorp	Germany (agent for Vicorp)											
Infomart	ITSS	Infomart	North America and elsewhere	Mini	DEC IBM		Once-off Licence: 200							
Information Technology and Marketing	Rotavision	Information Technology and Marketing	UK	Micro	ITM		1.5	Approximately 3.9 — 6.5 per terminal				Maintenance negotiable	1	1
Intercom Data Systems	Mistel	Softplan	UK (agent for Softplan)	Mini	DEC (PDP, VAX) Honeywell (DPS 6)	VMS, RSX, GCOS, Mod 400	Once-off Licence: 5 to 43 Monthly rental: 0.2 to 1.3	15	58	81		Maintenance 12% p.a. of Licence fee		
ISS Data	IVS-3 IVS-100	Aregon	Denmark (agent for Aregon)	Mini	DEC (PDP-11, VAX 750, 790 Clusters)									
Kabelmetal	BTS	Kabelmetal	West Germany	Mini	IBM (Series 1)	EDX	Once-off Licence: 17	Terminal controller 10 + Series 1			$58 per month		0	0
Kienzle Apparate	MCS 9100	Kienzle	Europe	Mini	Kienzle (9100)	MTOS		7	42	N/A		Software prices depend on application	0	0
Langton Electronic Publishing Systems	PIII	Langton	UK, Europe and elsewhere	Mainframe	IBM (4300, 3030, 3080 series)	DOS/VSE VSI MVS MVS/+A	Once-off Licence: 30 — 92	6	15	30		No rental option. Additional costs for training and maintenance	8	8
								Plus cost of computer						
Link Associates	PVS-990 PVS-NET PENVIEW SYSTEM 10	MGS Computer Services	UK (agent for MGS)	Mini	Texas Instruments (DX10 DNOS)									

Footnotes see page 42

Names of some reported sales	Videotex display standards supported	Database access methods supported	Editing options supported[4]	Windowing: Same system	Windowing: Host system	Programming language options[5]	Networking options	Front-end to	Application facilities[6]	Security features[7]	Comments
	Prestel, NAPLPS	Menu	D, E, T	●	●	C, PL/1, EDL, S/1 Assembler	PSTN	IBM: SDLC, BSC	V, M	P, CUG	
	Prestel							IBM			Not a full videotex software package. Applications require specially written software.
Friends Provident UK), Neckerman (Germany), Beecham (UK), Datafile (UK)	Prestel, CEPT			●	●		X.25	IBM			A gateway software package requires specially written software for applications.
	Antiope			●	●						These two products together allow videotex terminals to connect to IBM mainframes.
	Antiope			●	●						
Baric Computing Services	Prestel, Antiope (on System 25), CEPT('85-'86)	Menu, Keyword('85), user own programming	D, E	●	●	C, F, PLAN	PSTN, X.25, Prestel and Viditel gateways	IBM: 3270 ICL: DBS	V, M	P, CUG (time and date coded access)	
	CEPT			●	●		German gateway, PSTN, 3270				
											For details see Vicorp.
	Telidon, NAPLPS (CEPT under development)	Menu, Keyword, user own programming	E, A, T	●	●		X.25	IBM, DEC			This software is used as the core of the Swiss PTT videotex system.
Liverpool International Garden Centre (UK)	Prestel/ Teletext, CEPT + NAPLPS ('85-'86)		E						M		A visual information/marketing system.
	Sony UK										For details see Softplan.
											For details see Aregon
	CEPT, Prestel, Antiope	Menu, Keyword		●	●	EDL	PSTN, X.25, German gateway, PABX	Siemens, Tandem	M	P	Designed for use on a PABX. Also supports Telex and Teletex protocols.
	CEPT	Menu, Keyword, user own programming		●	●	C, F, B, P, RPGII	X.25, German gateway	IBM (SNA), Siemens, Univac, Bull	V	P, CUG	
Rumbelows, Commercial Union (UK), Esselte (Sweden)	Prestel, NAPLPS, Telidon ('85), CEPT, ASCII ('85)	Menu, Keyword, user own programming	D, E, B, A	●	●	C, CICS, PL7, ASSEMBLER	PSTN, X.25, BSC, SNA, Prestel and Viditel gateways	IBM: SNA	V, M, TP	P, CUG	Product shipments began February 1984. Available in Scandinavia from Elanders Videotex AB.
											For details see MGS

Continued on next page

Figure 3.1 Private videotex system suppliers in Europe[1] (continued)

Supplier name	System name	Developed by	Marketed in	System type	Hardware supplier(s)	Operating system(s)	Software prices ($k)[2]	Hardware prices ($k)[2] 8 port	32 port	64 port	Operating system costs ($k)[2]	Comments on prices	Number of installations claimed worldwide[3]	Number of installations claimed in Western Europe[3]
MGS Computer Services	PVS-990, PVS NET, PENVIEW, SYSTEM 10	MGS Computer Services	UK, Europe, North America	Mini	Texas Instruments (DX10, DNOS)	DX10 DNOS	Once-off Licence: 13 Other once-off costs: 2	26	78	130	Licence 2.6 Maintenance 1.3 p.a.	—	37	37
Metrotel	Metrotel PVS	Metrotel	UK, Europe, elsewhere	Micro	Torch Apricot		4	7	Up to 16 ports			Hardware prices include micro-computer and multiplexer	5	5
Microdata Information Services Ltd	Viewbase	DISC International Ltd	UK, Europe, elsewhere	Mini	Microdata 6000 Series (Reality), 9000 Series (Sequoia)	PICK	Once-off Licence: 4 port 4 32 port 10	42	111	260	Maintenance 10% per month	Five year lease available including maintenance		
Microscope	Videogate	Microscope	Europe and elsewhere	Micro front-end processor	Microscope	CCOS product of Microscope		6	15	N/A	N/A	Prices do not include rack, cables, modems etc.	35 (3000 ports)	35
Modcomp	Viewmax Viewtracs	STL for Modcomp	UK, Europe and elsewhere	Mini	Modcomp (Classic II)	Max IV	Once-off Licence: 30 to 90	52	82	120				
Multisoft N.V.	Multiview	Multisoft	Belgium	Mini (Unix)	NCR TOWER (Unix)	UNIX	Once-off Licence: 10	26	N/A	N/A	1.7			
NCR Nederland N.V.	NCR Videotex	NCR, Switzerland and NCR Nederland	Switzerland, Germany, Netherlands, France	Mainframe	NCR (V8500/ V8600Series)	VRX	Once-off Licence: 18 Monthly rental: 0.5	53	89	136	0.4 per month		9	9
Nixdorf	NBTX		Germany, Switzerland		Nixdorf 8890 ER							Prices on application		
Norsk Senter for Informatikk	Mistel	Softplan	Norway (agent for Softplan)	Mini	DEC (PDP-11, VAX 700) Honeywell Bull									
Nova Automation AG	BETEX/3000 (formerly NOVA 3000)	Vicorp	Switzerland (agent for Vicorp)	Mini	Hewlett Packard (HP 3000) Tandem (Non Stop)	MPE IV MPE V	20-50	75	120	150			25	25
ODB Kontorsautomation AB	Mistel	Softplan	Sweden (agent for Softplan)	Mini	DEC (PDP-11 VAX 700) Honeywell Bull									
Orda B	Mistel	Softplan	Belgium (agent for Softplan)	Mini	DEC (PDP-11 VAX 700) Honeywell Bull									
Owl Microcommunications	Overview	Owl	UK, Europe	Micro Local Area Network	Apple II + Zynar/Nestar Cluster-one LAN		4	+4	+8	+16				
Paragon OY	Systel	OY Systek	Finland (agent for PG Group)	Mini	Perkin Elmer (PE 3200 Series)	OS/32								
Perkin-Elmer Data Systems	Systel (BTX 32)	OY Systek	Germany, UK, Holland, Belgium (agent for PG Group)	Mini	Perkin Elmer (PE 3200 Series)	0S/32	Once-off Licence: 12 to 32	36	89	119	7 including OS, COBOL, Timeshare, Editor	Software price includes training and documen-tation		

Footnotes see page 42

Names of some reported sales	Videotex display standards supported	Database access methods supported	Editing options supported[4]	Windowing: Same system	Windowing: Host system	Programming language options[5]	Networking options	Front-end to	Application facilities[6]	Security features[7]	Comments
CEGB (UK), Schuitema BV (Netherlands)	Prestel	User own programming	D, E	●	●	P, C, F, B	PSTN, X.25	IBM: BSC, SDLC Univac: Bidyne	V, M, C	P, CUG	MGS also markets a number of Videotex packages for Texas Instruments PC's. These 'Tiview' packages are not included in the sales statistics.
	Prestel, CEPT in '85	Menu	D, E, B, A	●			PSTN				Small micro-based private videotex system. It can be used in conjunction with public systems to automatically update and download frames.
Grand Metropolitan, Bass, Target Life (UK)											For details see DISC.
Thomson Holidays (UK), Thomas Cook (UK), Belgian PTT											The product is an FEP/network concentrator. Agents include Digitek, Cognotec, Ericsson.
Townsend Thoresen (UK), KLM (Netherlands), Volkas (South Africa)	Prestel, Antiope, CEPT	Menu, user own programming	D, E, B	●			PSTN, X.25, Prestel gateway		V, M, TP	P, CUG	
	Prestel, ASCII	Menu, Keyword, users own programming	D, E, A, B	●	●	F	PSTN		V, M	P, CUG	
Scarvag (Switzerland), Arke Reizen (Holland)	Prestel, CEPT, ASCII	Menu, Keyword	D, E	●		C, B	PSTN, X.25, Swiss and Dutch gateway		V, M	P, CUG, timed disconnect	Includes gateway software.
							German gateway				A modular system, can be simple gateway or full private system.
											For details see Softplan.
											For details see Vicorp.
											For details see Softplan.
											For details see Softplan.
	Prestel	Menu, Keyword, user own programming	E, B	●					M		
											For details see PG Group.
											For details see PG Group.

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Figure 3.1 Private videotex system suppliers in Europe[1] (continued)

Supplier name	System name	Developed by	Marketed in	System type	Hardware supplier(s)	Operating system(s)	Software prices ($k)[2]	Hardware prices ($k)[2] 8 port	32 port	64 port	Operating system costs ($k)[2]	Comments on prices	Number of installations claimed worldwide[3]	Number of installations claimed in Western Europe[3]
PG Group	Systel (Megaview, BTX 32, Vision 32)	OY Systek	Europe, elsewhere	Mini	Perkin Elmer (PE 3200 Series)	OS/32	Once-off Licence: 11 to 30 Monthly rental: 0.2 to 0.9	40	60	96	3 minimum		15	15
Philips	Business Viewdata System	Philips (Netherlands)	Netherlands, Germany, UK, Italy, Belgium, France	Mini	DEC (VAX)		Once-off Licence: 27	33	66	110				
	Philips Videotex Centre	Aregon/ Enidata	Italy	Mini	DEC (PDP-11, VAX)	RSX/ VMS	Once-off Licence: 17	28 to 56	56 to 112	140+	Included in hardware costs	Other software costs amount to $6k to $7K	4	4
Plessey	Ibis	Viewtext	UK	Mini	Plessey manufactured PDPs and VAXs									
Postel	Systel	OY Systek	Sweden (agent for Systek)	Mini	Perkin Elmer (PE 3200 Series)									
Poulter Compuvision	Genesystem	Genesys	UK (agent for Genesys)	Mini	Genesys									
Radio Rentals Contracts	Thorntel	Thorn-EMI Television Rentals and Radio Rentals Contracts	UK	Mainframe	ICL (2900)	VME	Monthly rental: 0.6	4	12	22	0.1 per month		30	30
RAET	Videotex 100	VTT Finland	Holland, Belgium, UK	Mini	Hewlett Packard (HP 1000 A Series)	RTE-A	Lease prices: 8 to 24	40	52	77	10	Maintenance 10% p.a.	1 public 2 private	3
Rediffusion Computers	Corporate Videotex Systems (CVS)	Rediffusion Computers	UK, Eastern Block, elsewhere	Mini	Rediffusion (RCL 2830)	RCL O/S	Once-off Licence: 7 Monthly rental: 0.1	43	100	180	Included in hardware costs	Maintenance 12% p.a.	30	30
Resource Computer Systems	Vision 32	OY Systek	UK (agent for Systek)	Mini	Perkin-Elmer (PE 3200 Series)	OS/32	Once-off Licence: 24 to 52	24	31	52		Monthly rental not available. Other software $13K to $18K	10	10
Sat Schrack	IVS-3 IVS-100	Aregon	Austria (agent for Aregon)	Mini	DEC (PDP-11, VAC 750, 790, Clusters)									
SATT	Metrotel	Metrotel	Norway (agent for Metrotel)	Micro										
SDL	X-tex (provisional name)	SDL	UK, USA, South Africa (by Olivetti)	Mini	DEC (VAX)	VMS (SDL's own software)	Dependent on size of network					Prices available on request	5	0
Sema	Viewmax Viewtracs	Modcomp/ Sema	France (agent for Modcomp)	Mini	Modcomp Classic II	MAX IV								
Siemens	VDX	Siemens	West Germany, Switzerland, Austria, Italy and elsewhere	Mini Mainframe	Siemens		Once-off Licence: 30-38		100					

Footnotes see page 42

Names of some reported sales	Videotex display standards supported	Database access methods supported	Editing options supported[4]	Windowing: Same system	Windowing: Host system	Programming language options[5]	Networking options	Front-end to	Application facilities[6]	Security features[7]	Comments
Postel (Swedish Post Office)	Prestel, CEPT	Menu, Keyword, user own programming	D, E, B, T, A	•	•	C, F, P, ASSEMBLER	PSTN, Viditel gateway, German gateway	IBM: BSC/3270 also TTY	V, M	P, CUG, user own programming	Marketed through Perkin Elmer (see above) also Paragon OY, Postel, Resource Computer Systems.
	Prestel, CEPT	Menu, Keyword	D, E, B, T	•	•	F	PSTN, X.25, Gateway	IBM, DEC, Sperry	V, M, T, P	P, CUG	
	Prestel, CEPT, Antiope	Menu, Keyword	D, E, T		•		Gateway	IBM	V, M		
											For details see Viewtext.
											For details see PG Group.
											For details see Genesys.
	Prestel	Menu, Keyword, user own programming	D, E, A	•		C, F	PSTN, X.25		V, M	P, CUG, user own programming	
											Available in UK from Assyst.
	Prestel, CEPT, NAPLPS, ASCII	Menu, Keyword	D, E	•		EDITOR	PSTN, X.25, SNA, REDNET		V, M, D	P, CUG	Also supports Telex.
											For further details see PG Group.
											For details see Aregon.
											For details see Metrotel.
South African Post Office	Prestel, CEPT, ASCII	Menu, Keyword, user own programming	D, E, B	•	•	P	PSTN, X.25, Prestel and other gateways		V, M	P	Also provides for Multilanguage frames, Multiterminal standards, Multigateway standards. Designed for very large systems (500-10,000 ports).
											For details see Modcomp.
	Prestel, Telidon, NAPLPS, CEPT	Menu, Keyword, user own programming	D, E, T	•	•		X.25, Btx gateway	IBM	M		

Continued on next page

Figure 3.1 Private videotex system suppliers in Europe[1] (continued)

Supplier name	System name	Developed by	Marketed in	System type	Hardware supplier(s)	Operating system(s)	Software prices ($k)[2]	Hardware prices ($k)[2] 8 port	32 port	64 port	Operating system costs ($k)[2]	Comments on prices	Number of installations claimed worldwide[3]	Number of installations claimed in Western Europe[3]
Sititel	Telepac	Sititel	France	Micro-processor based videotex networking products	Sititel									
OY Softplan	Mistel	Softplan	Europe	Mini	DEC (PDP-11, VAX 700) Honeywell Bull (DPS 6)	VMS RSX		PDP-11 13	15	34 VAX-700 29	40	79 Included in hardware price	Keyword search and other facilities are extra	44	43
Sperry	Videotex 1100	Sperry UK	Europe and elsewhere	Mainframe	Sperry (1100 Series)	OS/1100	Once-off licence: $35-55 Rental: $1-1.7 month						Other software costs: $1.5 p.a.	15	10
SPL	Dabit	Danet	UK, Belgium, Netherlands, Sweden	Gateway											
Steria	Videopac (200, 300, 400, 450, 500, 1000) Dialpac, Infopac, Mailpac	Steria	France and elsewhere	Mini Mainframe	DEC (VAX) Bull (Mini 6) IBM (43xx, 303x)	G COS CICS/ACF VTAM/MSV	Once-off Licence: 25 to 100	38					Software is modular; price depends on modules required		
STR A.G.	Umbratex Transitex Infotex Editex	STR	Switzerland	Mini Micro	DEC (PDP-11/23 VAX 11)	RSX/VMS	Once-off Licence: 5 to 50	20	50	70	1 to 20			9	9
Systime	Computex	Viewtext	UK (agent for Viewtext)	Mini	Systime (5 Series)										
Telefonbau-und Normalzeit	Btx-IRIS Btx-SUSY	T & N	Germany	Mini	DEC (VAX)			85					Price includes basic hardware, software and OS costs		
Telemachus	TM3	STL	UK and elsewhere	Mini	DEC (PDP)		Once-off Licence: 8 to 40								
Telemedia	IVS-3 IVS-100	Aregon	Belgium, Holland (agent for Aregon)	Mini	DEC (PDP-11, VAX 750, 790,Clusters)										
Télésystèmes	TS'L 230, 240, 260 TS'L 400 TS'V 3000 TS'V 5000 TS'V 16000	Télésystèmes	France, USA (through Videodial)	Mini Mainframe	IBM (370, 43xx, 303x) Bull (DPS 66, 88, 7) Prime Tandem		Once-off Licence: 12 13 to 50 19 to 44								
Tietojyva	IVS-3 IVS-100	Aregon	Finland (agent for Aregon)	Mini	DEC (PDP-11, VAX 750, 790, Clusters)										
TRT	VDX 025	TRT	France and elsewhere	Network Videotex concentrator	TRT			7 ports: 5	6					50+	40+

Footnotes see page 42

Names of some reported sales	Videotex display standards supported	Database access methods supported	Editing options supported[4]	Windowing: Same system	Windowing: Host system	Programming language options[5]	Networking options	Front-end to	Application facilities[6]	Security features[7]	Comments
Saint Gobain, BNP, PTT (France)	Antiope	Menu					PSTN, X.25, 3270	IBM: 370, 4300, 30XX, BSC 3270			Sitintel, a subsidiary of Stèria, produces a range of networking products for videotex systems.
Belgian PTT, British Telecom Research Laboratories, Sony UK	Prestel, CEPT, NAPLPS	Menu, Keyword	D, E, B	•	•	F (any DEC supported language)	PSTN, Prestel gateway	IBM: 3270	V, M, D	P, CUG	Marketed through a number of agents in Europe including AVS Intext, BTM, Intercom Data Systems.
ECCTIS; Open University Union Band of Switzerland	Prestel, Antiope, CEPT 3, NAPLPS (1985)	Menu, Keyword, user own programming	D, E, A	•	•	C, F, PLI, Mapper (1985)	PSTN, Prestel and other gateways		V, M, C, DM	P, CUG, user own programming	Can front-end any host which can be addressed through DCP/TELCON
											For details see Danet.
Viniprix, Cycles Peugeot (France), First Bank of Minneapolis (US)	Antiope	Menu, Keyword (other search methods available)	B				PSTN, X.25		V, M	P, CUG	A range of modular videotex software products.
Telepress AG, Ringier AG	CEPT	Menu, Keyword	D, E, B	•	•	Any DEC supported language	PSTN, X.25, Swiss gateway	IBM: 3270 SNA Tandem: X.25		P, CUG	Also marketed by Autophon in Switzerland
											For details see Viewtext.
	CEPT	Menu, Keyword					Btx gateway, X.25			P	
British Airports Authority, Pilkingtons (UK)	Prestel	Menu, user own programming	D, B	•	•		PSTN, X.25	Honeywell			Can be considered either as a small videotex system or a powerful editing system.
											For details see Aregon.
General Foods, American Express (USA) Antiope	Antiope Antiope Menu, user own programming Antiope Antiope	Menu, Keyword, user own programming	•	•	•	X.25	X25 X.25 Honeywell, IBM X.25 X.25				Front-end or network processor. Micro front-end or stand alone. Mainframe interface.
											For details see Aregon.
											A network concentrator which can allow 15 terminals to use 1 leased line or an X.25 link

Continued on next page

Figure 3.1 Private videotex system suppliers in Europe[1] (continued)

Supplier name	System name	Developed by	Marketed in	System type	Hardware supplier(s)	Operating system(s)	Software prices ($k)[2]	Hardware prices ($k)[2] 8 port	32 port	64 port	Operating system costs ($k)[2]	Comments on prices	Number of installations claimed worldwide[3]	Number of installations claimed in Western Europe[3]
Vicorp Videotex Corporation A.G.	Betex (formerly Viewdata 3000)	Vicorp	Europe	Mini Mainframe	Hewlett Packard (HP 3000) Tandem (NonStop)	HP: MPE V Tandem: Guardian	Once-off Licence: Hewlett Packard version 15 to 30 (for 1 CPU), Tandem version 40 to 60 (for 4 CPU's). Monthly rental: approximately 4% of figures quoted	32	50	65	Included in HP version. $4K in Tandem version	Hardware prices quoted are for fully operational HP 3000 hardware	35	30
Videotex Systems Inc.	PC-Display	Videotex Systems Inc.	US	Micro	IBM (IBM-PC)	PC-DOS	Once-off Licence: 0.3	4 (for 3 ports)			0.06 (from IBM)	System can only handle up to 3 ports	15	3
Viewdata Systems	Alpha-Vision	Viewdata Systems Limited	UK	Micro Mini	Alpha-Micro (AM 1000-AM 1092)	AMOS	Once-off licence: 4.5 Annual rental: 1.4	18	48	64	0.7	Prices depend on application. Billing software extra		
Viewtext	Computex	Viewtext	UK, Europe, elsewhere	Mini	DEC (PDP-11, VAX) Systime (5 Series)	VMS RSTS/E RSXI/M MPS	Once-off Licence: 13 Monthly rental: 0.6	21	46	98	None	Price not dependent on number of ports	48	41
Visualdata	IVS-3 IVS-100	Aregon	Spain (agent for Aregon)	Mini	DEC (PDP-11, VAX 750, 790, Clusters)									
VTT Technology	Videotex 100	Technology Research Centre of Finland	Europe	Mini	Hewlett Packard (HP 3000), Intel Micros	RTE-A (RT-6/VM)	Once-off Licence: 15-30 Monthly rental: 0.75-1.5	38	64	96	Included in hardware costs	Gateway hardware excluded	1 Public 2 Private	1 Public 2 Private
Zellweger Uster	IVS-3 IVS-100	Aregon	Switzerland (agent for Aregon)	Mini	DEC (PDP-11, VAX 750, 790, Clusters)									

if not all, of the many videotex software suppliers, listed in Figure 3.2, whose products run on DEC equipment.

It is too early to tell how successful DEC will be in the European videotex industry. Suppliers of videotex software have found that, in order to remain competitive, they have been forced continually to enhance their products. DEC's system was developed in the US and the company may find that it will need to invest heavily to adapt and enhance its product for the European market, which may take some time. DEC's salesforce also need to learn the skills associated with selling videotex systems.

Data General (Germany) and Microdata have entered into agreements to market the systems developed by two software houses. In the case of Data General the arrangement is with the German-based company

Figure 3.2 Private videotex software suppliers whose products operate on DEC computers

Aregon International
CTL
D. M. England
Danet
Genesys
Infomart
Philips
Softplan
Stèria
STR
SDL
Telefonbau und Normalzeit
Telemachus
Viewtext

Note: Suppliers' agents are not included.

Names of some reported sales	Videotex display standards supported	Database access methods supported	Editing options supported[4]	Windowing: Same system	Windowing: Host system	Programming language options[5]	Networking options	Front-end to	Application facilities[6]	Security features[7]	Comments
Toyota, Panasonic, Vauxhall, British Oil (UK)	Prestel, CEPT, Antiope, NAPLPS, ASCII	Menu, Keyword, user own programming	D, E, B	•	•	C, B, F, P	PSTN, X.25, Prestel, German and Swiss gateways			P, CUG	Agents include Aircall UK, IDO, Nova Automation. Telex and Teletex access also supported.
Metrotel (UK), BPI (New Zealand)	Prestel	Menu		x	x	B	Variety of baud rates, Bell 212A, 103, CCITT V23				Small videotex package for the IBM P.C. Also serves as an intelligent editor.
ICC (UK)	Prestel			•			PSTN				
BP Minerals (UK), Cable and Wireless (US)	Prestel	Menu		•	•		PSTN				Also marketed by Comdial Communications, Plessey Office Systems, Enterprise Systems.
											For details see Aregon.
Finnish PTT, RAET (Netherlands)	Prestel, Antiope, CEPT, NAPLPS, Telidon, ASCII	Menu, Keyword	D, E, B, A	•	•	P, F	PSTN		V, M, D, telesoftware in 1985	P, CUG	Designed for public systems up to 500 ports. Available through Assyst in UK and RAET in the Netherlands.
											For details see Aregon.

Augur who markets the software in conjunction with Data General. Microdata, on the other hand, has an agreement with the UK-based company, DISC.

The Microdata/DISC arrangement is of particular importance. DISC has, for some time, been marketing its VIEWBASE private videotex system which runs on, among other computers, Microdata Reality and Sequoia minicomputers. Now Microdata will market the VIEWBASE product to its existing customers and will also provide the software free, as standard system software, to all new customers. The immediate effect of this arrangement will be to increase rapidly the number of computer systems supporting videotex. It is likely to be several years before all Microdata's customers with this videotex capability are using it effectively. DISC has also licenced its videotex system to selected other suppliers of PICK operating system hardware suppliers.

AT&T has entered into an agreement with Aregon International*, the UK-based supplier of IVS-3 and other private videotex systems. The two companies will jointly develop a new product based on IVS-3, to be called IVS-5. AT&T will be paying $3 million to Aregon International, for research and development and as an advance on royalties. The new product will support the NAPLPS presentation standard. The system, which will initially run on DEC VAX 11/750s or 11/780s but later on AT&T's own range of minicomputers, will be marketed by AT&T in the US. Elsewhere, the product will be marketed by Aregon International.

The entry of AT&T into the private videotex system software market is important for the following reasons:

*As this report goes to print another major agreement involving Aregon was announced. The deal with Mitsubishi of Japan is reported to be worth over $3,000,000.

—AT&T is the largest company in the computer and telecommunications industry, and the only organisation of comparable size to IBM in the industry.

—It indicates AT&T's commitment to videotex as a business tool as well as a vehicle to reach the mass residential market.

—AT&T will now be in direct competition with DEC and IBM in the US.

—The product will support both NAPLPS and Prestel and, eventually, CEPT presentation standards.

Another, potentially important entrant to the French market is Burroughs, whose product 'Burrotel' is available on a number of its computers. Burroughs has not yet announced that it will market Burrotel in other countries.

In September 1984, it was announced that Christian Rovsing had filed for bankruptcy. It now seems unlikely that the company will be allowed to flounder, but it remains unclear whether parts of the company will be sold to other computer manufacturers*. Christian Rovsing was Denmark's largest computer manufacturer, and supplied the system for the Danish PTT's videotex service, Teledata.

Some major contracts

The most valuable and prestigeous contracts for videotex software suppliers remain those placed by the national PTTs. The following important PTT contracts were awarded during 1984:

—The contract for the Norwegian PTT system was placed with the French company CAP-Gemini-Sogeti and Tandem Computers.

—VIATEL, the Australian national system, is to be based on Prestel software and hardware supplied by GEC.

—A contract for the South African PTT system was awarded to the UK company, SDL.

—BTM was awarded the contract to develop the Belgian PTT's videotex network and services. BTM is using videotex communications equipment supplied by UK-based Microscope, and will be running Oy Softplan's videotex software, Mistel.

The changing industry profile

Over the past 12 months, we have observed two related trends:

—The increasing use of agents by software suppliers.

—The move towards exploiting international marketing opportunities.

*As this report goes to print, ITT's acquisition of Christian Rovsing's minicomputer division has been announced.

In this year's survey we have identified 43 independent local suppliers of videotex software that are acting as agents for the companies that developed the software. This figure compares with 20 agents identified in our survey conducted a year ago.

It is clear that an increasing number of suppliers have realised that:

—There are valuable international opportunities for the sale of videotex technology.

—The videotex standards adopted by national PTTs, and other technical standards (such as gateway protocols), have a major bearing on the ease with which individual suppliers can enter a market.

—The most effective way to gain a rapid entry into an overseas videotex market is to use an agent who is familiar with the market in the country concerned.

Of course, some suppliers, such as DEC, IBM, ICL and Computer Automation already have offices in a number of countries, and generally use these offices to market their products internationally.

Private videotex systems on the market

Figure 3.1 presents in tabular form the features and characteristics of the videotex software products available in Europe.

The figure shows that:

—There are 88 products on the market, compared to 56 twelve months ago.

—Of the products available, 53 are minicomputer-based products, 28 are for mainframes and nine are for microcomputers. (Some products are available for both minicomputers and mainframes.) Last year there were only 12 products for mainframes, so the share of available systems that are mainframe-based has increased from around 20% to 30%.

—In addition to the above, there are suppliers of videotex networking equipment, such as protocol converters, cluster controllers and concentrators.

We now review the characteristics of the different types of products, namely:

—Minicomputer-based private videotex systems.

—Mainframe-based private videotex systems.

—Microcomputer-based private videotex systems.

—Videotex networking products.

We go on to consider the features and facilities of the products which are presented in Figure 3.1.

Minicomputer-based private videotex systems
Minicomputer-based private videotex systems still dominate the market in terms of the number of products available, and in terms of the installed base of systems. We believe that the advantages of minicomputer-based systems will continue to make them successful in the market over the next five years. These advantages are:

- —Low-cost and powerful hardware.
- —Ease of implementation and installation.
- —Several software products are available for the most popular makes of computers, particularly DEC minicomputers.

While minicomputer-based systems will continue to be successful, their share of the installed base will decrease because:

- —The systems based on small, low-cost minicomputers lack processing capability.
- —On a marginal-cost basis, it is usually cheaper to add videotex software to an existing mainframe than to install a minicomputer system with its associated hardware and software.
- —The increasing availability of mainframe-based products — particularly for IBM mainframes — will give system operators greater choice.
- —Videotex is being used increasingly as a means of accessing traditional DP programs and files. This increases the attractiveness of mainframe-based systems.
- —Stand-alone videotex systems, for which minicomputers are more cost effective than mainframes, are being seen as less important as the industry matures.
- —Microcomputer-based systems will become more competitive.

Mainframe-based private videotex systems
More mainframe-based systems are becoming available. Many of the products on offer are not, however, full-function videotex software packages, but are systems that facilitate access to non-videotex files from videotex terminals. Such 'partial implementations' will, we believe, increase in number because of:

- —The increased use of gateways to provide telecommunication facilities, especially in France and Germany.
- —The high degree of involvement of data processing staff and 'customised' software in these implementations ensures that more control of videotex developments in user organisations is kept within the data processing unit. (This is obviously attractive to the management services managers who are generally responsible for selecting videotex systems.)
- —Improvements in the products available.

Partial implementation does, however, lack the flexibility of full-function videotex systems. It is, therefore, likely that many users will wish to migrate from their initial 'partial implementations' to the use of full-function software.

Microcomputer-based private videotex systems
More microcomputer-based systems are becoming available and, as we discuss in the section dealing with terminals, many editing systems based on microcomputers are, in effect, small private videotex systems. The technology of microcomputer-based videotex systems was reviewed in depth in the report we issued last year. It is however, worth stressing that, as microcomputers become more powerful and more widely used generally over the next five years, the number of worthwhile and cost-effective applications for microcomputer-based videotex systems will increase dramatically.

Videotex networking products
Figure 3.1 includes details of a number of products that are, in fact, not videotex software packages, but are videotex networking devices. A list of manufacturers of such products is given in Figure 3.23 (in the section on videotex networks on page xx).

These products are used in a number of ways:

- —As terminal handlers, usually on mainframe-based videotex systems.
- —As protocol converters, allowing videotex terminals to access existing applications programs and files.
- —As communication concentrators, allowing several terminals to use a single communications link to a videotex system.
- —As network nodes, providing access points to videotex networks that are based, for example, on X.25 protocols.

In most cases the devices will perform more than one of these functions, and occasionally all of them.

The main reasons for using such devices are that:

- —They allow mainframe computers to handle large numbers of asynchronous videotex terminals (an operation for which few are designed).
- —Access can be given to mainframe files from videotex terminals without the need to purchase videotex software packages.
- —Communications costs can be reduced by locating network devices close to clusters of users, and

by linking the devices using leased lines, X.25 or other networking options.

Features of private systems

Over the past few years the number of facilities and applications available on private videotex systems has increased considerably. Prospective system operators are now presented with an impressive, even bewildering, array of system options and facilities, and system suppliers are constantly enhancing their products as new videotex applications are found and to increase the competitiveness of their products. Many facilities are now taken for granted. Basic facilities that are demanded as prerequisites by many system operators include an editing facility, a 'tree-structured' database, 'window' facilities and security features based on user passwords and closed user groups (CUGs). Most software packages, however, now provide many more facilities and it is useful for both users and suppliers to analyse the importance of these functions and their applications.

Display standards

Each European country has its preferred videotex standard. In most countries this is the Prestel standard; though in France the Antiope standard prevails, as does the CEPT standard in West Germany. In other countries two or more standards may be acceptable and supported by the PTT. In the future, CEPT will be used more widely as will, we believe, the North American standard NAPLPS.

An analysis of Figure 3.1 shows that 17 suppliers are now offering CEPT as a display standard. This number is likely to increase as the German market is showing considerable activity.

Database access methods

A keyword-search facility is now offered by many system suppliers. One common complaint from users whose systems do not have this facility concerns the time taken to find particular items of information on the database using menu-type access methods. Keyword search, and other more sophisticated search facilities will, in the near future, become a standard feature on videotex systems.

Editing options

Many videotex systems provide the facility to create frames manually from remote terminals.

Experience has shown, however, that many successful private videotex systems use automatic methods of frame creation. There are two main methods for automatically creating frames:

—The use of specially-written software within the videotex system.

—The use of a reformatting package, such as Langton's PREVIEW.

Two of the implementations described as case histories in Chapter 4 — the Export Credit Guarantees Department and 'Fishnet' — are good examples of the use of these two approaches. As users become more experienced in the applications of videotex they will, we believe, expect systems to support automatic frame-creation facilities, as well as manual editing facilities.

Window facilities

Window facilities allow system operators to write their own software and 'embed' this in the videotex system. Many window applications concern access to existing DP files and non-videotex systems. A window facility is an essential feature of private videotex systems. In selecting systems, users should be concerned about:

—The number of programs that can be implemented using the window facility.

—The ease of implementation of the 'user exit' needed to use or access non-videotex programs and files.

For suppliers of minicomputer-based systems the ability to offer a product that can access a wide range of different mainframe computers (but especially IBM mainframes) is extremely important.

Networking

There are now a number of ways in which terminal users can be linked to a private videotex system. The main options are:

—Public and/or private telephone networks.

—Gateways to a public videotex system.

—Packet-switched networks with videotex access points (X.25).

—Leased-line network.

—Non-PTT value added networks.

These options are shown diagrammatically in Figure 3.3. The use of both public and private packet-switched networks for videotex access is likely to increase. An X.25 capability, together with gateway software, is an important feature for private videotex systems.

Although the existence of international standards has always been one of the strengths of videotex technology, there are areas where international standards do not yet exist. One such area is gateway protocols, and the protocols used for gateway access to the PTT videotex networks are different in virtually every country. Even within a country, changing gateway specifications can cause major problems. Until international standards are agreed, the position on gateway protocols is likely to get worse over time rather than

better, and this will cause major problems for both users and suppliers.

Other facilities

Of the other facilities which appear on Figure 3.1, the following are worthy of note:

—User-to-user messaging is now seen by users as an important facility on videotex systems. Useful messaging facilities include distribution lists and personal-message files.

—Billing and statistics facilities are often provided by suppliers, and are particularly important when a system is in its trial stage, or has been implemented to market an information service.

—'User-update frames' are provided on some systems. These frames can be edited by the user without the need to use the full editing facilities. This is increasingly becoming recognised as a valuable feature.

Supplier market shares

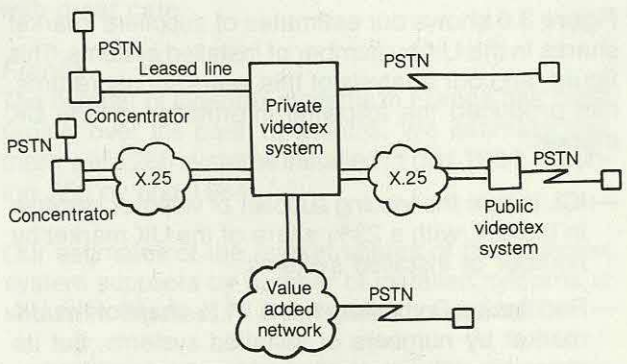
An analysis of our 1984 survey shows:

—The private videotex system suppliers covered in our survey claim that they have supplied 1,182 videotex systems installed worldwide by mid 1984.

—Our best estimate is that there were 1,050 videotex systems installed in Western Europe in mid 1984 reaching 1,240 by end 1984. This represents an increase of over 70% since 1983.

—The videotex software market, in terms of the installed base of systems, remains dominated by IBM, CAP-Gemini-Sogeti, ICL, Rediffusion and Aregon International, although the market shares of these companies have changed significantly in the last year.

Figure 3.3 Different networking arrangements for private videotex systems

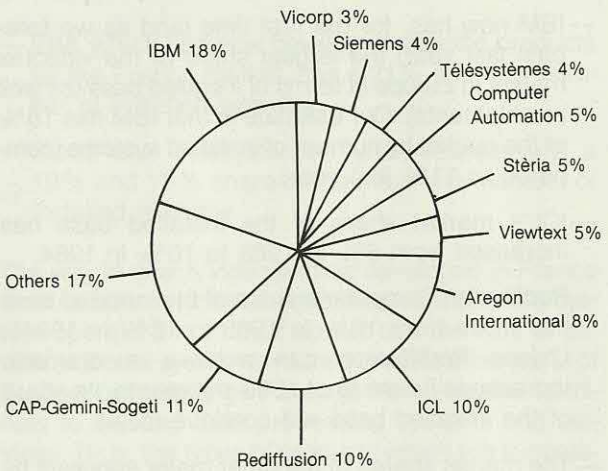


—Although the UK is the country with the largest number of private videotex systems, the UK's share of the European private videotex market is decreasing. We estimate that by the end of 1984 the UK will account for 32% of European installed systems.

—The size of the French market is increasing rapidly. We estimate that nearly one third of the private videotex systems installed in Europe by the end of 1984 will be in France.

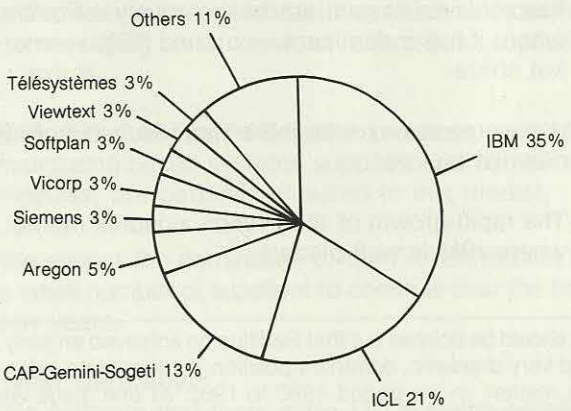
Figures 3.4 and 3.5 show our estimates of the market shares of the leading videotex suppliers in terms of systems installed and shipped. In this section we

Figure 3.4 Private videotex system supplier market shares by total number of systems installed at end 1984



Total number of installed systems in Western Europe = 1,240

Figure 3.5 Supplier market shares in Western Europe by numbers of private videotex systems shipped in 1984



Total number of systems shipped in Western Europe = 582

analyse the changes in the market position focusing on the most important changes which have taken place over the last year, and assessing the factors which have affected suppliers' market positions.

Figures 3.4 and 3.5 illustrate the way in which IBM, ICL and CAP-Gemini-Sogeti, are increasing their dominance of the market. These three companies are increasing their market share of both the installed base and of the numbers of systems shipped. IBM had a 35% share of the shipments in 1984 compared with a 15% share in 1983. IBM has been particularly successful in France and Germany but significantly less successful in the UK. By contrast, ICL has been especially successful in the UK. We estimate that 85% of the systems shipped by ICL in 1984 were installed in the UK.

An analysis of Figure 3.4 and a comparison of our market share estimates for last year with those of this year's reveal that:

— IBM now has, for the first time (and as we forecast last year) the largest share of the videotex market in Europe in terms of installed base (as well as shipments). Our estimate is that IBM has 18% of the market by number of installed systems (compared to 11% last year).

— ICL's market share of the installed base has increased from 6% in 1983 to 10% in 1984.

— Rediffusion Computer's share of the installed base has fallen from 16% in 1983 to 10% in 1984*. Unless Rediffusion can achieve a dramatic increase in its share of 1985 shipments, its share of the installed base will continue to fall.

— The market shares of the other major suppliers by numbers of installed systems are: CAP-Gemini-Sogeti 11% (10%), Aregon 8% (9%) and Steria 5% (7%). (Figures in brackets are 1983 market shares.)

— CAP-Gemini-Sogeti, while only increasing its overall European share of the installed base marginally, has achieved its gain almost exclusively in France, where it has a dominant — around 35% — market share.

IBM's increased market share has resulted from a number of factors:

— The rapid growth of the French videotex market, where IBM is well placed.

— The growth in the German market and the move from Prestel to CEPT display standards. As the supplier of the system used for the public videotex service, Bildschirmtext, IBM was particularly well placed to sell into the private videotex system market.

— The trend towards the use of mainframe-based videotex systems, another area of IBM strength.

A comparison of shipment market shares in 1984 and 1983 (published in our earlier report) shows the volatility of the private videotex system market: while IBM and ICL have achieved impressive gains in market share, and CAP-Gemini-Sogeti, Aregon International and Softplan have broadly maintained their share, other suppliers have lost market share. For example, Télésystèmes has fallen from an 11% share to just over 3%, while Rediffusion Computers' share has fallen from 11% to under 3% (included under 'others' in Figure 3.5).

Private videotex system developments in the major countries

Very rapid market growth of private systems is being maintained in France and the 'rest of Europe', compared with a relatively slower growth in the UK and West Germany. By the end of 1985 we expect that the number of installed systems in France will exceed those in the UK.

United Kingdom

The size of the UK market by number of installed systems, was around 375 in mid 1984 increasing to an estimated 400 by the end of the year. Many established systems have been considerably enhanced and some systems have been replaced completely. Because of the growth in the other European countries only 32% of the systems installed in Europe are in the UK in 1984 compared with over 40% in 1983. The main effect of the declining relative importance of the UK market has been to encourage UK manufacturers to market their products throughout Europe (to, it must be said, varying degrees of success).

Figure 3.6 shows our estimates of suppliers' market shares in the UK by number of installed systems. This figure, and our analysis of this years survey returns, has produced the following information on the UK market:

— ICL is now the leading supplier of videotex systems in the UK, with a 23% share of the UK market by number of installed systems.

— Rediffusion Computers has a 21% share of the UK market by numbers of installed systems, but its share has fallen over the last two years as a number of organisations have been replacing their Rediffusion systems with larger computers.

*It should be pointed out that Rediffusion achieved an early, and very dramatic, dominant position in the private videotex market, in the period 1980 to 1982. At one stage we estimate that half the systems installed in Europe were supplied by Rediffusion. Given this early lead, it was almost inevitable that Rediffusion would lose market share.

Figure 3.6 Private videotex system supplier market shares in the UK by number of systems installed at end 1984

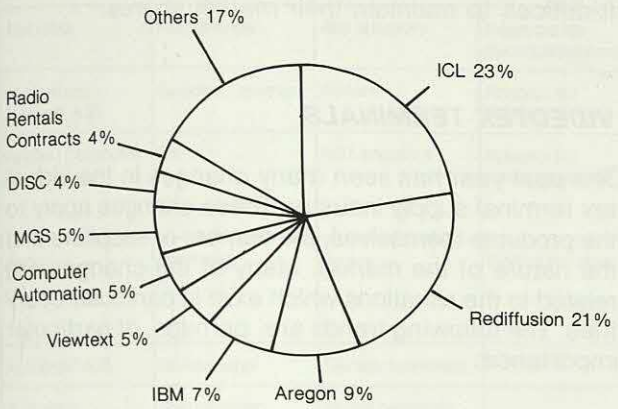
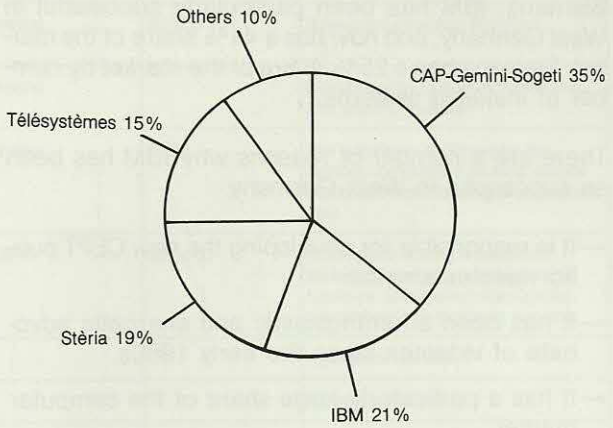


Figure 3.7 Private videotex system supplier market shares in France by number of systems installed at end 1984



—Aregon International still remains a major supplier in the UK although other markets are becoming increasingly important to the company. Aregon has been particularly fast to recognise and exploit opportunities in developing European markets such as Spain and Italy, as well as the US, Australia, South Africa and Japan.

—IBM has a 7% market share in the UK by number of installed systems. This share is well below its share in Germany and France, largely because its products are best suited to gateway and other national networked systems. British Telecom's gateway pricing policy has been one factor contributing to IBM's relatively poor performance in the UK.

The UK market remains particularly competitive. We estimate that there are over 20 suppliers of private videotex systems in the UK. It is clear that the market cannot support this number of suppliers profitably. It is therefore of particular importance that prospective system operators choose their system suppliers with great care.

France

The number of videotex systems in France has risen rapidly over the past 12 months. We estimate that there were 280 systems installed in mid 1984, reaching 350 by end 1984.

Our estimates of the market shares of the videotex system suppliers by number of installed systems is shown in Figure 3.7. This figure shows that:

—CAP-Gemini-Sogeti dominates the French market with an estimated 35% share by number of installed systems.

—IBM, which has now developed specific products for the French market, has a 21% share by number of installed systems.

—Stéria and Télésystèmes have, respectively, a 19% and 15% share of the market by number of installed systems.

The way in which videotex has developed in France favours certain types of videotex products. Many system operators in France do not use the type of private videotex system favoured in most other parts of Europe, but simply give access from videotex terminals to existing data processing systems and services. Thus, the types of products which are successful in France are those which:

—Allow access from videotex terminals using the standards and networking protocols unique to France.

—Can be easily integrated with existing DP systems.

—Provide 'value-added' facilities (such as indexing, messaging and keyword search) as optional extras.

IBM and CAP-Gemini-Sogeti's products, primarily mainframe-based systems supplied in a number of modules, are particularly suited to this market.

We expect the domination of the French market by a small number of suppliers to continue over the next few years.

West Germany

We estimate that there were 170 systems installed in West Germany in mid 1984 reaching 200 by the end of 1984. Our estimates for the private system

suppliers' market shares in West Germany are shown in Figure 3.8.

The West German market is dominated by IBM and Siemens. IBM has been particularly successful in West Germany, and now has a 44% share of the market. Siemens has a 25% share of the market by number of installed systems.

There are a number of reasons why IBM has been so successful in West Germany:

—It is responsible for developing the new CEPT public videotex service.

—It has been an enthusiastic and energetic advocate of videotex since the early 1980s.

—It has a particularly large share of the computer market.

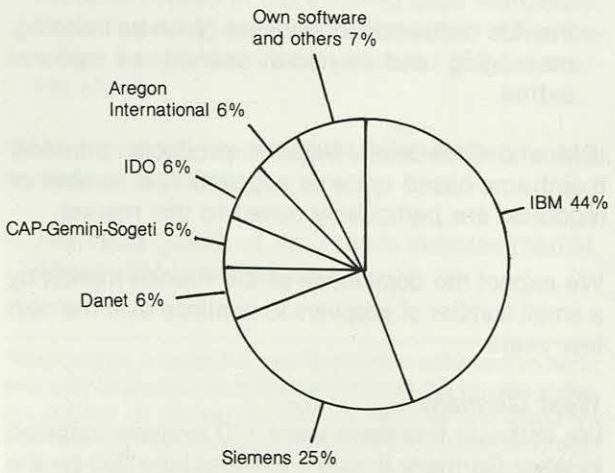
—Many of the early users of the Bildschirmtext trial gateway service were IBM customers, so IBM has had four years to learn how to market in a 'videotex gateway' environment.

Rest of Europe

We estimate that around 290 systems were installed in countries outside of the UK, France and West Germany by the end of 1984. The number of private systems was increasing especially fast in 1984 as more PTTs announced plans for the future of videotex in several countries. The private videotex systems market is more mature in Finland, Sweden and the Netherlands than in most of the other smaller countries.

We believe that, over the next few years, competition amongst suppliers of private systems in these countries will increase sharply as more suppliers of internationally-successful products recruit agents in these countries. The smaller suppliers, especially those with weak international marketing links, will find it difficult to maintain their market shares.

Figure 3.8 Private videotex system supplier market shares in West Germany by number of systems installed at end 1984



VIDEOTEX TERMINALS

The past year has seen many changes in the videotex terminal supply industry. These changes apply to the products themselves, the number of suppliers and the nature of the market. Many of the changes are related to the situations which exist in particular countries. The following trends are, perhaps, of particular importance:

—The rapid increase in the number of installed Minitel terminals in France to 200,000 in mid 1984, and to an estimated 400,000 at the end of 1984. This represents almost 80% of the total installed base of videotex terminals in Europe.

—The growth in the number of suppliers producing terminals that conform to the CEPT display standard: from nine in 1983, to 24 in 1984.

—The rapid growth in the market for television set adaptors and the growing number of suppliers of microcomputer adaptors.

The suppliers' offerings are also changing, in particular:

—An increasing number of facilities are now being incorporated into terminals, thus complicating the terminal selection process for users.

—There is a growing interest in integrating videotex terminals with other products such as microcomputers and videodiscs.

—Photovideotex systems for displaying full-frame or part-frame colour images have been developed. They will be commercially available from mid 1985.

In conducting the research for this report, we reviewed 95 European suppliers and their products. In this section we analyse the markets for videotex terminals, the numbers of suppliers serving the market, and the evolving situation in different European countries. Our review considers the overall position in Europe, before focusing on the markets in the largest countries: those in France, the UK and Germany.

Suppliers of videotex terminals

The suppliers and the products surveyed in our research are presented in Figure 3.9. While the list is not exhaustive, we estimate that it contains some 90% of European suppliers and presents an accurate picture of the range of products available in Europe.

Figure 3.9 Videotex terminal suppliers[2]

Supplier name	*Primary markets*	*Principal products*	*Type*	*Videotex standards*	*Typical price*[1]	*Comments*
Abc Data	Netherlands	Abc adaptors	Adaptors for microcomputers	Prestel	$6,700	Based on Luxor Abc 80 micro
AU System Network A.B.	Sweden, Denmark	Aviterm	Adaptor for IBM-PC	Prestel		Distributed by Ericsson, Panasonic and IBM-PC dealers
Applied Computer Techniques	UK	ACT adaptors	Adaptor for microcomputer	Prestel	$190	The adaptor is designed for the Apricot computer. Facilities include automatic downloading of pages onto disc
Augur	Germany	Argus	Editing terminal	CEPT	$25,500	A complete editing workstation, including hardware, software and furniture. The system also comes complete with a digitising camera
Autophon A.G.	Switzerland	Dornier terminals				Agents for Dornier
Autronic	Switzerland	Mupid terminals				Agents for Mupid
A.V.S.	France	Devlonics terminals				Agents for Devlonics
Ayr Viewdata	UK, USA	Ayr adaptors	Adaptors for televisions	Prestel		
Bang & Olufsen	Scandinavia, Netherlands		Business and residential terminals	Prestel		Popular terminals in Denmark
Barco Industries	Europe	CV33	Computer terminal with videotex capability	Prestel	$1,300-$2,090	Teletype and 80-column display capability
Baumann Electronic	Germany	BT-UT10 BT-UT12 BT-UT14	User terminal with basic editing capability	CEPT	$920-$1,020	The terminal comes complete with high resolution screen. The editing facility does not include DRCS
		BT-VT10 BT-VT10C	Portable terminal	CEPT	$1,565-$1,700	A 'briefcase' terminal with integrated cassette drive and acoustic coupler
Bee Systems Ltd.	UK	BEE 8040T	Adaptor for microcomputers	Prestel	One-off $3,900 Bulk sale $1,300	The adaptor is suitable for a range of microcomputers
Bishopsgate Terminals	UK, Europe, South Africa, Australia, USA	BTL 14/16/20 AVT	Range of business terminals, editing terminals	Prestel CEPT	$920-$2,614	Supply a range of terminals, including custom-built terminals with particular features for specialised applications
Blaupunkt	Germany	CI/CES 300	Adaptors	CEPT	$340-$510	
		CIS 300	User terminals	CEPT	$680-$850	
		DC 32	Editing terminal	CEPT	$1,190	A simple editing terminal, screens and keyboard cost extra
		VC Editor	Editing workstation	CEPT	$5,100	A modular editing workstation
		IVC Editor	Editing workstation	CEPT	$11,900	A sophisticated editing workstation based on the Apple II microcomputer
BOD Datensysteme	Germany	Biltex-Btx software	Editing software for microcomputers	CEPT	$510-$680	The system is based on the Loewe BBTO14 and Sirius I microcomputer. Available in a range of implementations
BTM	Belgium		Business and residential user terminals	Prestel		Supplies ITT and Nokia terminals
CAP-Gemini-Sogeti	France, West Germany, USA	Editel	Editing software for microcomputers	Antiope Prestel		The software can be used with the following: CDC 110, NCR Decisionmate 5, Basis 108, Kontron, Munro 8820, Intertechnique 55
CCS	France	CCS 7369	Decoder	Antiope	$740	
Complex Terminals	UK	Devlonics VSGT	Adaptor for microcomputers	Prestel	$785-$1,045	The adaptor can be used with the following: DEC Rainbow, IBM PC, Apple II, BBC Micro

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Figure 3.9 Videotex terminal suppliers[2] (continued)

Supplier name	Primary markets	Principal products	Type	Videotex standards	Typical price[1]	Comments
Richard Cumming and Associates	UK	MULTICOM	Adaptor for microcomputers	Prestel	$295-$360	Prices include modem; suitable for the following microcomputers: IBM PC, Olivetti PC, ACT Sirius, ACT Apricot and Osborne Keypro
C. W. Cameron	UK	Devlonics and Barco terminals				Agents for Barco Industries and Devlonics
Datakompass	Norway/Denmark	Tandata Adaptors				Agents for Tandata
Decca	UK and elsewhere	Deccafax	Business terminals	Prestel		
Destel	France	Minitel Couleur EDT 800	Decoder	Antiope Antiope	$730 $1,010	
Digitek Computer Systems	Holland	Tandata Adaptors				Agents for Tandata
Direction Générale de Télécommunications (DGT)	France	Minitel	Residential and business terminals	Antiope	$7.50 per month	DGT is the government department responsible for the distribution of Minitel terminals
Dornier	Germany, Switzerland	DO912 series	Editing terminals/ workstations	CEPT	$2,040-$18,700	The DO912 series is a range of editing terminals from the very simple to the very sophisticated
Easydata	UK (also sold in France and Belgium)	Elf	Portable multifunction terminal	Prestel	One-off $720	A desktop terminal capable of displaying 40 and 80 column videotex, and other protocols
FIET	France	V400 Valisé	Adaptor for TV Portable business terminal	Prestel, CEPT Antiope	$1,010 $1,790	DRCS is available as an optional feature A portable terminal with a 13cm monochrome display
Future Technology Systems	UK	Viewcom	Adaptors for microcomputers	Prestel	$195 (expected price)	Announced September 1984, operates on the Future Technology Microcomputer
Wilhelm Geiger GmbH	Germany	WGII	Microcomputers with inbuilt videotex capability	CEPT/Prestel	One-off: $1,870-$5,100 Bulk sale: $1,310-$3,570	The computer supports both 40 and 80 column videotex as well as other protocols
Granada TV Rental	UK	P16 range PADXX range P22 VA3	Business terminals Adaptors for TV receivers Residential terminals	Prestel Prestel Prestel	$560-$615 $220-$360 $415	
Grundig	Germany, Switzerland	BT2002	Microcomputers with inbuilt videotex capability	CEPT	$10,200	The system is based on the Grundig microcomputer
Hamilton Rentals	UK		Adaptors for microcomputers	Prestel		
Hello Informatique	France	Apple Tell	Adaptors for microcomputers	Teletel	$660	
HIS	UK, Netherlands, Austria, West Germany, Sweden, US, South Africa		Public access terminals	Prestel, Antiope		
IBM	Worldwide	IBM PC/videotex	Videotex adaptors for IBM-PC	Telidon, NAPLPS, Prestel, CEPT	$325	Adaptors consist of interface boards and software
Infotesys	Germany	Infotool	Editing and application software	CEPT, Prestel	$2,380-$5,100	
Italtel Telematica	Italy	Omega 1000	Business terminal	Prestel, Antiope		The terminal also has an ASCII capability

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Figure 3.9 Videotex terminal suppliers[2] (continued)

Supplier name	Primary markets	Principal products	Type	Videotex standards	Typical price[1]	Comments
ITCU	UK	ITCU adaptors	Adaptor for BBC microcomputer	Prestel	$235	Distribution is restricted to ITEC centres in UK
ITT	Europe	ITT 3920	Public access terminal	CEPT, Prestel		Public access terminal with full alphanumeric keyboard
Kienzle Apparate GmbH	Germany	9008	Multifunction business terminal	CEPT		The terminal is due for launch in 1985. It is capable of text and data processing as well as Teletex and Bildschirmtext
Loewe Opta	Germany, Switzerland	DBT 01 BBT 014 BBT 1014 BBT 914 BBT 010	 Simple editing terminals Simple editing terminal Simple editing terminal	 CEPT, Prestel CEPT, Prestel CEPT, Prestel	 $2,310-$2,790 $1,360	 The terminal has a 10" flat colour screen
Lohja	Finland, Scandinavia		Residential and business terminals	Prestel	$950	
Luxor	Scandinavia, Netherlands, West Germany		Adaptors and editing software for microcomputers	Prestel	$650-$900	Runs on Luxor ABC 80 micro
Matra-Temat	France	TTEA 315 TTEA 620 TTEA 820 TTEA 310	Range of integrated telephone/ videotex terminal products	Antiope	$505-$1,410	The TTEA 310 is the standard Minitel terminal
mbp	Germany	mbp-Btx software	Software for microcomputers	CEPT, Prestel, Antiope		
Méta Videotex	France	Station Locale, Videotex, ('Visitel' software)	Adaptor for microcomputer	Antiope	$535	
Metrotel	UK, Europe and elsewhere	Metrotel IPT (also agents for Videotex Systems Inc.)	Intelligent editing system	Prestel (CEPT in 1985)	$6,400	The system includes a local videotex database and database management software. Based on Torch or Apricot microcomputers
Micronet	UK	Micronet adaptors	Adaptors for microcomputers	Prestel	$140-$240	Supply a range of adaptors for home and business microcomputers
Mupid Computer Gesellschaft mbH	West Germany, Austria, Switzerland, Italy, Sweden, South Africa	Mupid 320 Mupid C2D	Microcomputers with inbuilt videotex capability	Prestel, alphageometric CEPT, alphageometric	$735-$1300	The terminals have a wide range of facilities for manipulating text and images and for frame creation
NCR	Switzerland, Germany, Netherlands, Belgium	Decision mate V	Microcomputer with inbuilt videotex capability	Prestel, CEPT	$2,590-$3,660	
Nixdorf	Germany, Switzerland	88ED BTO1 886X 8870 Btx	Editing workstation Displayphone with videotex capability Videotex editing software	CEPT CEPT CEPT		Based on Nixdorf PC Videotex editing software for use on Nixdorf's standard office workstations
Nokia	Finland, Sweden, Belgium, Norway, UK, Austria		Business terminals	Prestel, alphageometric	$1,500-$3,000	
Northern Telecom	UK, Europe, North America	Displayphone	Integrated business terminal with videotex capability	Prestel	$2,120	A multifunction terminal capable of operating on a range of protocols including 3270, VT100 and PSS
N.V. Devlonics	Europe	Devlotex	Adaptor for microcomputer	Prestel, Antiope	$1,325	Suitable for IBM and ICL PCs

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Figure 3.9 Videotex terminal suppliers[2] (continued)

Supplier name	Primary markets	Principal products	Type	Videotex standards	Typical price[1]	Comments
Olivetti	Italy, Germany		Business terminal	Prestel, CEPT		The terminal is based on the Olivetti M20 PC and includes a high resolution colour monitor
Owl Micro-communications	UK, Scandinavia, USA	OWL EDITEL OWLTEL	Sophisticated editing terminal Adaptor for microcomputer	Prestel Prestel	$5,230 $710	Editing facilities include word processing and storing 200-4,500 frames on disc Adaptor for Apple microcomputers
Philips Business Systems	UK and Italy Europe Germany Holland	3607 (BIT 2) HCS110 HCS 400 2730 P2000T P3500	Business, user or editing terminal Business terminal Editing terminal Adaptors for microcomputers	Prestel Prestel, CEPT CEPT Prestel	$1,130	Facilities include on line editing and television reception
Patric Videotex	Eire	Plessey terminals, Tandata adaptors				Agents for Tandata and Plessey
Plessey Office Systems	UK	Vutel	Displayphone	Prestel	$800	
Prism Microproducts	UK	Prism Viewdata and communica-tions system	Adaptors for microcomputers	Prestel	$160-$340	Adaptors are supplied for the following microcomputers: IBM PC, Apricot, Sirius and Apple II
Radio Rentals Contracts	UK	0943/4 6144 6154	Dumb terminal Domestic terminal Business terminal	Prestel Prestel Prestel (CEPT under development)	$720 $970 $980	Radio Rentals Contracts are agents for Sony and Philips as well as marketing their own products The 6154 terminal has a number of special facilities including 28k RAM for application programming, and an auto-answer modem.
Radiotechnique-TRT	France	Sematel 75XX series Sematel 4030	Range of business and domestic terminals	Antiope/Prestel	$400-$885	TRT are now one of the major suppliers of videotex terminals in France
Rafi (Eurokey)	Germany, Switzerland	C14	Editing terminal	CEPT, Prestel	Screen: $1,430-$2,040 (depending on resolution) Keyboard: $150-$220	Can support both 40 and 80 column display format
Rediffusion Computers	UK	Teleputer 3	Microcomputer with videotex capability inbuilt	Prestel	$4,700	Can support a range of communication protocols: ASCII, 3270, CO3, VT109, as well as 40 and 80 column videotex
SABA	Germany	DC2000	Decoder for editing terminal	CEPT, Prestel	$750	
Schoonderbeck Elektro B.V.	Netherlands	1402 PK 1403 PK 1420 PK	Business user terminal Editing terminal	Prestel Prestel (CEPT future option)	$945 $750	
SEL	Germany		Editing station Adaptor Public terminal	Prestel, CEPT Prestel, CEPT Prestel, CEPT	$780-$1,460 $440 $3,400	
Seleco	Italy	Mupid terminals				Agents for Mupid
Siemens	Germany	T3220 T3210 Bitel T3310	Business terminal Displayphone Editing terminal	CEPT Prestel, CEPT Prestel, CEPT, alphageometric	$1,330 $910 $2,275	
Skala Television (3 suppliers)	Belgium, Netherlands, Spain		Business and residential terminals	Prestel	$75 a month	Rental only. Thorn EMI subsidiary
Salora OY	Finland, Denmark, UK, Italy, Norway, Sweden, West Germany	Salora VTX 2000	User terminal	Prestel, CEPT	$740-$1,145	

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Figure 3.9 Videotex terminal suppliers[2] (conclusion)

Supplier name	*Primary markets*	*Principal products*	*Type*	*Videotex standards*	*Typical price[1]*	*Comments*
Sony	UK, West Germany	KTX 9000 KTX 1400 VDX 100	Business terminal Business terminal Adaptor for RGB monitor	Prestel Prestel Prestel	$1,110 $860 $460	Compact business terminal with 9" colour screen Designed for use with the Sony Profeel monitor ($653)
STC Tele-communications	UK, USA and elsewhere	Displayphone	Integrated business terminal including videotex facility	Prestel	$1,630	
Tandata	UK, Europe and elsewhere	Td 1100, 1404, 1616 Td 2616	Adaptors/terminals residential/business Business terminal	Prestel (CEPT-mid '85) Prestel (CEPT-mid '85)	One-off: $490 Bulk sale: $360	
Tele-Control	Austria	Tele-Datasoft adaptors				Agents for Tele-Datasoft
Tele-Datasoft	Germany (Finland, Austria)	BTX-micro software	Adaptor for microcomputer	Prestel, CEPT	$629-$1,020	Adaptor for DEC microcomputers
Telefunken	Germany	FZ 650	Decoder	CEPT		
Telefusion	UK	Distributor for Sony, Decca, Tandata, ITT, Philips and others				See appropriate suppliers for details
Tele-Hansa	Finland	Tele-Datasoft adaptors				Agents for Tele-Datasoft
Téléphonie SA	Switzerland	Dornier terminals				Agents for Dornier
Telic-Alcatel	France	Alcatel VB250 series	Range of user terminals, many of the Minitel type	Antiope	$370-$785	Alcatel are the main suppliers of videotex terminals in France
Thomson Tele-communications	France	VDT 3V 107	User terminal	Antiope	$1,345	Editing software for the 107 model is available at $220
Torch Computers	UK	Torchtel	Adaptor for microcomputer	Prestel		
Vector Marketing	UK		Adaptor for microcomputer	Prestel	$150	Adaptor for BBC microcomputers
Video Electronics	UK		Camera input device	Prestel		
Videotex Systems Inc.	USA, agents in UK, Europe	PC-Prestel	Software package for IBM-PCs	Prestel	$200	The software package together with the microcomputer could be used as a small stand-alone system
Visionhire	UK	Agents for Philips, Decca, Sony and others	Range of residential and business terminals (see manufacturers)	Prestel		See relevant manufacturers for details
VTT Technology Inc.	Europe	HP 300 adaptor DEC PC 100 adaptor	Videotex emulators for HP150 and DEC PC100 microcomputers	Prestel	$400 $300	The product is sold as a package including a diskette, modem and user manual
Wegner Technologie	Germany	Astra 2001	Editing workstation	CEPT	$10,200	Peripherals available include a digitising camera
Wordplex	UK	Wordplex personal computer 80 series	Microcomputer with inbuilt videotex capability Wordprocessors with videotex capability	Prestel Prestel	$3,140 $390 for software	
X-com	France	X-tel	Adaptor for microcomputer	Antiope		
Xyllyx	Europe		Public access terminals	Prestel	$2,500-$3,500	
Zycor	UK, Europe and elsewhere	Teledek series	Adaptors for TVs, microcomputers, portable terminals	Prestel	$350-$1,250	

Notes: [1]All prices are quoted in US dollars. These prices have been converted from European currencies according to the rates on 1st August 1984, as published by *The Financial Times* in London.

[2]There is a small number of further suppliers of terminals which we have not included principally because of their low profile in Western Europe. However, we estimate that the table contains some 90% of the European suppliers in mid-1984.

An analysis of Figure 3.9 shows that:

—The UK still has the largest number of suppliers of videotex terminal equipment with an estimated 32% of European suppliers by number.

—The number of suppliers in Germany has increased: Germany now has an estimated 21% of the total number of European suppliers.

—The French market is still dominated by a relatively small number of suppliers, despite the very large numbers of terminals being sold.

Figure 3.10 shows a breakdown of the number of terminal suppliers according to the display standard of their products. In our last videotex report produced 12 months ago*, we identified nine suppliers who were planning to introduce CEPT-based products. This year, we have identified 28 suppliers offering CEPT terminals (although a number of these were still awaiting either components, such as the Mullard/Valvo EUROM chip, or PTT approval, or both).

Figure 3.10 Analysis of European videotex terminal suppliers by the display standards of their products

Display standards	*Number of suppliers*	*Percentage of total number of suppliers*
Prestel	67	71%
Antiope	16	17%
CEPT	35	37%
NAPLPS	1	1%

Note: Suppliers offering products with more than one display standard are included more than once. Manufacturers who plan to offer CEPT terminals but have not yet commercially launched their products have been included under CEPT.

Supplier market shares

Figure 3.11 shows our estimate of the market shares of the major videotex terminal suppliers. Our estimates indicate the following:

—Telic Alcatel remains the major supplier of French Minitel terminals and holds a European market share by volume of 55%, somewhat more than last year when it was 50%.

—The two other major suppliers of Minitel terminals, TRT and Matra, who were awarded PTT contracts in 1984, each hold 10% of the total European market by volume.

—Philips remains the major supplier of videotex terminals in Europe outside France with 16% of this market. If the sales of TRT in France are taken into account (TRT is a Philips subsidiary), Philips holds 14% of the total European market.

—Philips subsidiaries or companies associated with Philips continue to dominate in particular markets outside France. In mid 1984, Loewe had 90% of the German CEPT market by volume although this share was somewhat artificial as other suppliers' products were awaiting approval for connection by the German PTT. Mullard and Valvo, which are owned by Philips, supply the majority of decoders for Prestel and CEPT terminals.

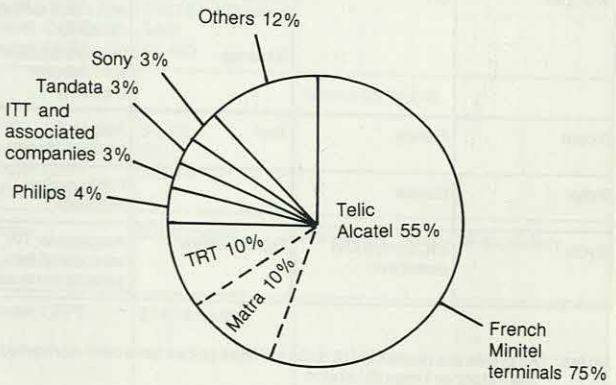
—ITT and its national subsidiaries holds 3% of the European market.

—Sony, whose videotex products are manufactured in the UK, have a 3% share of the market.

—Tandata Marketing now holds 5% of the total European market by volume. Tandata, which markets videotex adaptors/controllers, is particularly important in the UK with a 20% share by volume. Moreover, Tandata has increased its share of the European television set adaptor market to over 50% in 1984.

—87 suppliers (those included under 'other' in Figure 3.11) are fighting for the remaining 12% of the market. This represents some 62,500 terminals in 1984, an average of just over 600 terminals per supplier. Most of these will have been supplied by the more important suppliers such as Nokia, Rediffusion, Siemens, Solara and Thorn-EMI. However, many of the suppliers in the 'other' category are specialised (for example, some supply only editing terminals).

Figure 3.11 Terminal manufacturers market shares by number of terminals installed in Europe at end 1984



Total number of installed terminals = 520,000

*"Private videotex systems — Their Selection, Use and Future Prospects".

Over the next four years we expect that:

—Telic Alcatel's share of the market will decrease as more of the terminals manufactured by TRT and Matra for the French PTT come onto the market. Although the three major French suppliers also manufacture Prestel-standard and ASCII terminals, and are starting to market them more aggressively outside France, sales of these products will be overshadowed by shipments of Antiope-standard terminals in France.

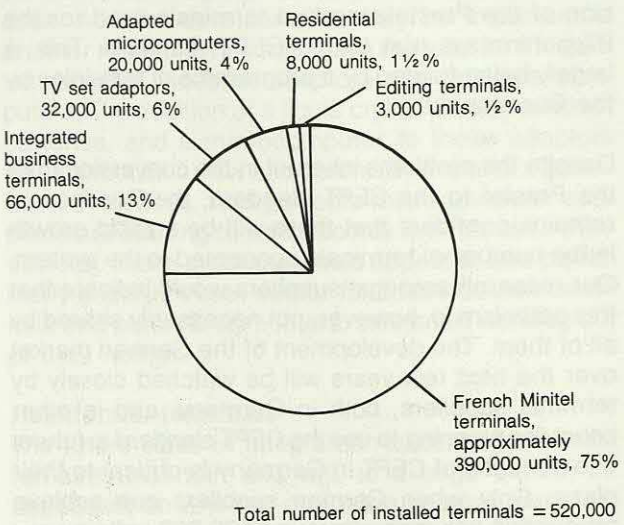
—Philips, which is developing a number of new products for the German, UK and Netherlands markets in particular, will continue to maintain its overall market position in Europe, though its share is likely to decline in some countries.

—The other major manufacturers of integrated business terminals will find it increasingly difficult to maintain their share of the market, as a result of growing competition from manufacturers producing adaptors for television sets and microcomputers.

Figure 3.12 shows our assessment of the European market for terminals categorised by terminal type in terms of the installed base for 1984. As we anticipated last year, the share of the market of the French Minitel terminals has increased substantially from 55% at the end of 1983, to 75% by the end of 1984. Of the remaining terminals, we estimate that 13% of the total are integrated business terminals, 6% are external TV set adaptors, 4% are adapted microcomputers, 1.5% are residential terminals and 0.5% are editing terminals.

This represents a reduction in overall market share for all types of terminal except Minitel terminals; a reduction due almost entirely to the growth of the Minitel terminal population in France. It is interesting to note that the modest growth in market share that we anticipated last year for microcomputer adaptors has not materialised yet. Their success in 1983 was largely accounted for by the rapid penetration of Prestel's Micronet telesoftware service into the UK residential market. This early success has not been maintained in 1984, mainly because of the difficulty experienced in selling adaptors to users of very low-cost home computers, such as the Sinclair Spectrum. It has proved much harder to persuade buyers of these $120 devices to spend a similar sum for a videotex adaptor, than it was to sell to owners of such computers as the BBC Acorn that cost around $400-$500. Prism, the main UK supplier of microcomputer adaptors has started to diversify its marketing into the business and non-UK sectors, and to reduce its dependence on Micronet.

Figure 3.12 European terminal market share by type of terminal (volume) at end 1984



Total number of installed terminals = 520,000

Country-by-country review

Differences in PTT policies and the needs of the markets have resulted in different types of products being marketed in different European countries. In this section, we briefly analyse the state of the market in the major European countries.

France

1984 has seen the Minitel distribution programme of the French PTT achieve volume shipments. By October 1984, the installed population of Minitels was 330,000 (more than the total European terminal population in July), with 80,000 of these units being rented by businesses for $7.50 a month. The rate of installation was then running at 25,000 to 35,000 units a month, more than four times the rate of installation of all other videotex terminals in Europe.

Virtually all of these terminals are monochrome, but there are signs that some business users are beginning to demand colour displays. Some manufacturers are offering terminals of the Minitel type but with enhanced facilities, and adaptors have been developed to allow a wide range of popular microcomputers to interface to Minitel terminals. These terminals do not form part of the Minitel distribution programme, and are purchased direct from the manufacturer, rather than being rented from the PTT.

The PTT has, over the past year, granted terminal supply contracts to manufacturers other than Telic Alcatel particularly to Matra and TRT. We expect this purchasing pattern by the PTT to continue, both to avoid excessive dependence on Telic Alcatel, and to develop a competitive, high volume supplier industry. We therefore expect that Matra and TRT will increase their share of the market at the expense of Telic Alcatel. Many different types of terminal will also become available from suppliers not directly involved

in the Minitel programme to satisfy the market's need for enhanced facilities. We believe, however, that this will remain a small share for the foreseeable future.

It should be noted that the PTT's target is to install three million Minitel terminals by the end of 1986. It installed nearly 300,000 in 1984, and has to ship a further 2.6 million over the next two years to achieve its target. To achieve this will not be easy. It will need to increase its installation rate from 25,000 a month to an average of around 110,000 a month over the next two years. This can only be achieved gradually, so it is likely that, towards the end of 1986, manufacturing output may be as high as 300,000 units a month if the target is to be met. This will present the PTT with major logistics and policy problems. To market and install terminals at this rate will represent a major (if not unprecedented) task. And the DGT will need to consider what to do after 1986. If it takes steps (such as charging for terminals) to reduce its rate of investment this is likely to reduce demand, and this will cause serious problems for suppliers (and political problems for the PTT). We believe it is likely, therefore, that the PTT will deliberately seek to undershoot its 1986 target, that it will continue the Minitel distribution programme well beyond 1986, and that French suppliers will seek to penetrate markets outside France over the next two years. Given the large production volumes required to satisfy the PTT's needs, Telic Alcatel, Matra and TRT will have a significant competitive advantage over other European suppliers.

United Kingdom

Although the UK ranks second to France in terms of the number of installed videotex terminals, it remains the best served in terms of the number of suppliers and types of products.

Philips and Sony are the major manufacturers serving the business market and our research indicates that Sony may be increasing its market share at Philips' expense. It has a wider product range, and Philips' new business terminal, designed in the Netherlands, may not fully reflect the needs of the UK market.

We estimate that the numbers of adaptors being sold for both TV sets and microcomputers is increasing. These adaptors dominate the residential market, and are increasing their share of the UK business market. They will be of growing importance during the second half of the 1980s.

We envisage no major changes in the UK market for videotex terminals in the next year, apart from evolutionary product enhancements, mainly involving the addition of greater intelligence in devices. The steady trend towards an increasing use of adaptors is, however, likely to continue, with greater emphasis being placed on adaptors for popular business microcomputers, such as the IBM PC, ACT's Apricot and Sirius, and Apple IIs.

Germany

The German videotex terminal industry is growing, both in terms of numbers of suppliers and the numbers of CEPT-based terminals, despite the difficulties resulting from the continuing delays in the operation of the new Bildschirmtext service. The suppliers are faced with other problems: the slow production of chip sets for CEPT decoders, and the lack of experience of how the CEPT standard may affect user reactions and needs.

Loewe, is the major videotex terminal supplier in Germany, followed by Blaupunkt, Grundig and Telefunken. As part of its takeover of the Grundig group, Philips was obliged, for legal reasons, to sell its holding in Loewe, and Grundig is likely to introduce a range of terminals that compete with Loewe's products.

Many suppliers, aware that CEPT frames are more difficult to prepare and edit than Prestel or Teletel frames and that there is a need to build up a large CEPT database before the mass market for terminals will emerge, are producing sophisticated (and expensive) editing workstations. Some of these workstations include digitising cameras and graphics tablets to aid the production of complex graphics. It remains to be seen whether information providers will find these workstations necessary. We expect that the CEPT standard, and the added complexity of creating graphics, will accelerate users' growing awareness that text is more important than expensively produced graphics. A further effect of the more complex CEPT display standard is the use of high resolution screens in many of the CEPT terminals, thus further increasing costs.

Another early market opportunity lies in the conversion of the Prestel-standard terminals used for the Bildschirmtext trial to the CEPT standard. This is largely being funded by a programme of subsidies by the Bundespost.

Despite the problems inherent in the conversion from the Prestel to the CEPT standard, the Bundespost remains confident that there will be a rapid growth in the number of terminals connected to the system. Our research amongst suppliers would indicate that this optimism is, however, not necessarily shared by all of them. The development of the German market over the next few years will be watched closely by terminal suppliers, both in Germany, and in other countries planning to use the CEPT standard in future. The success of CEPT in Germany is critical to their plans. Only when German suppliers can achieve production volumes of around 100,000 units a year

will CEPT terminal prices begin to fall to the levels already achieved for Prestel-standard devices.

Suppliers' offerings and the technology of videotex terminals

In this section we highlight some of our main conclusions on terminal developments and market issues that relate to different types of terminals. The types reviewed are:

—Adaptors for television sets.

—Residential terminals.

—Integrated business terminals.

—Editing terminals and editing software for microcomputers.

—Adaptors for microcomputers.

—Multistandard terminals.

—Other types of terminals.

The section closes with a brief review of the growing interest in enhancing interactive videodisc systems to support videotex display and communication standards.

Adaptors for television sets

We believe that the market for television set adaptors for both domestic and business use will grow over the next two years. This increase in the use of adaptors has been, and will continue to be, dependent on improvements in the technology. We have already seen, in 1984, the production of adaptors with full alphanumeric keyboards and with infra-red remote control. The infra-red remote control facility, a feature of many of the early residential videotex terminals, which has also been used by IBM for its PCjunior, improves the ergonomics of terminals connected to the 'master' TV set in homes, and reduces the terminal 'footprint' on the business executive's desk. Adaptor developments may be important in another respect. They may pave the way for the convergence of videotex adaptors and portable computers. The addition of a liquid crystal display window, batteries, and a microcomputer to these adaptors would produce a new and potentially important generation of devices. And portable microcomputer suppliers are starting to add videotex interfaces to their devices. These products would appeal to one particularly important user sector for both videotex terminals and portable computers: salesmen working out of their homes.

Residential terminals

The future sales of integrated residential terminals remains uncertain and will, to a large extent, be dependent on whether or not the adaptor manufacturers can produce low-cost, small and reliable television adaptors. Another factor affecting the future of the integrated residential terminal will be the sales of teletext receivers. The new generation of teletext integrated circuits are microprocessor based and are, therefore, more flexible than the previous generation. We review these factors below.

The advantages of videotex television adaptors are that they can be used in both business and home environments, they require less storage space and they have a longer market life than TV sets which require regular 'styling' changes to appeal to fashion and status-conscious consumers. This has obvious appeal for TV retailers and home computer retailers. They also lend themselves to mail-order marketing techniques. Integrated residential videotex terminals have none of these advantages, and as long as the residential videotex market remains a small one, it is unlikely that the inherent cost advantages of built-in videotex facilities can be realised. As has been demonstrated in the past, the development of integrated residential videotex terminals represents a major investment and high risk venture for TV set manufacturers.

The development of more sophisticated teletext systems represents both a threat and an opportunity. The threat arises from the fact that these systems will significantly improve the quality and scope for broadcast teletext services, thereby allowing teletext to compete more effectively with videotex. On the other hand, the incorporation of increased microprocessor capability into teletext sets reduces the cost of adding a videotex capability.

It is still unclear what impact these two factors will have on the market for integrated residential videotex terminals. This is likely to become clear in West Germany over the next two years. The Bundespost and German terminal suppliers are relying on a rapid emergence of a residential videotex market and are building terminals designed to respond to this need.

Integrated business terminals

A number of improvements are being made to business terminals to meet the needs of increasingly sophisticated users. These improvements include the provision of more sophisticated autodiallers, and increased local storage and processing capability.

In France, many Minitel-type terminals are being produced with multiple-number autodiallers; an improvement on the first generation of sets. In the UK, terminals such as the Philips 3607 have the capability of storing up to 12 telephone numbers in memory. This is of particular value in the travel-trade where many travel principals and tour operators run their own private videotex systems, and travel agents need rapid access to many of them.

The decrease in cost of memory and processing components has allowed manufacturers to produce low-cost videotex terminals with some local storage and processing power. This fact, together with the increasing availability of microcomputers with a videotex capability and adaptors for microcomputers, will have an important influence on a number of videotex applications.

One example is the Thorn-EMI 6154 terminal which includes 28K bytes of RAM memory and an auto-answer modem. The terminal can be used to run short programs and store data as well as to store videotex frames. It also allows the terminal to receive information from a computer or other users at any time and is particularly useful for messaging. It is also useful as a data-entry device in retail outlets. A day's sales information can be entered and stored on the terminal for overnight access via a telephone call from a computer at the retailer's head office.

Terminals with a processing capability can also be used in other industries, for example insurance brokers. Current policy rates can be downloaded into the terminal's memory from a remote videotex system. These rates can then be used, together with an application program, to calculate policy details for clients.

We believe that the incorporation of increased processing and storage capability is the single most important innovation for suppliers of business videotex terminals. Suppliers that fail to incorporate these facilities into their future products will face severe competition, both from terminal suppliers that do and from videotex-adapted microcomputers. And if, as we expect, the manufacturers of Minitel terminals start to market their products aggressively outside France, then any cost savings resulting from not incorporating enhanced facilities will be far outweighed by the volume-manufacturing economies achievable by the Minitel terminal manufacturers.

Editing terminals and editing software for microcomputers

In most cases where files are large or data needs frequent updating, it is preferable to generate a videotex database automatically, either by reformatting existing computer files, or by using software to provide a 'pass-through' facility to software and files resident on another computer. Furthermore, whenever any significant amount of manual editing is required then intelligent editing terminals will be required for the reasons given below:

— Efficient manual editing requires word processing facilities.

— A large local storage capacity is required to minimise the frequency of connection to the database computer.

— Many private videotex software packages do not enable the IP to efficiently manage the database; it is often difficult to determine how a database is structured and, for example, deleting sections of a database can therefore often be very time consuming.

Several types of intelligent editing terminal equipment are now available. In the UK, Owl and Metrotel provide microcomputer-based editing systems which operate on Apple and Torch computers respectively. In Germany, systems are available from, among others, Dornier, BOD Daten-Systeme and Blaupunkt. In France, CAP-Gemini-Sogeti and others supply editing software for a range of microcomputers. Figure 3.13 lists some of the microcomputers for which editing software and adaptors are available.

As these editing packages have become more sophisticated, and have enabled the user to store many more pages of information, they have tended to evolve into small, microcomputer-based private videotex systems. It is, therefore, becoming increasingly difficult (and perhaps meaningless) to distinguish between sophisticated editing systems and microcomputer-based private videotex systems.

The market for editing terminals has remained strong in Europe over the past twelve months. It is, however, small and accounts for less than one percent of the total terminal market. The markets strength results from the fact that videotex is still in that phase of its development where there is a need to create the databases and services to support a mass user market. This is particularly true in France, West Germany and Scandinavia. We do, however, detect a marked

Figure 3.13 Microcomputers supporting videotex adaptors and editing software

Microcomputer	*Number of adaptors available*	*Number of editing software packages available*
IBM PC	3	1
Olivetti PC	1	—
ACT Sirius	1	1
ACT Apricot	2	1
Osbourne	1	—
Luxor ABC 80	1	—
CDC 110	—	1
NCR Decisionmate	—	1
Basis 108	—	1
Kontron	—	1
Munro 8820	—	1
Intertechnique 55	—	1
Future technology	—	1
Apple II	2	2
Torch	—	1
BBC Microcomputer	3	—
DEC Rainbow	1	—
Philips P2000/3500	1	—

shift in the market away from basic editing terminals with limited storage capability (typically only a few frames), towards the use of standard microcomputers with special editing software.

Adaptors for microcomputers

Some of the adaptors for microcomputers now available include software, special adaptor boards for microcomputers and modems, while others consist only of software and users are required to purchase modems from a different supplier. Care should be taken when selecting microcomputer adaptors. Some microcomputers are difficult to adapt, and many products do not give the user full access to all the normal videotex functions. For example, some Prestel-standard adaptors for the IBM PC do not display double-height text or a full range of colours.

Despite these cautionary observations, and the fact that the market for videotex-adapted microcomputers has grown less rapidly in 1984 than we had anticipated, we remain convinced that this remains a major growth market, and one that will come to dominate the videotex business terminal market (and perhaps the residential market as well) during the second half of the 1980s and beyond. With the continuing rapid fall in the cost of microcomputers, more suppliers will be including modems in their products to maintain their value-added content, and more users will wish to access remote databases from their microcomputers. And in most European countries, the PTTs have already, or are likely to, adopt videotex modem-pricing policies that favour videotex as a communication protocol.

Multistandard terminals

Multistandard videotex terminals are still relatively expensive and are provided by only a few manufacturers. For example, Barco provides a product which can display both Prestel and Teletel frames, and most of Loewe's range of CEPT terminals have a CEPT/Prestel switch so that the user can access either type of system.

It is likely that multistandard terminals will become more widely available. This increased availability is the result of a number of factors:

- —The 'EUROM' CEPT chip can operate as both a CEPT and Prestel decoder.
- —PTTs are giving a low priority to the development of network 'gateways' that can perform videotex protocol conversion.
- —No private videotex systems (as far as we are aware) can allow a database created for one videotex standard to be accessed from a terminal of another standard without some loss of information or graphics.
- —There is a small but growing demand from users wishing to access videotex systems in different European countries.
- —The use of adapted microcomputers as videotex terminals greatly reduces the cost of providing a multistandard capability.

Finally, it is likely that an increasing number of videotex terminals, particularly adapted microcomputers and integrated business terminals, will be able to support non-videotex communication protocols, particularly ASCII and IBM's 3270 protocols.

Other types of terminals

In this section we briefly review public-access videotex terminals, displayphones (telephones with a built-in keyboard and screen) supporting videotex protocols, and photovideotex terminals.

None of these types of terminal has proved popular in Europe to date, though it is likely that they will become more widely used as the available products and the market matures.

Public-access terminals, which may be either coin-operated or free, are designed to be located in public places, such as hotels, airports, stations, libraries and shopping malls. A small number have been installed in Europe and have usually proved acceptable to users. They also perform a useful function in increasing awareness of videotex and in generating high database accesses from a relatively small investment in terminals. Evidence from North America corroborates the experience in Europe. In our view, PTTs and service providers should not ignore the potential opportunities from using public-access terminals as a part of their overall marketing plans.

The displayphone market has been slow to take off, both in Europe and the US. It is essentially a business market and displayphones are usually more expensive than a separate telephone and low-cost terminal. Another factor is the popularity of business microcomputers that can offer more useful facilities to users than displayphones. They do, however, have a smaller 'footprint' than alternatives, and may also appeal to the status-conscious executive. Videotex displayphones are available from a number of suppliers, including Northern Telecom, Plessey, STC, Siemens and Alcatel, and their popularity will undoubtedly increase as more advanced digital PABXs are installed (some have so many features that a display screen is needed to help users exploit them effectively), and as more senior managers become users of videotex.

Prototype photovideotex terminals have been available in the UK and elsewhere since the early 1980s. They have, however, failed to attract real market

interest largely because of their high cost and slow picture build-up rates. Both of these objections will be overcome during the late 1980s and 1990s as the price of memory chips falls — it has historically halved every four years — and as telephone networks are digitised, thereby permitting a 50-fold increase in data-transmission speeds over the telephone network.

During 1985, British Telecom will launch Europe's first commercial photovideotex service, using a terminal based on the IBM PC and communicating over its ISDN (public digital network) service. But both terminal and communication costs will be high — and for the typical user will probably be only slightly under $10,000 a year per terminal installed. Early applications are expected to be either very specialised or experimental.

Interactive videodisc and videotex

While it is beyond the scope of this report to examine this combination of technologies in any depth*, there is a growing interest in interactive videodisc technology, and videotex is frequently adopted as the display and communications standard for the text and data that is used in conjunction with the pictures stored on the videodisc player. A number of trial applications in the hotel, holiday, mail order, educational, retail and automobile industries have already been implemented, and the early results look very promising. We believe that the convergence of videodisc, microcomputing and videotex technology is one that will be of major significance to a wide range of industries, primarily in a marketing environment, and that the market for interactive videodisc systems will grow rapidly over the next five years.

VIDEOTEX BUREAU SERVICES

Videotex bureaux are a relatively small but very important part of the European videotex industry. In total, they accounted for only around 16% of total spending on videotex products and services in Europe, compared to about 56% for terminals and 28% for private videotex system hardware and software. This relatively small share of the market understates their real importance:

- —Bureaux provide a relatively low-cost and minimum-risk path into the videotex industry for small organisations, or organisations with little or no experience or videotex.
- —In future, as the videotex industry grows and matures, spending on bureau services will increase. By 1988, we estimate that spending on bureaux will account for 38% of the European videotex market (30% for public PTT bureaux and 8% for independent bureaux).

Videotex bureau services are provided in many countries by both the PTTs (generally called 'public' videotex services) and independent private commercial organisations, usually, but not exclusively, the larger timesharing bureaux.

In the late 1970s and early 1980s it was appropriate to distinguish between the PTT-run bureaux and networks and the services offered by independent organisations. The PTT-run services were then of such overwhelming dominance (and in some countries still are) that they required to be treated independently in any analysis of the European videotex market. This situation is changing. The domination of the videotex market by the 'public' services has begun to weaken in most countries. While no single independent videotex service has yet grown to be larger than the public services in the countries in which they operate, the combined size and marketing effort of the many bureau services that operate in Europe means that they now represent a significant force in the market. They can and do compete effectively with the public PTT-run services in a number of countries.

In this section, we analyse the videotex bureaux on offer in Europe. We include in our review both 'public' and 'independent' services, the types of services on offer, and list some of the more important bureaux. Finally we provide some insight and guidance for potential users of these services, to assist in their selection.

The number of videotex bureaux in Europe

There has been an increase in the number of independent videotex bureaux over the past 12 months. In this year's survey, we have identified 87 videotex bureaux as compared with 65 in 1983 and we estimate that there are a further 40 in existence, mainly in France. These bureaux are listed in Figure 3.14. In addition to these there are 13 public PTT-run videotex systems in Europe. Most of the public systems, which are listed in Figure 3.15 offer a full range of bureau services.

Public PTT bureaux

The European PTTs have chosen to implement their videotex services in three different ways. These are:

- —Centralised systems, with information held on, and services offered from, powerful central computers. Examples include Viditel and Videotel in the Netherlands and Italy, respectively. (The Prestel service in the UK can be treated as a centralised system, because IPs only use a central computer,

*It is however reviewed in greater detail in Butler Cox's report "Information Technology: Its Impact on Marketing and Selling". It also forms a part of the ESCO case history in this report.

Figure 3.14 Independent private videotex bureaux in Europe

Bureau name	*Country*	*System configuration*	*Comments*
AAAA	Netherlands	Systel on Perkin-Elmer 3230, 240 MB disc storage	Applications include: transport, book ordering, sales accounting – IPs pay $1670 p.a. for every 1,000 frames stored
ADP Network Services	UK, Netherlands, France, others	IGS-1 on DEC VAX	Applications now offered are specifically targeted at the automotive industry. A general videotex facility is no longer being marketed by ADP
AGI	Italy	Aregon	Bureau for ENI group of companies
Aircall Computer Services	UK	Betex 3000 on HP 3000	
Alldata Service GmbH	West Germany		
Allen Computer Services	UK	Computex	
Anglia Time-sharing Services	UK	CVS on Rediffusion hardware	
ARIEL	France	ARCOM and associated products on IBM 38	
AVS-Intext	UK	Mistel on Systime hardware	
Baric Computer Services	UK	Bulletin on 2 x ICL 2966, 20 MB main store and 2,000 MB disc store on each	Baric offers a range of videotex services; system design consultancy, etc. In particular, services are offered to the following industries: travel, medicine, pharmaceuticals, finance and property. Standard charges are $0.07/minute connect time for users and for IPs $6.30 per frame p.a.
Beaufort Computer Services	UK	Thorntel on ICL hardware	
Bell Telephone Manufacturing Co.	Belgium	Mistel on DEC hardware	
BTX Partner	West Germany	Own software (BTX-KOS) on DEC VAX	Based in Hamburg. Access via BTX-gateway, Datex-P or PSTN. Clients in banking, transport, tourism, manufacturing and import/export
CAP-Sogeti-Logiciel	France	Multitel 20 on Bull hardware	
CAS	West Germany	Own software + Dabit on IBM 3033	Provides a formatting service, networking via BTX gateway, database management and consultancy
Central Beheer	Netherlands	IVS-3 on DEC hardware	
Centrefile	UK	CVS on Rediffusion hardware	
CGI	France	IBM	
Cognotec	Ireland	Mistel on DEC hardware	
Compas	West Germany	IVS-3 on DEC hardware	
Control Data	West Germany	CAP-Gemini-Sogeti	
CTL	France	HP 9000	
Datasolve	UK		See Thorn-EMI
Datema	Sweden	Systel on Perkin-Elmer hardware	
Didot Bottin-Duplex	France	Multitel 20 on IBM 4341	Services include consultancy and application development
DISC	UK	Viewbase on Microdata hardware	
Editel	Belgium	IVS-3 on DEC VAX 11/780	This service, which uses Telemedia, offers access to a stock exchange information database. Annual subscription is $1,445
Eurodial (Télésystèmes)	France	Télésystèmes on HB 66/40	Access is available on PSTN, also Transpac, Tymnet, Telenet and Euronet
Finsbury Data Services	UK	IVS-3 on DEC hardware	
GAD	West Germany	Gateway on IBM hardware	Particular applications in banking and agriculture. BTX-gateway access provided
GCAM-Artemis	France	BRS on 2 x IBM 370/158	A range of services are provided. Access from PSTN or Transpac, Euronet, Tymnet, Telenet or Telex
GEC Computers	UK	Viewdata 4000 on GEC hardware	
Geest Computers	UK	Bulletin on ICL hardware	

Continued on next page

Figure 3.14 Independent private videotex bureaux in Europe (continued)

Bureau name	*Country*	*System configuration*	
GEISCO	France	Gateway on Bull hardware	GEISCO provide full consultancy services: project analysis, design and implementation. Access via PSTN, Transpac or the GEISCO network
GFI-Télésource	France	Telesource software on HB Mini 6	A range of banking and office communications services are provided
GSI-CATI	France		
Hanger Lane Computing	UK	IVS-3 on DEC, PIII on IBM	
Howson Algraphy	UK	Incotel on Honeywell	
IBM Deutschland	West Germany	IBM software and hardware	
IBM-Information Network Services	UK, France, Netherlands, Belgium	Own software on IBM	Consultancy, from application design to implementation, can be provided. Access via PSTN or via IBM's network
IBM Schweiz	Switzerland	IBM software and hardware	
ICL	Netherlands	Bulletin on ICL hardware	See also Baric (UK)
IDO	West Germany	Betex software	
Institute for Industrial Research	Ireland	IVS-3 on DEC hardware	
Intercom Data System Ltd.	UK	Mistel on DEC (3 x VAX 11/750) 500 MB disc storage	Consultancy, development and support services are offered. Access via Prestel gateway. Applications include teleordering of company shares
ISTEL-Viewshare	UK	IVS-3/IVS-100 on 2 x PDP 11/70, 2 x VAX 11/750, 4 x VAX 11/780	Bespoke application development available, including consultancy and software development. Application packages are available for the travel industry and sales order entry
Kommunales Gebietrechenzentrum	West Germany		
Liber	Sweden		
Mannheimer Morgen Rechenzentrum	West Germany	IBM	
NCC	UK		
NCR Datacentre	Switzerland	NCR Videotex	
NMPP	France		
NOB Wegtransport Holding BV-Tradicom	Netherlands	Megaview on Perkin-Elmer	Consultancy, software development and frame editing services are available. Applications include information on roads and freight markets
Norsk Centre for Information-Teledata	Norway	Mistel on PDP-11, 1 MB main memory, 126 MB disc storage	Consultancy, software development and frame editing services can be provided. A particular application area is the 'Datafreight' service for the transport industry. IPs pay an annual fee of $240 and $3,000 p.a. for 200 pages. Users are charged $3 per month
Nova Automation AG		Betex 3000 on HP 3000, 1 MB of main memory	Consultancy, software development and frame editing are all provided. Particular application areas include employment and the car market
Orda-B	Belgium	Mistel on DEC VAX 750, 4 MB main memory, 800 MB disc storage	Software development and frame editing is offered. Particular application areas include insurance, medicine, estate agents, architects
Patric Videotex	Ireland	Rediffusion	
Philips	Italy		
PG Group/Tietovoima	Finland	Systel on Perkin-Elmer	Consultancy, development and training are offered
Postel	Sweden	Systel on Perkin-Elmer	Consultancy and software development is supplied, also database creation and management. Facilities include advanced messaging, keyword search. Terminals are supplied
Prysesa	Spain	Modcomp	Specialises in travel sector
Questel	France	Télésystèmes	
Radio Schweiz	Switzerland		

Figure 3.14 Independent private videotex bureaux in Europe (continued)

Bureau name	*Country*	*System configuration*	*Comments*
Resource Computing	UK	Vision 32 on Perkin-Elmer hardware	
Ringier/Agentur 1818	Switzerland	STR software	
RZ Südwest	West Germany		
Scicon	UK	IVS-100 on DEC VAX 11/750	Consultancy and application development services are provided. One particular application is videotex access to bibliographic databases
SEAT	Italy		
SERPEA	France		
SGIP	France	Intertechnique, Bull Mini 6, DEC VAX 750	
SGZ	France	Multitel on Bull DP 58 and IBM 30XX, 43XX	The bureau runs INFOTEX software allowing telesearch, messaging, etc., as well as access to CICS applications
SIE	France		
Siemens AG	West Germany	Siemens	
SLIGOS	France		
Teledataservice Rechenzentrum	West Germany		
Telemedia	Belgium	IVX-3 on DEC, PDP 11/44 + VAX	
Telset (12 services)	Finland	Mistel on DEC, Systel on Perkin-Elmer	Database creation and maintenance services are provided
Thomson	France		
Thorn-EMI, Datasolve	UK	IBM gateway software IBM 3033 + Amdahl V6	Access to the bureau is via Prestel gateway. Applications include a holiday reservations system and a booksellers' ordering system ('Reservision' and 'Teleordering')
UCSL	UK	IGS-1 on DEC hardware	
Verlagswesen	West Germany		
Videotel	France	Stèria on Bull hardware	
Visualdata	Spain	Aregon	

Note: This list is not exhaustive. It excludes system suppliers who may offer trial facilities to prospective purchasers of their software, and suppliers of single application information services.
We estimate that there are a further 40 bureaux in existence, of which approximately 30 are in France.

even though the data base is replicated on distributed computers for user access.)

— Network systems, whereby the PTT supplies a general network facility with terminal handlers and nodes, through which users can access information and services on independent external computers, though one or more of these computers may be used by the PTT to offer bureau services. Examples include the new services under development in Belgium and Norway, as well as the French Teletel network.

— Combinations of the above approaches providing a network for external computers but also providing, as an integrated feature of the network design, information and services. The best example is the Bundespost's Bildschirmtext service in Germany.

Although the ways the PTTs have chosen to implement their videotex services has differed, they all have three features that distinguish them from independent videotex bureaux:

— The majority (if not all) of users in a country will be registered onto the PTT-run service.

— The ability to provide local-call access to a large geographical area, and usually to over 60% of the population of a country over a network run by the bureau operator.

— The ability to deal with a very large number of concurrent users, and high system reliability and access response times.

These are important system characteristics for many bureau clients and it is not surprising that the PTT bureau services have many more information providers than independent bureaux in most European countries.

Figure 3.15 Videotex systems operated by the PTTs

System name	*Country*	*System configuration*	*Comments*
Bildschirmtext	Austria	Siemens software running on GEC computers	A bureau service is offered
Bildschirmtext	West Germany	IBM developed software and hardware. The trial service using Prestel software and running on GEC computers is still operational but scheduled to be withdrawn in 1985	A bureau service is offered
Datavision	Sweden[1]	Software from AU-Systems, running on Ericsson computers	A bureau service is offered
Ibertex	Spain	The Spanish PTT has developed its own software	For the new CEPT system, a bureau service will be offered, but the service will otherwise follow the French Teletel model
Prestel	UK	Network of seven GEC 4000 computers. 490 MB Filestore	Consultancy and frame editing services available. Facilities include messaging, telesoftware, home banking, closed user group services and many others
PTT System + Telset (12 services) companies	Finland	Videotex 1000 (VTT) on Hewlett Packard	Public services in Finland are operated by the PTT as well as the 12 Telset companies which act as independent bureaux
RTT System	Belgium	Mistel 3 on DEC, VAX 11/750 456 MB disc storage	Consultancy and software development available. The bureau service is offered by Bell Telephone Manufacturing
Teledata	Denmark	2 x Christian Rovsing CR 800, each with 256 KB main store, 2 x 300 MB disc	A bureau service is offered. Consultancy and frame editing services availble. Establishing fee = $3,800. Quarterly fee = $1,425. System use $4.75/minute
Teledata	Norway	AviNet on Data General. During 1985-86 a new service based on CAP-Gemini-Sogeti's Multitel software and Tandem Computers will be offered	A bureau service is offered
Télétel	France	Network based on Télésystèmes' TSL 230s	The system cannot be considered as a bureau service. Only a network is provided
Videotel	Italy	Prestel software on GEC computers	A bureau service is offered
Videotex	Switzerland	STR and Infomart software on DEC VAX computers	The PTT offers only a data transmission network
Viditel	Netherlands	GEC 4000 computers running modified Prestel software	A bureau service is offered. Consultancy, software support for gateways, database creation all available. Users fees = $3 per month, $0.03 per minute. IPs $3,000 p.a. plus $3 per frame p.a.

Note: [1]The Swedish Post Office operate a system called 'Postel'. This bureau is listed in Figure 5.1.

The main weaknesses of the PTT-run services compared to independent bureaux are:

—A lack of flexibility in terms of system features, services offered and commercial terms.

—A generally bureaucratic approach to customer liaison and support, resulting, in some cases, in lower service levels.

—Fewer system features, for example in terms of transaction-processing capability, database-access options and access-security features.

The majority of European PTTs have decided, as a matter of policy, not to provide information services themselves, other than those directly related to the business of the PTT (such as a telephone directory service) and those necessary for the successful operation of the bureau and network, such as indexes to the information services offered by their bureau clients and on external computers connected to their network. There are, however, exceptions of which the most notable is Prestel. British Telecom (BT) has established a number of joint-venture information services, in conjunction with independent information providers. Not only does BT see this as a potential source of long-term revenue, but as a crucial feature of its videotex business activity. Without these services, BT believes it would be unable to stimulate the market, nor would it be in full control of its own market direction and future growth. Inevitably, this policy has led BT into direct competition with some important information providers in the UK.

Independent videotex bureaux

There are now more than 100 independent videotex bureau services operating in Europe. They represent the single largest sector of the private videotex market, accounting for around 15% of the private systems market, and are running virtually all the different types of private videotex systems available in Europe. They constitute an important marketing force and have made a considerable contribution to the success of videotex in Europe.

The reasons why organisations might wish to use an independent private videotex bureau were extensively discussed in our earlier videotex report on private videotex systems. These reasons are summarised below:

—Private bureaux allow organisations that are new to videotex to gain experience of using private videotex systems at low risk and cost.

—They make private videotex system facilities available to organisations which might otherwise be unable to afford to install their own systems.

—They usually provide a full range of support services, including consultancy, software development, frame design and database creation.

—They will, where mutually beneficial, establish joint-ventures with their clients to exploit the market.

—They may be able to offer 'packaged' systems for certain applications, thereby saving their clients the cost of developing their own interactive systems.

—They may offer turnkey or facilities management services to their clients wanting to install private videotex systems.

In this section we present an overview of the different types of bureau services available in Europe. We also review four videotex bureaux as case histories, and consider their offerings and the different ways in which they have chosen to position themselves in the marketplace.

Overview of bureau services available in Europe

France has many more independent videotex bureaux than any other country — around 42% of all bureaux in Europe. The distribution of bureaux by country is shown in Figure 3.16. The reasons for France's dominance of the European videotex bureau industry are:

—France has traditionally had a strong bureau industry.

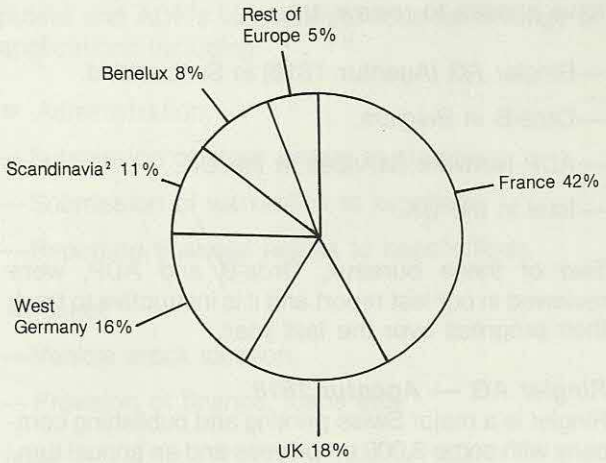
—The French PTT does not offer its own public videotex bureau service and has actively encouraged the establishment of bureaux.

—The Minitel terminal distribution programme has created greater awareness of videotex in France than exists in other European countries.

Videotex bureaux have been established for a number of different reasons, including:

—To promote the use of a private videotex system. These bureaux are frequently run by a videotex hardware or software supplier, or their agents. Examples include GEC and AVS-Intext.

Figure 3.16 The distribution of independent videotex bureaux[1] in Europe by country



Note: [1]We include the 40 bureaux in addition to those listed in Figure 5.1.
[2]Includes 12 Telset bureaux in Finland which constitute 80% of the bureaux in Scandinavia.

—To add a videotex access facility to an existing bureau or network service. Examples include GEISCO and ADP Network Services.

—To earn bureau revenue using the same computer facilities and skills required to offer a publicly-accessible database service. (This is especially common in France.)

—To exploit the videotex bureau market opportunity per se.

Many bureaux, rather than simply offering a generalised videotex service capability, target their services at particular markets. Examples include:

—Banking (GFI Telesource).

—Freight/Transport (NOB Wegtransport).

—Holiday reservation (Datasolve, Istel, Baric).

—Pharmaceuticals (Baric).

—Motor industry (ADP, Nova).

Over the next few years, we expect the European videotex bureau market to develop strongly. In particular, we expect:

—That the number of bureaux will increase, especially in countries where public videotex services are just becoming established, and in France and Germany.

—That the most successful videotex bureaux will be those that offer applications targeted at a specific industry or market sector.

In the following sections we review four bureaux as case histories. They are broadly representative of the many services available in Europe. The bureaux we have chosen to review are:

—Ringier AG (Agentur 1818) in Switzerland.

—Orda-B in Belgium.

—ADP Network Services in the UK.

—Istel in the UK.

Two of these bureaux, Orda-B and ADP, were reviewed in our last report and it is instructive to track their progress over the last year.

Ringier AG — Agentur 1818

Ringier is a major Swiss printing and publishing company with some 3,000 employees and an annual turnover of about SF500 million ($210 million). Ringier first started working with videotex in 1979 when its German subsidiary took part in the German PTT's Bildschirmtext trial. When the videotex trials started in Switzerland, Ringier became involved in that country as well. Early in 1984, Ringier's Swiss videotex division began to trade under the name of Agentur 1818. By 1985, Agentur 1818 hopes for revenues in excess of SF500,000 ($210,000).

The activities of Agentur 1818 cover consultancy, design, implementation and operation of videotex applications, mainly running on its own bureau system.

Agentur 1818's videotex system runs on a Digital Equipment VAX 11/750. The videotex software was produced by Standard Telefon and Radio, based on the system developed by Infomart of Canada. (STR were also responsible for setting up the public videotex operational trial in Switzerland.)

The main aim of Agentur 1818 is to offer Ringier's advertisers a complete marketing and distribution service, through both videotex and traditional printed media. Agentur 1818 also offers some information on behalf of Ringier in the book publishing area.

The majority of applications on Agentur 1818's external computer are aimed at the general public. There is already a range of applications, three of which are outlined below:

—For a mail order company, Agentur 1818 runs an application for requesting catalogues, and for ordering a limited range of goods and services.

—For a tour operator, Agentur 1818 offers a holiday catalogue ordering facility. In the future, this may be extended to allow tours to be booked. The system is aimed at the general public, rather than travel agents, and it remains to be seen to what extent the public will use an online tour-booking facility.

—For a bank, Agentur 1818 operates a small application through which VISA application forms can be requested. This system could be expanded in a number of ways, for example to offer investment advice.

At present, Agentur 1818 is making a loss on its videotex operation though it hopes to be in profit within a few years. Agentur 1818 obtains its revenues from the advertisers and information providers. It designs and implements videotex applications for a fee, and also charges for running the applications on its system.

The customers of Agentur 1818 hope to earn revenues from using videotex as a new marketing and distribution channel for their products and services. Agentur 1818 does not believe that its customers will derive significant revenues from selling information per se: the number of end users, and the value of the information offered, are generally too low to make the sale of information by videotex commercially viable for the foreseeable future.

Agentur 1818 sees its future prospects as being uncertain. The decision on the full public videotex system in Switzerland has yet to be taken, and both information providers and terminal users will be cautious until the decision is taken. To some extent this uncertainty favours Agentur 1818 because its clients are unlikely to invest in their own private videotex systems. It does, however, present serious problems in attracting new clients. If the public videotex system gets the go-ahead, and if terminal prices fall sufficiently, then, Agentur 1818 believes, end users will buy videotex-compatible televisions in volume and a mass market may emerge. Should this happen, many information providers will move away from the bureau environment and will set up their own systems to interface directly with the public videotex network.

Orda-B

Orda-B, one of a handful of bureaux in Belgium, was described as a case history in our report on private videotex systems. At that time, however, it had only one client. It is interesting, therefore, to examine how this bureau has developed over the past year.

Orda-B now has 12 organisations offering services using the bureau. In addition, there are around 100 clients (sub-IPs or advertisers) using the services provided by the 12 main operators. Their clients include organisations in the following sectors:

—Property.

—Architects/construction industry.

—Medicine.

—Publishing.

—Insurance.

—Distribution.

Orda-B's videotex system, which uses the Mistel software package, runs on a 32-port VAX 11/750 and system users have access to an IBM 3033 mainframe computer to run conventional DP applications. There are plans to introduce a second VAX minicomputer during 1984.

In common with some other videotex bureau operators, Orda-B also sells videotex software. In this way, it believes it can capitalise on the opportunity to migrate its bureau clients onto their own private videotex systems in due course.

ADP Network Services

ADP is a US multinational computer bureau, the largest in the world. In the UK, ADP has been involved in Videotex since July 1982. Its activities include the marketing of the IGS-1 and IVS-3 videotex software packages developed by Aregon as well as offering bureau services.

In 1983 ADP was targeting its videotex offerings at five industries:

—Pharmaceuticals.

—Transport.

—Insurance.

—Brewing.

—Automobile manufacturing.

During 1984, however, a reorganisation at ADP has caused the company to rethink its plans*. Although it will be continuing to service all existing videotex clients, and is still able to offer a range of videotex services, including the provision of microcomputers, ADP has decided to focus its future marketing activity exclusively at the automobile industry, and is developing a range of products and services for this sector of the market.

A number of different types of organisation are being approached. They include:

—Motor manufacturers.

—Finance houses.

—Motor dealers.

Motor dealers will be provided with microcomputers with a videotex capability and specially-written software. They will then be able to use these microcomputers and ADP's videotex services for a range of applications including:

- Administration:

—Submission of stock orders to suppliers.

—Submission of warranties to suppliers.

—Reporting financial results to head offices.

- Sales:

—Vehicle stock location.

—Provision of finance, loans etc.

Istel

Istel, a systems house, bureau and network operator based in the UK, is a wholly owned subsidiary of British Leyland. Istel offers a range of services including a value added network (VAN), electronic mail, timesharing, financial and engineering systems and a videotex bureau.

The videotex bureau called Viewshare uses the Aregon IVS-3/IVS-100 package running on two DEC PDP 11/70s, two VAX 11/750s and four VAX 11/780s. Users have access to a range of facilities including sales order-entry and travel systems which may use a link to an IBM 4033 mainframe.

The bureau now has 30 service providers on its system in a range of industries including:

—Automobile industry.

—Travel.

—Agriculture.

—Chemicals.

The use of Istel's value added network, called Infotrac, together with the videotex bureau is an attractive package to organisations with a large number of users spread over a wide geographical area.

Through the use of the VAN, the ability to access the system at local call tariffs is provided to many areas in the UK. This facility can greatly reduce the telecommunications cost to the user. Organisations can also connect their own computers to Infotrac.

VIDEOTEX NETWORKING

A network is an electronic communication system that links terminal devices (including the ubiquitous telephone) to each other and/or to computers. In the case of videotex, networks are required to give video-

*This reorganisation has had major significance for ADP and has resulted in a substantial cut back in its videotex operations and ambitious plans. The reorganisation's primary objective was to bring the operation into profit.

tex terminals access to the computers holding the information or offering the processing services that terminal users wish to access.

This section starts with a general discussion of different types of networks before reviewing the alternative videotex networking options available to system operators and users. It then lists the most important videotex network suppliers in Europe, including both PTT and independent suppliers, and goes on to examine the scope for implementing private and international data networks. The section closes with some basic rules-of-thumb for selecting between networking alternatives.

Network types

There are many different types of network but they can be classified according to whether they are designed primarily to support voice or data traffic, and whether they are basic or value-added networks (VANs). (Basic networks simply transport information between two points on the network; value-added networks perform additional functions that are of value to network users, such as allowing incompatible devices to communicate with each other.) Figure 3.17 illustrates this classification and gives some examples of different types of networks.

A useful distinction can also be made between the 'public' networks offered by the PTTs, and 'private' networks used in-house by large organisations, or offered to third parties by commercial bureaux. In all European countries except the UK (and in certain respects some Scandinavian countries), the national PTTs have a statutory monopoly over the provision of network services. Commercial organisations are usually not able to offer services that compete directly with the PTT. (For example, computer bureaux are permitted to provide network services to give their customers access to the bureaux' computers. They are not usually permitted to offer services that allow their customers to communicate between one another, or to access computers that are not operated by the bureaux.) The PTTs have, in special situations, allowed the development of independent shared networks. The best known networks of this type in Europe are the SWIFT network, used to handle international banking transactions, and the airlines' SITA reservation system network.

The situation in the UK is different. The British Government decided in the early 1980s that it would be in the national interest to deregulate telecommunications. As a result, it has granted a number of licences to commercial organisations to offer value-added network services in competition with British Telecom, the national PTT. Some of these networks support videotex, the most widely publicised being the networks offered by Baric (the computer bureau subsidiary of ICL) and Istel (the computer services arm of British Leyland). Figure 3.18 lists organisations in the UK that have announced VANs.

Figure 3.17 Examples of different types of network

	Voice	*Data*
Basic	The public telephone network	An in-house leased line data network
Value added	A voice messaging service	A videotex gateway network

Figure 3.18 VANs operators in the UK

Company	*Service*	*Category of VANS*
ADP Network Services		Mailbox Videotex
AVS Intext Baric Computing Services	Context Holidaymaster	Videotex Automatic ticket reservation and issuing
BT Audioconferencing	Audioconferencing	Conference calls
Business Switchboard and Cable and Satellite Telecommunications		
Darome International	The Darome Connection	Conference calls
Datavision Telesystems		Videotex
Datec	Envoy Viewbase	Mailbox Videotex
Digital Paging Systems	Paging system	
Essex Telecommunications	Common base station	
IBM	INS	Videotex
Istel	Comet Viewshare	Mailbox Videotex
Kensington Datacom	One to One	Mailbox
MDS Computer Systems	WINC	Mailbox
Nomura International	Capital	
Ocean Transport and Trading		
Prestel	Prestel	Videotex
Seeboard	Credit and load management system	
Telecom Gold	Telecom Gold	Mailbox
Telecom Tan	Telephone marketing	
Telephone Broadcasting Systems	Telemessaging Telemarketing	
Ticketmaster	Ticketmaster	Automatic ticket reservation and issuing
Travicom	Travicom	Automatic ticket reservation and issuing
Vitel Group of Companies		Videotex

Source: Communication Management, September 1984.

Videotex networking options

The videotex networking options most likely* to be used by videotex users and systems operators are:

—The public telephone network, to access a videotex computer system directly.

—An in-house telephone network, to access an organisation's own videotex system.

—The public telephone network, to access a data network (whether basic or value-added) that supports videotex protocols and provides access to the required videotex system. The data networks are typically the public packet-switched network or a private data network.

—The public telephone network, to access a special videotex value-added network (such as a public gateway service) and then, optionally, via another data network to the videotex system required.

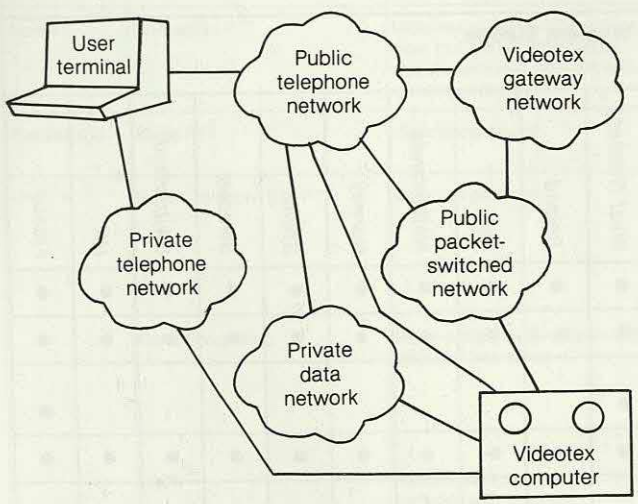
These options are shown schematically in Figure 3.19, and the main advantages and disadvantages of each network option are listed in Figure 3.20.

In some European countries, not all of these options may be available or economically viable. For example:

—In Belgium, the quality of the public telephone network is such that in certain areas it may be impossible to use the public telephone system to access a distant videotex system directly.

—In France, the PTT has opted to provide videotex access to their public packet-switched network, so no separate videotex gateway network option is provided.

Figure 3.19 Videotex networking options



*There are a few cases where videotex terminals have been directly connected to data networks (thereby avoiding the need to use the telephone network) or broadband cable networks. These are, however, so untypical that we do not consider them further in this report.

Figure 3.20 Advantages and disadvantages of different networking options

Network option	*Advantages*	*Disadvantages*
Public switched telephone network	— near-100% market coverage — immediately available — well understood — little investment required — fast implementation — flexible — international connections	— high transmission error rate — high cost over long distances
Private telephone networks	— not installed in all organisations — little investment required to connect — fast implementation — very low marginal cost where network is justified for voice traffic and has surplus capacity — gets round PTT modem regulations in some countries	— high transmission error rate — inflexible — restricted to in-house users
Public packet-switched networks	— very low transmission-error rates — distance-independent charging — low usage cost — users only pay cost of call to the network — international connections — reverse-charge (collect) calls possible	— high initial investment — limited geographical coverage in most countries — requires heavy usage to justify fixed operating costs — user unfriendly (unless supported by videotex PADs)
Private data networks	— low transmission-error rates — low marginal cost where network already exists and and has surplus capacity — can give a competitive advantage	— heavy investment in remote videotex concentrators required — high investment if network has to be established, and needs heavy loading to be cost justified
Special videotex gateway networks	— user friendly — local call access — buffer against peak loads — switching capability — central user billing — marketing vehicle to reach new end users — users need only pay for local call to public service — information can be held on public service	— heavy initial investment in some countries — facilities controlled by PTT (or VAN provider) — cost of value-added services may be too high — needs heavy usage to be cost justified

The availability of the various videotex networking options is shown in Figure 3.21.

Videotex network suppliers

In this section we list some of the more important videotex network suppliers. They include the PTTs running gateway networks and those providing access to private videotex systems over public packet-switched networks. They also include those bureau and independent network vendors who offer access to third-party computer systems.

Figure 3.22 lists the main European videotex network suppliers and provides an outline description of the network services available.

Private videotex data networks

An increasing number of private videotex system operators are choosing to develop their own videotex data networks to give access to their systems. They include commercial computer bureaux, such as ADP, Baric, Istel, IBM, Datasolve and GFI, As well as non-bureau organisations such as Thomas Cook, CNN and Thomson Holidays. There are a number of reasons for this:

— It is relatively inexpensive to convert an existing data network to accept videotex access and, with the low cost and increasing numbers of installed videotex terminals, the commercial advantages of attracting this terminal user base are increasing.

— Organisations that already have or anticipate a high usage of their private videotex systems are finding it more cost effective to run their own networks than use existing network suppliers, such as the PTT-run videotex gateways.

— Private videotex system operators may be able to offer their users — often their mainstream business customers — a better or cheaper communication service over their own videotex network. This can give them a competitive market advantage.

— The rapidly growing number of mainframe-based private videotex systems require to be front-ended by microcomputer-based videotex communications processors, to perform such functions as port-access sharing and protocol conversion. These communication processors can be located at the mainframe or remotely. Increasingly, they are being installed remote from the mainframe in order to minimise communication costs.

The main suppliers of the communications equipment needed to build a videotex network are listed in Figure 3.23.

In the UK (though nowhere else in Europe yet), organisations that have created videotex data networks to meet their own requirements are able to offer the use of their networks to other system operators, although they do need to obtain a value-added network service licence before they can do so. We expect that the videotex network service market will grow very rapidly over the next five years and that the provision of videotex networking services therefore represents

Figure 3.21 The availability of videotex networking options in Western Europe

	Austria	Belgium	Denmark	Finland	West Germany	Ireland	Italy	Netherlands	Norway	Spain	Sweden	Switzerland	UK	France
Public telephone networks	●	●[4]	●	●	●	●[2]	●	●[1]	●	●	●	●	●	●
Private telephone networks[3]	●	●	●	●	●	●[2]	●	●[1]	●	●	●	●	●	●
Public package-switched networks adapted for videotex		●			●									●
Private data networks[5]	●	●	●	●	●[2]	●[2]	●	●[1]	●	●	●	●	●	●
Special videotex gateway networks	●[6]		●[6]			●		●[6]	●			●[6]	●[6]	●

Notes: [1] Only access to the public videotex service is allowed. All private systems must be accessed via the public service gateway.
[2] Unlikely to be an economically viable option.
[3] Only to access in-house private videotex systems.
[4] Line quality may cause problems in use.
[5] In all countries except the UK, private data networks are only allowed to give access to the videotex system operators own customers and staff.
[6] Trial services available.

Figure 3.22 Videotex network suppliers in Europe

Country	*Network supplier*	*Type of network*	*Videotex standard*	*Network description and comments*
Austria	Austrian ITT	Videotex gateway	Prestel, CEPT	Test service only. Commercial service under construction. Value-added services include indexing and billing
Belgium	RTT (Belgian PTT) BTM provide some value added services associated with network	Packet-switched network with videotex interface	Prestel, later Antiope and CEPT	Value-added services include identification, service index and switching, mail box and billing. Available end '84 with the capacity to handle 72 simultaneous calls to 4 videotex systems. Within a year it is planned to offer 300 simultaneous users capacity, and access to 100 services on 15 computers
Denmark	Danish PTT and regional telephone companies	Videotex gateway	Prestel	Test service only linking some 2,000 terminals to 5 videotex computers. Value-added services include indexing, billing and access to information
France	DGT (French PTT)	Packet-switched network with videotex interface	Antiope	Limited value-added services including service identification and switching. Built to support the electronic directory and minitel terminal distribution programs, but all handles traffic to private videotex systems. The DGT pioneered this type of network architecture. The network can support over 2,000 simultaneous calls
Germany	Bundespost (German PTT)	Videotex gateway	CEPT	The Bundespost pioneered videotex gateway networks in the early 1980s. The network does not yet provide national coverage but is being rolled out during 1985. A hierarchical structure of communicating and service computers offering such value-added services as indexing, routeing and billing. No user charge for network usage, but service providers must bear the costs of linking to the videotex network over the DATEX-P packet-switched network. 80 service providers are attached to network. The Bildschirmtext gateway interface is very complex
Italy	SIP	Videotex gateway	Prestel	Identical to Prestel gateway in the UK. The network offers national local call access, and has 8 service computers attached. It is the only network that can be used legally to access private videotex systems
Netherlands	Netherlands PTT	Videotex gateway	Prestel	Resembles Prestel gateway architecture though not identical. No charge to users, but system operators connected over network pay $3,250 pa plus DATANET I packet-switched network usage cost. Around 10 service computers attached, including IBM, Dataskil, Tyl Datapress and several tour operators. The network can support around 80 simultaneous calls
Norway	Norwegian PTT	Videotex gateway trial service now, but will be replaced by packet-switched network with videotex adaptors	Prestel, later CEPT	Limited trial service available with usual value-added facilities associated with videotex gateways. Tendering for a replacement network which appears from the specification to be architecturally similar to the Belgian network
Switzerland	Swiss PTT	Videotex gateway	Prestel, CEPT	Prestel-standard service on trial system. Commercial service will support CEPT and alphageometric displays
UK	British Telecom (UK PTT)	Videotex gateway	Prestel, ASCII	18 service providers connected to Prestel gateway. 96% local call coverage of UK. Value-added services include speed and protocol conversion, protocol support, service directory, indexes, switching, security and billing, electronic mail and links to the telex network. Service computers connect over X25 packet-switched network
	Baric Computing	Value-added data network with videotex interfaces	Prestel, ICL protocols	Network being extended to give 85% UK local call coverage by end '85, and connection to Australia and South Africa. Value-added services include protocol conversion, electronic mail. Service computers can link to network using OSI, X25, SNA, and ICL protocols. Network can support 112 simultaneous users
	Istel	Value-added packet-switched network with videotex interfaces	Prestel, ASCII	Originally built to service British Leyland's internal and dealership communication needs, the service is now offered to third parties. The network can support very large numbers of simultaneous users
UK and elsewhere in Europe	IBM Information Network Services	Data network	Prestel, Antiope, CEPT (depends on country), 3270, ASCII	Currently only available as a network to access IBM bureau computers, but in early '85 will be able to offer network to third parties in UK

Figure 3.23 Suppliers of videotex networking equipment

Brown's Operating Systems
CAP-Gemini-Sogeti
IBM
ICL
Langton Electronic Publishing Systems
MicroScope
Radio Rentals Contracts
Sitintel
Stèria
Télésystèmes

Note: This list includes suppliers of mainframe based videotex systems where those systems use networking equipment.

a major commercial opportunity for those organisations, such as computer bureaux and large organisations with extensive networking experience, that feel able to grasp it. The deregulation of the telecommunications industry in the UK is being watched closely in other European countries. If evidence begins to emerge that the UK has benefited from deregulation, then similar moves may be made elsewhere in Europe.

International videotex networks

There are few international networks that support videotex traffic in Europe, apart from the international telephone network. IBM's Information Network Service and GEISCO's networks are international, but access is limited to each bureau's own computers, except where PTTs permit the provision of services to third parties.

Access to videotex systems in other European countries is complicated further by the adoption of different videotex standards by national PTTs*, and the need to cater for the special characters used in different European languages.

In the long term, the problems of international videotex networking will undoubtedly be overcome, and British Telecom, the Bundespost and the Netherlands PTT, and the Scandinavian PTTs, have agreed to link their respective networks to provide international access. It is clear, however, that this development has a low priority for these PTTs at present, and it will presumably continue to do so until their respective services are better established in their national markets.

In the short term, the only viable networking options for system operators wishing to serve several European countries are:

*Although all the European PTTs are pledged to adopt the CEPT level 3 standard, currently used in Germany, most are being cautious over the timing of its adoption.

— To develop a private international network using international leased lines or international packet-switched services.

— To establish links to public videotex gateway networks, and provide for the necessary videotex protocol conversion at the private videotex system host computer.

— To use the services of a bureau that provides international videotex networking services.

Selecting videotex networking options

Most private videotex system operators are likely to use the public telephone network as their primary networking option while access to their systems is light (for example, during early system trials), and as a standby network option in the event that other networks become overloaded. Although the public telephone network is expensive over long distances and suffers from high data transmission error rates, it is ubiquitous and requires system operators to make minimal early investments in network facilities.

It is less easy to choose which networking option to implement, once it has become clear that the public telephone network cannot be retained as the primary networking option. The most attractive networking option to select will depend on the characteristics of the videotex service offered, the geographical distribution of users, the actual and projected telecommunication traffic patterns and such commercial considerations as the use of the network to earn revenue from third parties or to gain a competitive edge in the market. To evaluate all these factors requires a detailed examination of each situation and it is beyond the scope of this report to provide guidelines and advice on this activity. Nevertheless, it is possible to provide some general and pragmatic rules-of-thumb about selecting networking options:

— Where surplus capacity exists on in-house voice and data networks, it is clearly sensible to absorb this capacity to meet the requirements of internal, and where appropriate external, users of the system.

— Public videotex networks (whether run by the PTT or independent network operators) should be used once network traffic has grown to the point where this option can be cost justified (but a privately-run data network cannot), and where terminal users are widely and relatively evenly distributed in the market.

— Private data networks should be implemented where data traffic is particularly heavy, perhaps from a single geographical location where there is a high concentration of users. Major investments in building data networks should not be made unless the advantages are clearly demonstrable.

CHAPTER 4

THE EXPERIENCES, MOTIVATIONS AND STRUCTURE OF THE VIDEOTEX MARKETPLACE

The marketplace for videotex has matured considerably over the last eighteen months, in parallel with the technology. Not only are the user base, the range of applications and the industry sectors using videotex expanding, but users are also becoming increasingly aware and sophisticated. This chapter explores some of the basic questions concerned with the exploitation of videotex technology by users themselves: how do users perceive videotex, how are they using it, and how do they see it developing over the next five years?

In this context, our definition of a 'user' is not one of the several hundred thousand terminal users in Western Europe. Rather it is the organisation using the technology to provide services for and on behalf of the end user. This means, in effect, the information providers (IPs) on public videotex services and independent bureaux, and the private videotex system operators.

We relied on the following principal direct sources for our research material:

- A mailed questionnaire to 200 selected private system operators and major IPs throughout Europe. Of these, 52 organisations returned usable questionnaires in time to be included in our analyses. Several of these were followed up by telephone interviews.
- Nine detailed case histories of selected videotex users. We concentrated on private system operators for our case histories as most private operators are also IPs, and their experience can, therefore, provide a wider perspective on the relevant issues.
- The supplier questionnaires which form the basis of our chapter on the supply position (Chapter 3). All suppliers were asked to provide a breakdown of their clients in terms of industry sectors and applications.
- 25 telephone interviews with selected users and local industry observers to obtain current and local information on each country.

In addition, we used data collected during past Butler Cox research work, and several of the many market surveys and studies carried out in each country, usually during and after public trials. Attendance at conferences and seminars provided further important input.

The result of our research is structured, in this chapter, under four headings:

- European videotex 'barometer': an analysis of the overall perception of, and likely future importance of, videotex, together with users' current and planned expenditure levels.
- User requirements and motivations: feedback from users on their requirements in terms of the features and characteristics of private videotex systems, terminals and bureau services.
- Case histories of videotex users: providing detailed studies of the experiences of several selected European organisations, that are broadly representative of videotex users in Europe.
- Application and market sector breakdown: supplying an overview of how videotex is used and by whom.

EUROPEAN VIDEOTEX 'BAROMETER'

To test users' general perception of videotex in Europe, we asked questionnaire respondents a series of questions designed to assess their experience with videotex so far, and their perceptions about the future. The results are shown in Figure 4.1.

There are a number of striking features about these results. Firstly, two out of every three respondents felt satisfied with their experience of videotex to date, but nearly all respondents felt that videotex would be important to their organisations over the next five years.

Secondly, about 15% of our respondents were already deriving larger tangible benefits from videotex than they were spending on service provision in 1984. However, 1986 or 1987 are seen as the years when most of our respondents expect to achieve the break-even point.

Figure 4.1 European videotex 'barometer'

Survey questions	*Percentage of respondents*		
In general terms, are you satisfied with your experience of videotex to date?	Yes 66%	No 27%	Undecided 7%
Do you think that 1984 has been a better or worse year for your videotex activities than 1983?	Better 71%	Worse 10%	Undecided 19%
Do you think videotex will be important for your organisation over the next five years?	Yes 92%	No 4%	Undecided 4%
Do you think that private videotex systems will be more important for your organisation than the PTT-run public videotex service over the next five years?	Yes 67%	No 29%	Undecided 4%
Do you consider that you will derive more direct tangible benefit from videotex in 1984 than you are spending in the year?	Yes 15%	No 81%	Undecided 4%
In what year do you estimate that you well derive more benefit from videotex than you are spending? (Answer '1984' or earlier if this is already true.)	1984: 15% 1985: 15% 1986: 30% 1987: 14% 1988 and beyond: 18% Never: 4% Not sure: 4%		

To put these perceptions and the answers to our other questions in context we asked our respondents to estimate how much money they spent on videotex-related activities, including all system, communication and human resources costs, in 1984. Forty respondents were able to answer this question. From their replies we were able to establish that the average spend on videotex per organisation was running at $210,000 a year. Slightly fewer respondents were able to estimate their expenditure levels by 1988 but from those that were able to answer this question we calculate that average annual expenditure on videotex per organisation will rise by approximately a factor of three to $615,000 in 1988. Figure 4.2 provides a more detailed breakdown of present and planned expenditure levels. UK companies were the highest spenders in 1984 in our survey, and the lowest spenders were Italian and Austrian companies. However, most companies' expenditure levels are expected to increase, by as much as ten-fold in some instances. Only two of our respondents expected a decrease in expenditure by 1988.

Figure 4.2 User expenditure on videotex

Expenditure level in the year	*Percentage of respondents*	
	1984	*1988*
Under $50,000	45%	20%
$50,000-$100,000	20%	12%
$100,000-$500,000	25%	44%
Over $500,000	10%	24%

Inevitably, figures such as these need to be interpreted with some caution. Not only are there wide country variations, but the organisations themselves are at different levels of development as regards videotex. In countries such as the UK, France, the Netherlands and West Germany, where more private systems are being sold than in some other countries, expenditure will naturally be higher than in countries where a greater proportion of organisations offer their services via PTT or independent bureaux, as is still the case in, for example, Switzerland, Austria and Italy.

Our respondents were asked what developments in the videotex field had been most important to their organisations in 1984. The answers reflect both developments at a national level and advances in the technology. Thus comments from West German and Danish respondents referred to the opening of the commercial services of their national public videotex systems, as the most important developments during 1984. But more widely applicable developments also rated as important were the broadening base of available hardware and software, the increasing acceptance of microcomputers as videotex terminals, the use of videotex for telesoftware distribution, and the positive market development and growth in France, the UK and the US.

Concerning the future developments most likely to impact their organisation's involvement in videotex, the most frequently mentioned were:

—Falling product prices, especially terminal prices.

—Large growth in the number of available services.

—Faster transmission speeds.

—Development of a joint US/European standard.

—Advent of new technologies: ISDN, smart cards, voice input/output, videodisc and cable TV.

—More mainframe systems for more sophisticated applications.

—Developments in the microcomputer field, including multi-standard adaptors.

—Interconnection of national videotex services.

USER REQUIREMENTS AND MOTIVATIONS

We asked our questionnaire respondents about their current and planned use of different types of videotex products and services, and the types of product developments they would like (and expect) to see over the next five years. We also asked a number of quest-

ions on attitudinal or motivational issues which influence their choice of product or service. In this section we discuss our findings in terms of the three principal types of videotex products: private systems, terminals and bureaux. We have concentrated on private systems as issues here are more complex and are frequently less-well understood than for the other two.

Private videotex systems

54% of our respondents had installed private videotex systems by 1984, and a further 21% were planning to do so by 1988. Most of the private systems in operation comprised only one or two separate hardware installations, but several system operators planned to increase this to four or five systems by 1988. Average port capacity per system was just under 30 in 1984, but existing system operators plan to increase this substantially: to an average of 133 ports per system by 1988. Those organisations not yet running private videotex systems, but which were planning to do so within the next five years, envisaged that the average number of ports per system would be 16 at time of installation. (This average excludes one system which was planned to start with 500 ports.) Most of the new systems that our respondents expect to introduce would be installed in 1985 or 1986.

We asked existing operators of private systems how they rated their overall experience with such systems. The answers reflect considerable realism amongst our respondents. Nearly two thirds (62%) said their experience with private systems was just as they had expected, 31% found the experience better than they had expected and only 7% were disappointed.

To understand the system features private operators would expect in the future, we asked both present and prospective system operators how important they would consider certain features of private videotex systems by 1988. The results are summarised in Figure 4.3. System and transmission security and error-free transmission of software and data were the most highly desired features. But the ability for ASCII and VDU-standard terminals to access the system, together with more sophisticated keyword search facilities, were also mentioned frequently. There were some notable variations by country in terms of desired features. Thus access via cable television systems was considered relatively more important by respondents from the smaller countries with high cable penetration, such as the Netherlands and Finland, and teletex access was highly rated amongst German respondents.

System features is one of the most important criteria leading users to choose a particular private videotex system supplier. But it is not the only one. The image projected, and the marketing approach adopted, by a supplier may be at least as important. We presented our respondents, who were running or planning to run private systems, with a list of 12 possible characteristics of suppliers and asked them to select up to five of these as the most important to them. By far the most frequently indicated requirement was for a supplier to be able to demonstrate his post-sales technical support capability. But also important was his reputation and experience as a supplier of videotex systems. Systems compatible with the client's existing hardware was also important (but less so), and only half of the respondents considered experience as a supplier of computing systems per se to be of prime importance. Least important overall seemed to be the videotex knowledge of a supplier's sales staff, and the quality of the supplier's general promotional literature (see Figure 4.4 overleaf).

We asked our respondents what developments they would like to see in the private system field. We received numerous answers, many of these echoing the requirement for features listed in Figure 4.3. There were, however, a series of further developments

Figure 4.3 Features of private videotex systems considered essential by 1988

	Importance by 1988 (percentage of respondents)			
Feature	*Unimportant*	*Fairly important*	*Very important*	*Essential*
Transmission of data and software to remote terminals without transmission errors	2%	15%	34%	49%
Transmission and system access security comparable to other computer systems	7%	18%	28%	49%
Access from typical VDU-standard terminals (eg, IBM 3270)	18%	16%	33%	33%
Sophisticated keyword access	16%	25%	30%	31%
Access from ASCII terminals (ie, teletype-like, VT100, etc.)	18%	24%	24%	34%
Multiple videotex standards	19%	29%	26%	26%
80-column display format	16%	36%	25%	23%
Teletex	17%	51%	17%	15%
Telex access	39%	41%	11%	9%

Others: Faster transmission speeds
Better interactive facilities/windowing
Identification of logical and physical users
Better facilities for user-own programming
Multi-protocol operation
Access for terminals with smart card readers
Videoframe with superimposed videotex
Industry-wide standards
Price improvements
Better text-handling
Better editing facilities
Integration with relational database systems
Ability to use more powerful database management systems
Interfaces to conventional database systems.

Figure 4.4 The most important characteristics of private videotex system suppliers

	Percentage of respondents
Evidence of technical support following sale	90%
Good reputation and experience as a videotex supplier	66%
Ability to supply a system compatible with your present hardware	63%
Ability to demonstrate systems similar to that required by you	61%
Good system documentation	55%
Ability to add new facilities to suit your own requirements	55%
Proven and long term commitment to videotex	55%
Good reputation and experience as a supplier of computing systems	50%
Ability to try the system on a 'bureau' basis before committing to purchase	37%
Ability to supply complete turnkey system including terminals for your users	11%
Well informed sales staff	11%
Good pre-sales literature	3%

Note: Respondents were asked to identify the five characteristics they felt were most important to their organisations.

required by users which were wider in scope than simple features. The most frequently mentioned of these developments were:

—International standardisation.

—More resilient communications protocols.

—Integration of videotex with office management systems.

—Inter-system compatibility.

—Availability of all standards, including Prestel, CEPT and NAPLPS.

—Integration of conventional DP with videotex.

Videotex terminals

The average number of terminals currently accessing the services of our questionnaire respondents was 255, but this was expected to rise to nearly 2,000 by 1988, which represents an eight-fold increase. The average use (weighted by terminal numbers for each respondent) was 9.5 minutes a day. Our respondents expect this to rise only slightly by 1988 to 11.5 minutes a day. In 1984, 14% of our respondents supplied terminals to their users. By 1988, 23% plan to do so.

Most respondents expected a substantial increase in the use of microcomputer-based terminals by 1988. In 1984 the weighted average ratio of dumb terminals to microcomputer-based terminals was 88:12. By 1988 this ratio was expected to change to 32:68; that is to say more than two out of every three terminals were expected to be based on microcomputers. There were some variations between respondents from different countries, but the reversal in the relative importance of these two basic types of videotex terminal is expected from our respondents throughout Europe.

We asked our respondents what developments they would like to see in terminals. The most frequently mentioned types of development are summarised in Figure 4.5. They, too, reflect the expectation that the role of microcomputers as videotex terminals would increase at a rapid rate, and that this would fundamentally change the profile of the terminal-supply industry.

Videotex bureaux

Perhaps not surprisingly, PTT-operated bureau services were the most commonly used by our respondents. In 1984, nearly half the respondents provided information via a PTT bureau, compared to the 15% who used an independent bureau. These proportions were expected to increase slightly by 1988.

We asked our respondents using bureau facilities (PTT or independent) what their most important reasons were for choosing to use such services, by rank-ordering the five most important reasons. The results are shown in Figure 4.6. The most important reason given was that using a videotex bureau involved lower

Figure 4.5 Principal developments in the videotex terminal field requested by users

- Multifunctionality (use as PC, workstation, DP terminal, cable TV access device, television, etc.)
- Multistandard support (including Prestel, CEPT, NAPLPS, ASCII, alphaphotographic)
- Dual standard, 40/80 columns per line
- Simple editing functions for user terminals and adopting the alphanumeric keyboard as standard
- Unsupervised data retrieval, more local storage capacity
- More compact desktop and portable models
- Incorporation of 'smart card' readers
- Standardised keyboard functions
- Abandonment of the videotex terminal *per se* in favour of microcomputers
- Higher-speed integral modems

Note: These requirements are not listed in priority order.

Figure 4.6 Principal motivations for using a videotex bureau

	Average rank order
Lower initial costs	2.1
Immediate wide geographic coverage	2.2
Trying out videotex before moving on to own system	2.5
Less resources needed	2.6
Competitors use or are likely to use the bureau service	4.4

Note: Respondents were asked to rank their reasons for using a bureau, using 1 to indicate the most important, and 5 the least important reason.

initial costs on the part of the service provider, but the ability to cover a wide geographic area very quickly came a close second. The profile of competitors on the videotex scene is not seen as very important, which is surprising considering the numbers of IPs that have flocked to become providers on PTT bureaux seemingly only because their competitors were doing so.

CASE HISTORIES OF VIDEOTEX USERS

We have on our files the names of nearly all information providers in Western Europe and several hundred organisations that have installed private videotex systems (of these, only some 280 are listed in Appendix 2 for confidentiality reasons).

From these names we have chosen to feature nine case histories of organisations using videotex in Western Europe. These complement those covered in previous reports in the Videotex Report Series.* For this report we have selected a sample of organisations, representing different approaches in the way in which they engage in videotex activities and how they solve both marketing and technical problems.

The organisations whose case histories we describe in this section are:

—Gruner + Jahr, a large West German publishing house, which is developing videotex applications to complement its major magazine titles. Gruner + Jahr was one of the first private system operators in West Germany to transfer its gateway services from the old GEC (Prestel) system to the new IBM (CEPT) system, operated by the Bundespost.

—The Bavarian State Ministry for Food, Agriculture and Forestry in West Germany. The ministry has developed a range of interesting applications for farmers, including information on farming product prices, pest control and fertilizers, as well as encouraging the development of closed user groups where applications are managed by co-operatives or service companies.

—Air France, the national airline of France. Air France's decision to get involved in videotex was largely motivated by a desire to offer services suitable for the general public, as well as services for specialists in the travel industry. Competitive pressures have also played an important part in Air France's decision.

—Barclays Bank SA-France, which is a subsidiary of Barclays Bank in the UK, and which offers videotex services quite separately from its UK head office.

—AGB in the UK, which offers a range of regularly updated information for the fishing trade, including prices, on its 'Fishnet' system.

—The UK Export Credits Guarantee Department (ECGD), which introduced its videotex system as part of a programme of office automation pilot projects sponsored by the Department of Trade and Industry. The system incorporates a number of interesting features, of which the integration of videotex with other office systems is not the least.

—Jetair, a Belgian tour operator offering holiday information and bookings to Belgian travel agents.

—Neckermann Travel in the Netherlands, which is implementing a system based on a link between its Dutch Prestel-based system and the West German CEPT system used by its parent company in West Germany.

—ESCO in Switzerland, which installed a highly successful system based on the use of videotex in conjunction with videodisc for travel applications.

Gruner + Jahr

Gruner + Jahr is a large printing and publishing company, based in Hamburg, in West Germany. Its main products are periodicals for the German market, but over the past few years it has also expanded overseas. In 1983/84, the company's turnover in Germany was around $460million, and its worldwide turnover was around $800 million.

Gruner + Jahr targets its publications very carefully at specific markets in socio-economic groups A and B, and it aims to be the market leader in each of its targeted market areas. Its videotex activities are

*Note: In past videotex reports we have featured the following organisations as case histories: La Redoute, Thomson Holidays, Rabobank, Neckermann (Germany), Debenhams, CCF, Grassroots, Datafreight, Talbot, Imperial Brewing and Leisure, Cycles Peugeot, Distriphar, Allianz, GIZ, Quelle, Bonair and Lloyd Anversois.

related to its major magazine titles. These include:

—Stern; a weekly general-interest news magazine.

—Capital; a monthly magazine aimed at senior employees and management.

—Impulse; a monthly magazine aimed at managers and employees of small to medium-sized companies.

—Brigitte; a fortnightly womens' magazine.

—Geo; a monthly magazine similar to National Geographic (Geo is also published in France).

—Eltern; a monthly magazine for parents.

—Prima; a monthly magazine for women published in France.

—Essen und Trinken; a monthly consumer magazine specialising in food and drink.

In the late 1970s, Gruner + Jahr made a strategic decision to be actively involved with videotex as a new medium for publishing and distributing information. It also decided that it would need to get involved with the new medium as early as possible so as to learn about the medium's possibilities and limitations.

During the pilot phase of Bildschirmtext (BTX) — the German PTT's videotex system — Gruner + Jahr set up four applications on their computer, and made them available via a BTX gateway link. The applications were designed to complement individual magazines. The magazines, and the associated applications, were:

—Essen and Trinken, which was supplemented by a recipe system on BTX. The application allowed the housewife to enter her requirements for the type of meal, cost, and preparation time, and the system responded with menu suggestions selected from 300 pages of information.

—Prima, which was supplemented with a variety of BTX telegames and telecompetitions.

—Capital, which was supplemented by a car insurance application. This application gave quotations for car insurance based on input details such as the type of car and the driver's profession.

—Impulse, for which the current issue's index was made available on BTX, as well as abstracts of some articles. Sample editions could also be requested.

As a result of the trial, Gruner + Jahr reached a number of conclusions. In particular, they concluded that, initially at least, videotex would mainly interest professional, rather than domestic, users. They also decided that videotex and printed publications must complement each other.

These conclusions have influenced Gruner + Jahr's plans for future videotex applications. The emphasis has moved towards providing applications for Capital and Impulse readers (professionals who are most likely to use videotex), and for readers of technical magazines.

Gruner + Jahr hope to achieve greater synergy between the magazines and videotex by relating the videotex applications very closely to magazine articles. Examples of such applications are:

—A salary information system, which asks the videotex user a variety of questions about his job, and responds with average salaries for that type of job throughout industry. This application relates closely to articles in Capital concerning salary structures, and a computerised salary survey offered by Capital.

—A second-hand computer exchange system, where prospective vendors can place advertisements for computers they wish to sell. This application supports a campaign in Impulse, featuring related articles and a survey of second-hand computer equipment.

Gruner + Jahr believe that the strength of magazines lies in their ability to carry general journalistic material, background information and limited data, while videotex is good at giving access to specific, but limited amounts of data selected from a large base of information. Gruner + Jahr hope to combine the two, to the benefit of both media. One potential danger they perceive is that the customer will go straight to the specific information on videotex without bothering to buy the background magazine article.

Another application, related to Impulse, concerns market research. It is aimed mainly at advertising customers. The application gives some general marketing information, and allows users to order special reports on the outlook for various market segments, and computer listings of companies in various industries. The information is drawn from Gruner + Jahr's own internal data banks, and is sold, typically, at prices in the order of $35.

Gruner + Jahr have considered other uses of videotex but these are not yet planned. They include the distribution of software via videotex, and the creation of a videotex closed-user-group newsletter containing up-to-date investment advice, and possibly replacing a existing weekly newsletter associated with Capital. This newsletter would contain high-value information, and the subscription to the closed user group would be in the order of $35 a year.

Gruner + Jahr have successfully converted from the Prestel standard used during the trial BTX phase to

the new CEPT system. Gruner + Jahr use HP 3000 hardware, and the Betex (Nova) system supplied by IDO.

For Gruner + Jahr, videotex has not yet paid its way. However, Gruner + Jahr believes that it has a future and that by the end of the decade its videotex activities should cover their costs — even when indirect benefits such as any increased magazine circulation are excluded. Gruner + Jahr's strategy for achieving this target is to sell high-value information, through videotex frames and ancillary services, and to sell it to a well-defined and carefully targeted marketplace which is prepared to pay for such information. The applications which Gruner + Jahr currently offer are a first step in this direction.

The Bavarian State Ministry for Food, Agriculture and Forestry

The Bavarian State Ministry for Food, Agriculture and Forestry is responsible for, amongst many other things, maintaining official advisory services which give Bavarian farmers free advice on agricultural matters. In fulfilling this responsibility, the Ministry is aided by various farmers' self-help co-operatives, breeders' associations and industrial advisory services.

Computers were used early on to support the advisory functions. In 1972, the first steps were taken to establish the Bavarian Agricultural Information System, called BALIS. By the early 1980s, BALIS had developed into a series of databases running under IBM's IMS database system. An interface to Bildschirmtext was built, and in July 1983, a first pilot project, BALIS-BTX, was initiated. The pilot project was carried out in collaboration with the Bavarian Farmers' Association and with BLV, a publisher specialising in agriculture. The pilot project gave about 20 farmers access to BALIS through a Bildschirmtext gateway. The project's aim was to test whether a videotex information system was acceptable to farmers. A second, nationwide, pilot project started in March 1984.

The software for BALIS-BTX was produced by the Ministry and runs on its IBM 3081 mainframe computer. The IBM computer was originally linked via DATEX-P to the German PTT's (DBP's) Bildschirmtext system in Dusseldorf to provide a Prestel-standard service.The BALIS-BTX service is now being converted so that it can be accessed from the DBP's CEPT computer in Ulm. The link will still be via DATEX-P. In-house, and for editing CEPT screens, the Ministry uses an IBM PC with a monitor running software produced by CAP-Gemini-Sogeti.

Two different groups of application are available through BALIS-BTX. The first group of applications is controlled and maintained mainly by the three organisers of the pilot project which are mentioned above. The applications, and the associated data, are publicly accessible. The second group of applications is based on closed user groups with individual farmers and farming co-operatives managing the information.

The first group includes simple information retrieval applications on a database which comprises standard farming information, for example:

- —Information on pests and diseases and on how they can be controlled.
- —Abstracts of articles in the trade press.
- —Summaries of how legislation affects farmers.
- —Summaries of the market prices for livestock and agricultural produce.

Other applications in this first group are more interactive, giving responses that are dependent on farmers' specific circumstances, for example:

- —Advice on which fertilisers to use, and on how much to use, based on the farmer's input of what he wishes to plant, what was planted previously on the land, and what fertilisers were used previously.
- —Personal nutrition and dietary advice, based on data entered on height, age, sex, occupation and lifestyle.

This type of interactive application is by far the most popular, accounting for over half of the frame accesses. The second most-popular applications cover regionally-specific information, such as a regional diary of farming events, or suggested periods for planting or spraying. The generally available applications, and the utility programs and menus underlying them, are supported by about 8,000 different frames of information, and attract the vast majority of accesses.

The second group of applications is not publicly accessible, and contains data that is private to individual farms. The applications are based on only a few dozen frames, and account for only a few per cent of the total frame accesses. Nevertheless, this group of applications is important.

Essentially, the Ministry is acting as a videotex bureau. The information stored in these applications is maintained by the individual farmers, while the applications are co-ordinated by one of the self-help co-operatives or a service company. The users effectively form a closed user group. Examples of this group of applications are:

- —Recording and controlling the milk yields of dairy cows.
- —Controlling pig and cattle breeding.

Each farmer can record the information concerning his own livestock and recall it later to use it in managing his farm. The importance of this group of applications is that it uses videotex not just to communicate information, but also to give farmers access to data processing facilities.

The users of BALIS-BTX were drawn from three sources:

— The original BTX trial subscribers in Dusseldorf and Berlin.

— About 20 farmers in three regions of Bavaria, who have been using the system since July 1983.

— About 100 farmers throughout Germany, who have taken part in a country-wide pilot project since March 1984.

The farmers taking part in the BALIS-BTX pilot trials were chosen from volunteers, but with a view to obtaining a mix of participants in terms of criteria such as size of farm, location, mix of produce and level of education.

The costs to the farmer of using BALIS-BTX are the Bildschirmtext subscription charges and the telecommunications costs. No charge is made for the frames maintained by the Ministry, and the terminals are either on loan or were sold at the price of a standard colour television set. The Ministry, however, does charge for use of the individual farm data applications. The charges are based on the cost of the machine resources used, and are invoiced to the self-help organisations responsible for the applications. Currently, these costs are met from the general membership revenues, though this may not be possible if many more farmers join the scheme. The cost to the farmer is, therefore, low, and it should not be a large influence on the acceptability of BALIS-BTX in the pilot phases.

It is too early to say how well the system is being accepted by the farmers, although there are already some positive indicators. A study is still being carried out to determine this and its results are expected to be available towards the end of 1984.

The fact that farming areas are widely dispersed means that new technology is an ideal vehicle to distribute information, and most farmers already use telephones to get pre-recorded agricultural information. The main strength of BALIS-BTX is that it can offer much of the information that a farmer needs from a single source. Other videotex services, such as mail order teleshopping, or telebanking, should also be relevant to farmers. In theory, therefore, videotex should be well accepted by farmers.

The main motivation of the Ministry and of the self-help organisations for using videotex is that it helps them in fulfilling their statutory duties to support Bavarian agriculture, and it may reduce the administrative costs of providing this support. Some trade associations may even reduce their membership fees in future for farmers who use videotex. BALIS-BTX will, therefore, not be judged on purely commercial grounds.

The future development of BALIS-BTX will initially revolve around making more applications available, and making the system available to more farmers. In the longer term, the second group of applications described, those dealing with the farmers' individual data, may be better supported by a personal computer in the farm. This computer would need to communicate with Bildschirmtext for the information distribution applications, and would also receive the software for applications that are processed locally.

Air France

Air France is the premier international airline in France. It is the fourth largest airline in the world, in terms of international passenger-miles flown each year, and third largest in terms of international freight-miles per year. Air France runs a fleet of 92 passenger aircraft and six cargo aircraft. The turnover of the company in 1983 was FF24,145 million ($2,560 million) and it employed 34,400 people.

The company operates mainly in Europe, the US, South America, the Middle East and North Africa. Several subsidiary companies operate in related business areas in most of these countries. Their activities include hotels, tourism (package holidays and charter flights) and in-flight and ground-based supply and maintenance.

Air France comprises a number of corporate divisions of which two — the Direction Commerciale and the Direction Informatique have been jointly involved in developing videotex services.

Air France's data processing is the responsibility of the Direction Informatique. It is organised into five departments: Valbonne, a computer centre employing about 200 analysis and programming staff; Massy, another centre of similar size; Telecommunications; Etudes et Economies, a management department of some 15 people; and a department that looks after end-user computing issues. These departments have all been involved, to varying degrees, in developing Air France's videotex system.

The data processing installation at Valbonne is based on a Sperry 1100/93 running passenger-management and other information services. The Valbonne system has a front-end computer controlling 10,000 terminals and 4,000 printers worldwide in Air France agencies. The installation at Massy is IBM-based and runs tradi-

tional administrative data processing applications, as well as aircraft spare-part tracking and freight management systems.

Air France decided to become involved in videotex as soon as the French PTT began to promote it. Air France's objective was to improve service and improve image, although all projects are cost justified on two possible bases — to increase revenue and to achieve cost savings. Air France was influenced by the SNCF/AIR INTER system which offers timetable information. It decided to allow videotex access to the existing Valbonne application. This provides online information about aircraft and passenger movements, embarkation, reservations and seat availability, and permits tickets to be issued. The aim was to develop a system suitable for use by the general public and small travel agents.

Air France chose Telesystemes' private videotex system, running on Bull Mini-6 computers. The Telecommunications section of Air France provided additional support. The project was organised into four phases and was run jointly by the Direction Commerciale and the Direction Informatique.

The first phase was to define the project, its costs and benefits, and requirements. This phase was led by the Direction Commerciale and monitored by the Etudes and Economies section of the Direction Informatique. The second phase addressed technical issues, such as detailed system design and development. This phase was led by the Direction Informatique and was monitored by the Direction Commerciale. Those aspects of the project that related to the Sperry hardware were carried out by a team of 20 people at Valbonne. The videotex software interface was taken care of by Telesystemes.

The third and fourth phases comprised the handover, testing and technical maintenance of the system. These were the joint responsibility of the Direction Commerciale and the Direction Informatique. However, the commercial exploitation of the system, that is to say marketing the system to users is the responsibility of the Direction Commerciale.

The videotex applications currently running on the Mini 6 are:

- —General information including fleet details, services, publicity etc.
- —Flight status information, including information on strikes and delays.
- —Timetables, giving all the information contained in the existing, printed pocket timetable.

The existing system provides 100 ports and Air France expects to increase this by 100 ports each year, so it expects to have some six Mini-6s running videotex systems by 1990.

It sees videotex as performing two services — external services and internal services. The external services, which will operate as part of Air France's other DP systems, will extend existing branch services to a wider public via low-cost 'Minitel' videotex terminals. These services will be expanded to cover all aspects of flight reservations — tariffs, availability and bookings, and they will be accessible by keyword or menu. The scope of the applications will be extended, and their availability will be gradually increased — first to small Air France offices, then major customers, such as travel agents and hotels, and eventually to the general public. The facilities provided will depend heavily on the existence of adequate security provisions and they will need to use 'smart cards' before, for example, reservations can be confirmed. Until then the general public will be restricted to taking options on flights which will need to be confirmed separately by Air France offices. Air France sees the possibility of extending the service overseas using, for example, Prestel in the UK, where they use the Travicom system at present.

In terms of numbers, some 1,000 travel agents had already been equipped with 'Minitels' by mid 1984. By 1986, Air France hopes to offer ticket printers to attach to the terminals. As far as cost is concerned, Air France will charge only for hardware and communications costs.

The 'internal' services will concentrate on messaging, principally for flight personnel on overseas trips, but they may also include internal marketing information.

Air France sees considerable scope for co-operation in offering a multi-company, international travel service. This might include rail and ferry information as well as interconnections for internal and international flights. Overall it sees videotex as a means of improving its level of service and of expanding its business.

Barclays Bank SA-France

Barclays Bank SA-France is a subsidiary of Barclays Bank UK and Barclays Bank International. It is 99% owned by these two organisations.

Barclays Bank SA employs nearly 1,400 people and it has 41 branches in France, and 11 subsidiaries whose activities include banking, leasing, property and personal loans, property development and financial management. The bank itself has 75,000 accounts and 47,000 customers.

The bank has a data processing department which is independent of the UK operation. It runs twin IBM 4341 Model IIs with two 3705 front-end processors.

Most systems operate in batch mode, but the intention is that branches will soon have their own online terminals. The main data processing applications are traditional ones, such as financial accounting and customer-account management. The system is connected to the SWIFT inter-bank clearing network.

The bank has set up a videotex department which is responsible for choosing applications, technical design issues, trouble-shooting and client support and management. The bank's branches contribute to commercial decisions affecting their customers.

The videotex service offered at present is for bank customers, not for internal use. It is being run as an experiment in collaboration with three other private French banks. These banks are La Banque Louis-Dreyfus, Banque Veuve Morin Pons (a subsidiary of the Dresdner Bank) and Banque N.S.M. (a subsidiary of ABN in Holland). The banks have joined forces to offer videotex services using a videotex service bureau.

The service bureau they use is GFI. The main reason they decided to use a bureau was to enable them to test the technology and likely services, and to gauge customer reactions without making a major financial outlay.

GFI undertakes the technical design work and provides the videotex computer (in this case a Bull Mini 6). The terminals connected tend to use both ASCII and Antiope protocols. The standard terminal offered by Barclays SA is a Radiotechnique terminal and a printer, in total costing less than FF10,000 ($1,000). This is the recommended configuration which customers can obtain from Barclays SA at preferential prices. Alternatively, they can have access to Barclays' service from any Teletel-compatible terminal.

Barclays' reason for offering videotex services is partly in response to customer demand, and partly as a reaction to competitors' offerings. The main application offered at present is customer-account management. Customers access the service using the Transpac public packet-switched network. When they have entered their password, customers select the service they require using service menus. They can make account balance enquiries, monitor movements on their account, and check on payments in and out. Customers can also look for specific transactions by cheque number or value.

About 50 customers were subscribing to the service in mid 1984 and another 40 are expected to subscribe before the end of the year. These are all business rather than residential clients. The average system use is less than two hours a month, representing about 30 calls. For this level of usage, customers pay FF750 ($80) a month.

The main benefits to Barclays SA from offering the service are a greater competitive edge and a better service for their customers. The aim is to encourage customers to make better use of their accounts. (The bank has, however, found that a better managed account often means less profit for the bank.)

The next development in the service is seen as being the introduction of interactive services, such as funds transfers. However, to meet the bank's strict security requirements, better means of identifying terminal users are needed. GFI are proposing the use of 'smart cards' together with more sophisticated passwords. Future customer services will be dictated by customer demand.

Although the service makes a small loss, Barclays SA feels it is a success. The bank is preparing to move to using its own videotex computer, but this can only be cost-justified once it has about 100 customers using the service. It does, however, expect to make this move by June 1985, by which time this target should be reached.

Once Barclays SA runs its own in-house videotex system, the videotex department plans to offer an internal service, with branches being connected directly. This would almost certainly entail the use of dual-function data processing/videotex terminals, connected via Transpac or the public telephone network to both the IBM mainframes and the videotex computer.

AGB

The viewdata service known as Fishnet was the result of a joint development between two companies: AGB Heighway Publications and AGB Cable and Viewdata.

AGB Heighway Publications is well known in the fishing industry through its publications, Fishing News and Fishing News International. AGB Cable and Viewdata operates an in-house viewdata system (Aregon International's IVS-3 system running on a PDP 11/70) for a range of applications.

Fishnet was developed to fulfil an observed information need in the fishing industry. The need was for:

— Up-to-date fish-auction prices from a number of locations.

— Up-to-date information on quantities of fish landed at a number of ports.

— Predictions on future landings of fish.

Fish are landed at ports around the North Sea every day of the week. Auctions are held daily at all of these ports and, immediately following the auctions, the fish are transported inland to buyers, and in some cases to wholesale markets, such as Billingsgate in London.

Clearly, the supply of fish is unpredictable. It depends on the number of boats docking on any one day, and of course the weather. Consequently, the price of fish can vary greatly at the various auctions.

Fish merchants, who can often buy fish from a number of auctions, therefore need to know the prices of fish at these auctions very quickly to prevent them purchasing fish at a higher price than is necessary.

Many fish merchants satisfy this need by employing teams of people to telephone the various ports early in the morning to check auction prices. An alternative method is for the merchants to arrange for contacts at the various ports to send telexes listing the prices and quantities of fish landed.

Clearly both methods of obtaining information are expensive for fish merchants, and are not always reliable. Moreover, very few merchants receive information from all of the auctions at which fish is being sold. The Fishnet service is intended to provide comprehensive information on fish prices and the quantities of fish landed, at an attractive price. The applications so far implemented comprise:

- —Up-to-date market prices for all types of fish at a particular port.
- —The prices for a range of sizes of a particular type of fish at a particular port.
- —A comparison of the various prices and landings for a particular type of fish at a number of ports.

The Fishnet service is operated by AGB Cable and Viewdata. Representatives, one at each of the ports covered by the service, dictate the price and landing information to the AGB Cable and Viewdata office in London. The information is entered into the videotex system using specially-developed input software to automatically update frames. Information is updated three times a day and covers the start of the auction, as well as the closing prices.

Since May 1984, the system has covered 16 North Sea ports in England, Scotland, Denmark and Holland. These ports account for 70% of the fish landed from the North Sea every day.

As well as the input software, other software has been written to enable users to convert prices between various currencies, and also to convert between the units of weight used in the fishing trade (stones and kilos).

AGB Cable and Viewdata expect the service to become the prices 'Bible' of the fishing industry over the next few years, and is also looking at similar applications in other industries.

Fishnet is a very good example of the kind of application that is particularly suitable for videotex: fish merchants were unfamiliar with computer technology, so ease of use is important, as are inexpensive terminals. The information is of high value to fish merchants, and is highly perishable.

Export Credits Guarantee Department (ECGD)

The ECGD is a UK government department which employs a total of 1,800 staff at its regional offices and in its two headquarter locations in London and Cardiff. The ECGD performs two roles:

- —The provision to exporters of insurance cover against non-payment by overseas customers.
- —Assisting in the provision of finance for exporters by providing guarantees to banks.

The ECGD installed a GEC videotex system in 1982 as part of the UK Department of Trade and Industry's (DTI's) Office Automation Pilots Programme. In order to meet the requirements of the DTI, who was providing some of the finance for the project, the system had to include a number of innovations. These innovations, together with the scrutiny which the project received as a result of being a pilot site, make the ECGD videotex system particularly interesting.

The most impressive aspects of the system are:

- —The responsibility given to users to maintain the databases.
- —The automatic generation of frames from information held on an IBM mainframe.
- —The use of a report generator to produce reports from information held on viewdata frames.
- —The small number of support staff needed to operate the system.

By early 1984, over 100 videotex terminals had been installed both in the London and Cardiff headquarters and the regional offices. It is expected that more use will be made of multifunction terminals in future. Word processors have already been linked to the videotex system so that text generated on a word processor can be reformatted to produce videotex frames.

The main applications running on the ECGD videotex system are as follows:

- —Case control.
- —Departmental/country information.
- —Personal diary management.

Case control

One of the departments of the ECGD uses the GEC videotex system to create a database of information relating to the particular overseas projects for which

it is responsible. The most interesting aspect of this application is the degree of responsibility given to the users to create and maintain their own pages of information. The application depends to a great extent on the 'update field frame' facility on the GEC system which allows users to amend certain fields on a videotex frame without needing to use the editing software and without requiring editing keyboards on their terminals. (The system operator must provide blank 'fields' on frames for new cases to be entered. However, these frames can be generated in a standard format quickly and easily.)

One of the innovations developed for the ECGD project was a report generator to be used with a 'report frame'. Using this facility, a user can produce a report from the information contained on the case control database. The user keys in a number of conditions on a report frame and, later that day, he or she receives a print-out answer to the request. Such a report might show, for example, the number of cases handled by the ECGD, identifying loans of a specific value relating to a particular country.

Departmental/country information
In order to evaluate the applications for guarantees which they receive from British exporters, the staff at the ECGD require up-to-date information on the export markets concerned.

The videotex system therefore holds a database giving statistical information on 220 overseas markets, as well as the terms and conditions under which the ECGD is prepared to provide insurance cover for those markets.

Much of the statistical information held on this database is updated monthly, directly from one of the ECGD's IBM mainframes. This updating is done by linking the IBM computer to the GEC minicomputer on which the videotex software resides. This automatic creation of frames helps to reduce considerably the number of system support staff required.

Personal diary management
The diary application also makes use of the 'update field frame' facility of the GEC videotex software. It allows senior managers to maintain their personal diaries on the videotex system. These diaries can then be accessed by other members of staff. Although this application is clearly of secondary importance, it has proved to be extremely popular with users.

Jetair

Jetair is a Belgian tour operator that also runs a number of travel agencies. Jetair began to introduce videotex in 1983 for use by Belgian travel agencies. By mid 1984, around 120 travel agencies, concentrated in the areas of Brussels and Antwerp, were connected to its videotex system.

Jetair uses ICL's Bulletin videotex software, and the main applications are those typical in the travel industry — making reservations for flights and accommodation, together with an informational database of holidays on offer. Jetair had bought the Bulletin system (developed by ICL in the UK) as a package, but found it necessary to adapt it to the Belgian environment. This required making major software changes. Reservations can be made via the system, but final confirmation is only made after manual checking of the reservations. Jetair has found this to be necessary, as errors seemed to occur in a small number of cases where travel agents had booked over the videotex system. Training the travel agents in the use of the system has proved to be a major problem for Jetair. Despite an extensive training programme, problems still arise, especially with the calculation of fares and customer invoicing.

The absence until recently of a public Belgian videotex system has proved to be another problem. The RTT (the Belgian PTT) has found it impossible to meet the demand for extra telephone lines needed to connect more travel agents in Belgium to Jetair's system. There is also a regulatory restriction on the use of private videotex systems. This regulation specifies that only organisations engaging in the same type of activity may use such a system. The restriction has prevented Jetair from offering its service to the public at large, although it believes there exists a demand from the public for the type of service Jetair offers. The forthcoming opening of the RTT's videotex system will, it is hoped, solve many of these problems. It will also mean that Jetair will no longer need to store and make available a comprehensive database of airline and rail timetables, as these will be available on the RTT system from other service providers.

Jetair will continue to expand and improve its current services, not only in Belgium but also abroad. In particular, it is planning to increase its presence in the Spanish holiday market and intends to offer videotex services there.

Neckermann Amsterdam

Neckermann Amsterdam is the Dutch subsidiary of Neckermann und Reisen (NUR) in Germany, which is, in turn, a subsidiary of Neckermann Versand, the West German mail order company.

Neckermann Amsterdam's involvement in videotex is interesting not so much for the applications it has implemented, which consist of fairly typical travel applications, but because it is developing a direct link with the mainframe videotex system of its parent company in Germany. This system uses the CEPT

standard, whereas the Dutch subsidiary uses a Prestel-based system.

The applications offered are booking, confirmation, and invoicing of holidays, and the videotex system has about 300 users.

Neckermann Amsterdam started offering services on the Dutch PTT's Viditel system shortly after the trial started in 1980. Initially its database comprised about 500 frames, but this was later reduced to about 100 frames, because it was found that user demand did not warrant so large a database.

The direct connection from Holland to the IBM mainframe of NUR in Frankfurt was being tested as planned and, from October 1984, a formal trial, which should last for one month. A front-end processor at the Frankfurt installation is used to convert the information stored in the German 8-bit CEPT standard to the 7-bit Prestel standard used in the Netherlands. Initially the connection will be made via the public videotex services in Germany and the Netherlands. Depending on technical and cost considerations, a direct connection between the Neckermann Amsterdam and Frankfurt systems may be implemented.

ESCO

ESCO is a Swiss tour operator. It sells its tours both through its own, and through independent, travel agencies.

In February 1983, ESCO decided to support sales of its holidays with information provided on videodiscs, and with a videotex system. Videodisc was chosen for its interactive capabilities, and was to be used to show pictures of the tour destinations to customers. The videotex system was installed to give up-to-date information, and in a later stage, to accept bookings. The two technologies run in parallel on a common workstation. The videodisc players are not controlled by videotex control signals, but are operated independently.

In September 1983, the first videotex terminals and videodisc players were installed in travel agencies. By the end of February 1984, over 300 travel agencies were equipped and using the system for information retrieval. By the end of 1984, online booking by the travel agent should be possible through videotex.

The system runs as a closed user group on ESCO's private videotex system, and is not intended to be accessed directly by the public. This decision was taken for marketing reasons. ESCO felt that its tours offered so many choices and options, that an expert adviser would normally be needed to help the customer find his 'ideal' holiday.

Normally, the travel agent uses the videodisc and videotex systems in conjunction but not simultaneously. Travel agents use the videodisc system locally (that is to say, not online to the videotex system) to demonstrate various destinations and facilities, and to help the customers make their decisions. The videodisc programme is organised so as to lead from general to more specific information on different countries, resorts and hotels. Film sequences and still pictures are intermingled, and are accessed entirely under the travel agent's control.

The videotex system is used to access specific information, such as flight details and availability, hotel availability, information on exchange rates, air and water temperatures to be expected, local excursions, and so on. This information is normally only required towards the end of the sales session, and after the customer has decided on the resort and the hotel at which he wishes to stay. However, the system does allow easy switching between the videodisc and videotex systems. ESCO also uses the videotex system to distribute administrative information to travel agents, including news of special offers, tours available at short notice, and special sales campaigns and competitions. In the next phase of the development of the system, travel agents will be able to use the videotex facility to make bookings. Again, this transaction will normally be carried out after a local session using the videodisc.

ESCO use several levels of hardware in its system. An IBM System 34 computer carries out the essential central administration and file maintenance tasks. A System 36 computer is linked to the System 34, and runs the on-line booking system, which is accessed from conventional computer terminals at ESCO's head office. The videotex software (IBM's SVS/1) runs on a Series 1 minicomputer, which is linked to the System 36. The travel agents' terminals were developed for ESCO by Philips. All the main components are combined in one workstation: a screen (to display videodisc or videotex information), a videodisc player, a videotex decoder and modem, a controller for the two systems (which can store up to 15 videotex pages locally), a keyboard and a printer.

ESCO's videotex system uses the Prestel standard. There were several reasons for this choice:

— ESCO needed a system which could be installed during 1983. This was before the Swiss PTT introduced its CEPT-standard service.

— ESCO's applications required a fast response time, which could be better achieved using Prestel rather than CEPT.

— ESCO's applications did not require the additional graphics capability of CEPT.

The system has had a very significant impact. Travel agents have a much wider range of information at their disposal while serving their customers. The information includes items which were difficult to obtain before the system was introduced, such as weather information, or up-to-date information on the availability of local excursions. The information is immediately available to travel agents, and the flow of sales discussions is not interrupted by lengthy phone calls, or by the travel agent needing to move away physically to consult different documents. Moreover, the information that is presented to the customer on videodisc is much more informative and easier to relate to than the information available from catalogues and brochures.

ESCO has carried out a survey of its agents and customers, which showed that around three-quarters of the customers felt that the system had helped them in choosing their holiday. As a result, the level of complaints received from customers after their holidays has been reduced significantly. The travel agents are also pleased with the additional service they can give their customers and with the support which the system provides in selling holidays.

ESCO's turnover has also increased. In the first year of operation, turnover increased by about 25%, and the increase in turnover was maintained in the second year. These are better results than were achieved by the Swiss travel industry generally, though it is of course impossible to identify just how much of ESCO's extra growth can be attributed to the videodisc/videotex system. Nevertheless, ESCO believes that its investment will be justified by increased turnover over a three-year period.

APPLICATION AND MARKET SECTOR BREAKDOWN

In this section we provide a breakdown of the videotex user base in terms of the kinds of applications implemented and users' market sectors. We have addressed these issues from two standpoints — terminals and private systems. As far as terminals are concerned, a breakdown by industry sectors is not in itself very useful. (For example, a food manufacturer is, perhaps, more likely to use videotex to access financial and commodities information than in assisting in the process of food manufacture per se. Or a large engineering firm might use videotex in its travel department rather than in the factory.) However, in terms of private systems, an industry breakdown is valuable because it identifies the type of company likely to have suitable videotex applications. It may also help to identify the financial and competitive pressures that lead to the introduction of videotex systems.

Breakdown by type of application

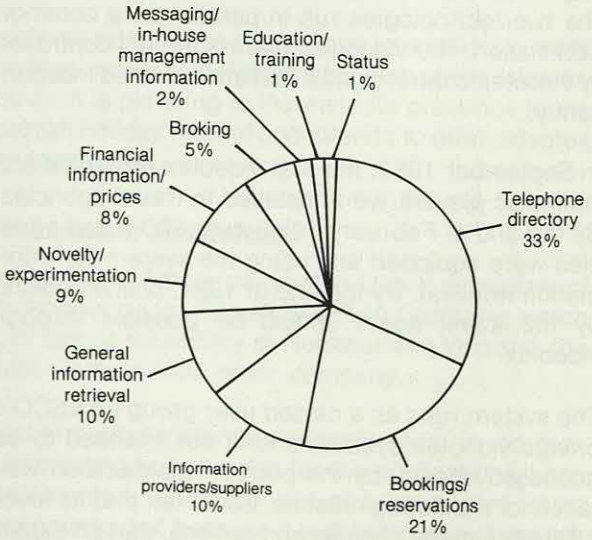
Our research has provided us with an opportunity to examine the type of use that videotex terminals in Western Europe are used for. Almost invariably there is one principal reason why a videotex terminal is acquired and used, and this applies to both domestic and the business sectors. In the business sector, the main purpose in using a terminal might be, for example, the ability for travel agents to book holidays, or for car dealers to locate a particular type of car. In the domestic sector it might be to gain access to games, home shopping or telesoftware services, or an electronic telephone directory. This is not to say that other applications are not used by these users. Merely that, barring the inevitable exceptions, potential videotex users are likely to be attracted only if the medium can offer them a direct and recognisable benefit, be it tangible or intangible.

The breakdown of the European terminal base by principal application, and in terms of business and domestic sectors, is shown in Figures 4.7 and 4.8. Overall, we estimate that 40% of terminals in Europe are used by businesses and 60% in homes. This breakdown includes France where many of the terminals — 75% — are supplied free to residential telephone subscribers. Excluding France, the split is reversed: we estimate that 67% of all terminals are installed in businesses and only 33% are in homes.

Applications in the business sector

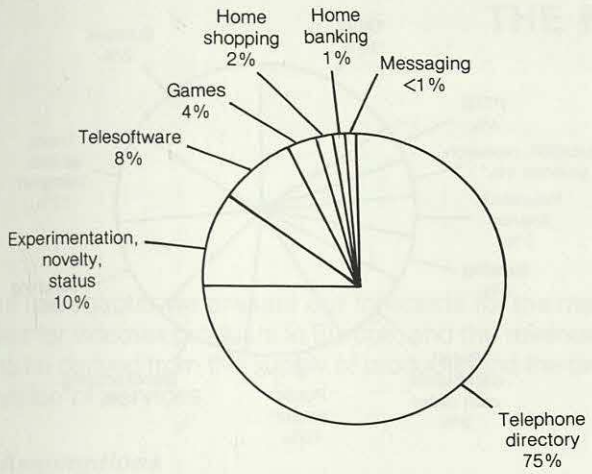
The main business sector applications that we have identified are:

Figure 4.7 Breakdown of videotex applications in Western Europe — business terminals



Note: Percentages relate to the total number of business terminal users.

Figure 4.8 Breakdown of videotex applications in Western Europe — domestic terminals



Note: Percentages relate to the total number of domestic terminals.

—Electronic telephone directory; which is the most important application in France and Denmark, but is as yet virtually non-existent elsewhere.

—Bookings, reservations, access to stock files and ordering; which are important especially in the travel sector. This application is important in every European country, especially in the Netherlands and the UK where a large proportion of the installed terminal base use this type of application. Business teleshopping is also included in this category.

—Management information and internal office systems. This type of application commonly resides on in-house private videotex systems or on closed user groups on PTT-operated or independent bureau systems. Videotex used as a presentation medium and for messaging is also included here.

—Information providers (IPs) use of the system; which comprises not only the use of editing terminals to input data but also the use of terminals to access information from other IPs or for demonstration purposes. It also includes terminals used by suppliers and PTTs for research or demonstration purposes.

—Financial information and banking transactions and prices. The use of videotex to access rapidly changing information on prices, such as share and commodities prices, has been one of the more successful videotex applications and is now available in most countries. All other banking and insurance applications for the business sector are also included here.

—Education and training; which includes training applications by both educational establishments, and the training departments of other business organisations.

—Broking; which includes applications which involve bringing together two or more parties with reciprocal interest, for example finding lorry loads and capacity on return journeys.

—Information retrieval; which comprises access to databases of specific or general interest, be they conventional databases or databases specially developed for videotex. In France especially, this kind of application has many users. The category also includes the use of public-access terminals.

—Experimentation, learning about videotex and novelty; which is one of the main reasons why videotex terminals are used before other, more useful and specific, applications are sufficiently developed by service providers.

—Status; which is different from 'experimentation' in the sense that the terminal is clearly intended as a status symbol or as a gimmick, and from which no other benefit is ever expected.

Applications in the domestic sector

The main domestic sector applications that we have identified are:

—The electronic telephone directory; where the same comments apply as for the business sector.

—Telesoftware; which is an increasingly attractive application for home microcomputer users. Many domestic terminal users in the UK and Austria are motivated to use videotex because of the availability of telesoftware.

—Games (excepting telesoftware games); including all the entertainment applications intended to amuse the user at home.

—Home shopping; which includes mail-order applications. This kind of application is especially mature in West Germany. Holiday bookings made direct by the public are also included in this category.

—Homebanking; which is used in a number of countries but especially in the UK, France and West Germany.

—Messaging; by which we mean direct user-to-user messaging.

—Experimentation, novelty and status; which is still one of the principal reasons why domestic terminals are acquired and used.

Breakdown by industry sector

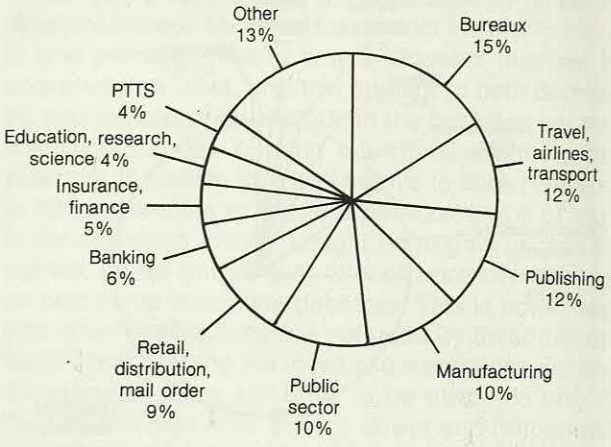
A breakdown by the industry sectors of information providers (IPs) is not, at this stage in the development of videotex in Europe, very meaningful given the still

large number of IPs who use videotex, mainly the public PTT-run systems, principally for experimental purposes or to offer a few frames of promotional information. We have, however, analysed the industry sectors of private systems operators, using our file of private videotex operators containing some 400 names and making assumptions about the remainder based on information provided by suppliers. This breakdown is shown in Figure 4.9. (Although a number of these system operators are also involved for experimental purposes, their proportion is very much lower than for IPs on public systems.)

The most important sector in terms of the number of systems are videotex bureaux, followed by transportation and travel and the publishing industry. Some telecommunications authorities acquire systems from private system suppliers, for use as public systems and for experimental and research purposes. This explains the relatively high percentage (4%) of private systems installed in this sector.

We expect bureaux to remain the dominant sector until 1985, by which time the number of systems installed by the travel industry will equal those installed by bureaux. The retail/distribution sector is also expected to grow rapidly in the short term. It will be 1987 or 1988, we believe, before the full potential of the banking and insurance sectors begin to be realised. The main reasons for this are the stringent security requirements expected by organisations in these sectors (some banks are waiting for smart cards to become generally available in France), and also their generally conservative and cautious attitude.

Figure 4.9 Industry breakdown of operators of private videotex systems



Note: Percentages relate to the total number of private videotex systems.

CHAPTER 5

THE MARKET FOR VIDEOTEX IN EUROPE

In this chapter we present our forecasts for the market for videotex products in Europe, and the revenues to be derived from the supply of products and the provision of services.

Assumptions

In arriving at our forecasts, we have made a number of assumptions about the future development of the market. Some of these are overall assumptions, applying to all or several products or countries, others are specific to particular products or countries. These assumptions are specified in detail below.

Overall assumptions

We have made the following general assumptions:

—The supply of terminals in any one country is adequate to satisfy demand. This assumption is realistic in most cases but in those countries that are, or will be, introducing the CEPT standard there could be continued terminal supply difficulties for some time yet. (Where we believe that a supply shortfall may exist, it is covered in detail in the next section.)

—The communications system and videotex access computers are reliable and available to a reasonable extent, although 100% reliability and availability can of course not be guaranteed. This assumption applies to private and public videotex systems as well as independent bureaux.

—The number of available microcomputer-based videotex terminals increases substantially and their appeal to users (which was identified clearly in our research) continues. This assumption applies particularly to our forecasts for the UK, Austria, the Netherlands and Scandinavia in the shorter term, but in the longer term the proportion of such terminals is likely to be high in all countries. (Our forecasts of terminal installed base and annual unit sales would be substantially lower if this assumption were not met for most countries.)

—Forecasts for all countries, but especially for France, the UK, West Germany and Austria, assume a growing proportion of domestic terminal shipments.

—The regulatory environment affecting videotex is relatively free in all countries, and that no significant market protectionist measures are introduced, except those that applied already in 1984.

Country-by-country assumptions

For each country we have assumed that the following specific assumptions apply:

- Austria:

—The full commercial public service is introduced by early 1985.

—Regulatory restrictions on home banking and shopping are lifted, at least to the extent that these services can be provided.

- Belgium:

—The new RTT service becomes available on schedule.

—Latent (and pent up) demand leads to faster-than-average market take-off.

- Denmark:

—Additional applications, and especially more gateway links, are developed for the public service.

- Finland:

—The PTT system succeeds in providing a country-wide videotex network linking the different local videotex operations.

- France:

—The policy of the French PTT to subsidise and ship Minitel terminals in volume is continued.

- West Germany:

—The changeover to CEPT is complete by Spring 1985.

—The potential terminal-supply shortfall proves only a minor factor in the development of the market.

- Ireland:

—Videotex services continue to be provided by non-

PTT organisations, and the PTT maintains its current positive, but laissez-faire, policy.

- Italy:

—The new public CEPT system is opened by mid 1986 but Videotel is extended in the meantime according to plan.

—Restrictions on private videotex systems are lifted, modified or ignored to the extent that the private videotex market can develop in line with demand.

- Netherlands:

—The PTT's policies to target videotex services to specific market sectors continues, and meets with reasonable success.

- Norway:

—The new PTT system is implemented by the end of 1985.

- Spain:

—The new PTT system is operational by mid 1985, but a shortage of CEPT terminals will exist until the end of 1985.

- Sweden:

—The PTT system is enhanced to provide adequate gateway facilities.

- Switzerland:

—The government gives the go-ahead to public videotex services by early 1986 at the latest.

- UK:

—The PTTs' policy of targeting videotex services at specific 'trigger' market sectors continues.

—Suppliers of home microcomputers start building modems into their products during 1986/87.

Product and expenditure assumptions

We have made the following specific assumptions concerning market penetration, usage and spending on products and services:

—The European average price of a terminal decreases from $325 in 1984 to $250 in 1988, but prices for Minitel-type terminals will be lower than this average, while the price for CEPT terminals will be higher. Average prices for terminals are assumed to be $275 in France in 1984, decreasing to $215 in 1988, and $700 in West Germany in 1984, decreasing to $340 in 1978. In the UK and the remaining countries, the average price assumed is $450 in 1984, decreasing to $275 in 1988. Annual values of the terminal market include the cost of any subsidies by the PTT.

—The proportion of residential terminals in total rises from 65% in 1984, to 75% in 1988. The proportion of residential terminals in France will continue to be substantially higher than in other countries.

—2% of the installed base of terminals are replaced in 1984 and this rises to 4% in 1988. (These low replacement rates reflect the large numbers of newly installed devices in the installed base.)

—Average user spending on services provided by public and independent videotex bureaux increases slightly from $20 a year for residential terminals in 1984, to $30 a year in 1988. For business terminals this spending increases for $150 to $170 over the same period. While these averages may seem low, it should be remembered that our terminal forecasts are for all videotex terminals. The majority of terminals are in France, where the principal application is the largely free telephone directory service. Telecommunications costs are not included in these figures.

—The proportion of user spending on services provided by independent bureaux increases slightly from 20% in 1984, to peak in 1985/86, before returning to that level in 1987 and 1988. Spend on independent bureaux will be higher than average in France, Switzerland and some of the smaller European countries.

—The average number of ports per private system rises from 20 in 1984, to 45 ports by 1988.

—Private systems are replaced at a rate increasing from 5% of the installed base in 1984, to 12.5% in 1988.

—The average cost per private system, including hardware and software is $65,000 per system plus $1,500 per port in 1984, decreasing to $45,000 per system plus $1,350 per port in 1988.

—The software element of private systems represents 30% of system sales values in 1984, rising to 40% in 1988.

All our forecasts are for year-ends. Most of our research for this report was conducted between June and September 1984, and the facts and figures contained in earlier chapters relate mostly to this period. The end of 1984 figures contained in this chapter are, therefore, projections, though, especially in the case of French terminal installations, we have verified our projections against the known terminal base at the time of writing. Our forecasts cover the five year period: 1984 to 1988.

MARKET FORECASTS

In this section we present and discuss our forecasts under three headings:

—Market forecasts for videotex terminals. Our forecasts cover: installed base, annual shipments and annual value of shipments, and include geographic breakdowns. The proportion of terminals of different types and of different standards are also reviewed.

—Market forecasts for private videotex systems. Our forecasts cover the number of private videotex systems and port capacity installed and shipped, together with annual shipment values and geographic breakdowns.

—Market forecasts for revenues from bureau access. Our forecasts cover revenues for both private and public videotex bureaux.

Our forecasts do not cover telecommunications*.

Videotex terminals

In this section, we forecast the growth in the number and value of videotex terminals. The forecasts comprise the installed base and annual shipments, and include geographic breakdowns.

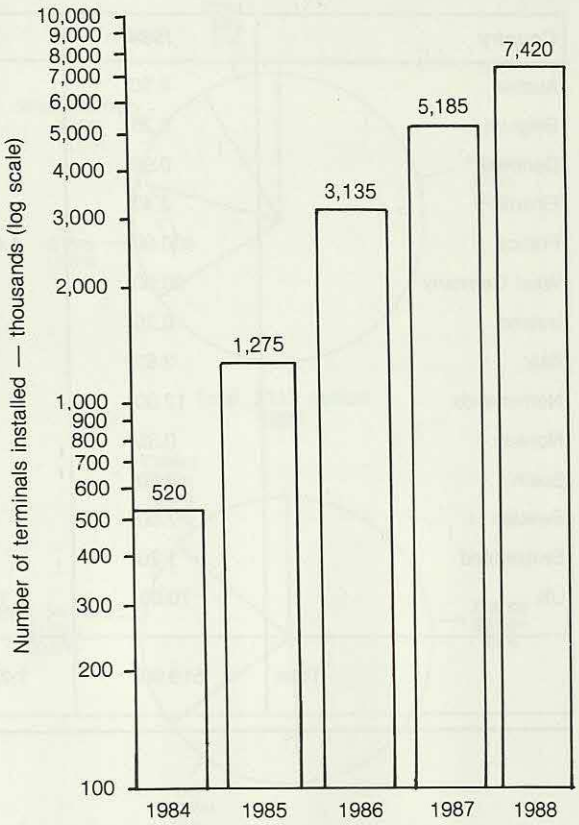
Our forecast for the total number of terminals installed in Western Europe are presented in Figure 5.1. From 1984 the installed base of terminals will grow from just over half a million to nearly 7.5 million in 1988. This represents a 15-fold increase in installed base over 4 years, and represents an average annual growth rate of 95%.

Our forecasts are marginally lower than those we produced last year, when we forecast an installed base of 8 million terminals by 1988. This is principally because it is now quite clear that the West German market will develop more slowly than we envisaged last year. However, we believe that the early slippage in West Germany will begin to be made up by 1987/88, a period when growth in the other two big European markets, France and the UK, will begin to slow down.

Figure 5.2 provides a breakdown by country of our terminal installed-base forecast. For much of the rest of the 1980s, the majority of terminals installed and shipped will be in France, but growth is also high in the Netherlands, Belgium, West Germany and the UK. Italy and Spain represent big potential markets, but we do not expect high terminal penetration in these countries before the end of the 1980s.

Figure 5.3 presents our market forecasts for annual shipments of terminals and the value of the shipments. Annual unit sales, including replacements, will rise from 345,000 in 1984 to over 2.5 million in 1988, a 7-fold growth. Our forecasts are for all terminals, whether connected to public systems or private systems or both. The relative slowdown in shipment growth in 1987/88 reflects our view that the French PTT is likely to modify its Minitel distribution policy once it has achieved its 1986 target of three million installed terminals.

Figure 5.1 Forecast of the installed base of videotex terminals — Western Europe total



The value of annual terminal sales will rise from $112 million in 1984 to nearly $634 million by 1988, a 5-fold growth. The fact that value growth is lower than volume growth is a reflection of falling terminal prices.

Figures 5.4 and 5.5 provide a geographic breakdown of our forecasts for terminal shipments by volume and value. The share of shipments in France is highest in 1984, at 78% of total European shipments, but it will still represent over half the total shipments in 1988, even though we anticipate a relative slowdown in Minitel terminal shipments in France after 1986. Our terminal shipment forecast for 1988 reflects market saturation being approached in France and in the UK, but continuing fast growth in West Germany and most of the other countries.

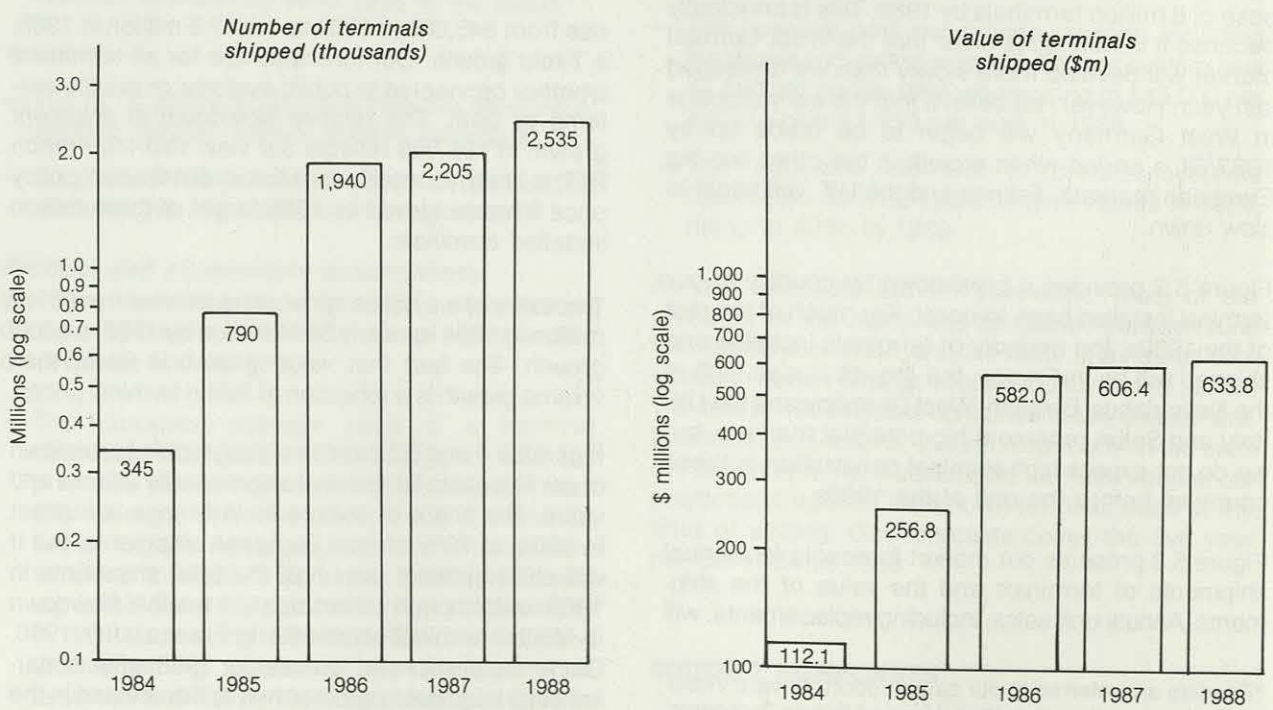
*Readers are referred to our earlier report 'Private Videotex Systems — their Selection, Use and Future Prospects' for an estimate of the market for telecommunications services.

Figure 5.2 Country-by-country market forecasts for the installed base of videotex terminals

Thousands of terminals

Country	*1984*	*1985*	*1986*	*1987*	*1988*
Austria	2.50	8.00	22.00	50.00	90.00
Belgium	0.25	2.00	15.00	45.00	80.00
Denmark	0.95	4.00	10.00	17.00	30.00
Finland	2.40	4.00	8.00	14.00	25.00
France	400.00	1,000.00	2,500.00	3,750.00	5,000.00
West Germany	20.00	70.00	150.00	400.00	750.00
Ireland	0.25	1.00	3.50	7.00	12.00
Italy	2.50	6.00	15.00	40.00	90.00
Netherlands	12.00	25.00	50.00	90.00	130.00
Norway	0.35	1.20	6.00	12.00	25.00
Spain	0.50	3.00	10.00	35.00	75.00
Sweden	7.00	25.00	35.00	50.00	70.00
Switzerland	1.20	3.50	12.00	25.00	45.00
UK	70.00	125.00	300.00	650.00	1,000.00
Total	519.90	1,277.70	3,136.50	5,185.00	7,422.00

Figure 5.3 Forecast of terminal shipments (numbers and value) — Western Europe total



Note: Replacements are included.

Figure 5.4 Geographic breakdown of terminal shipments by number

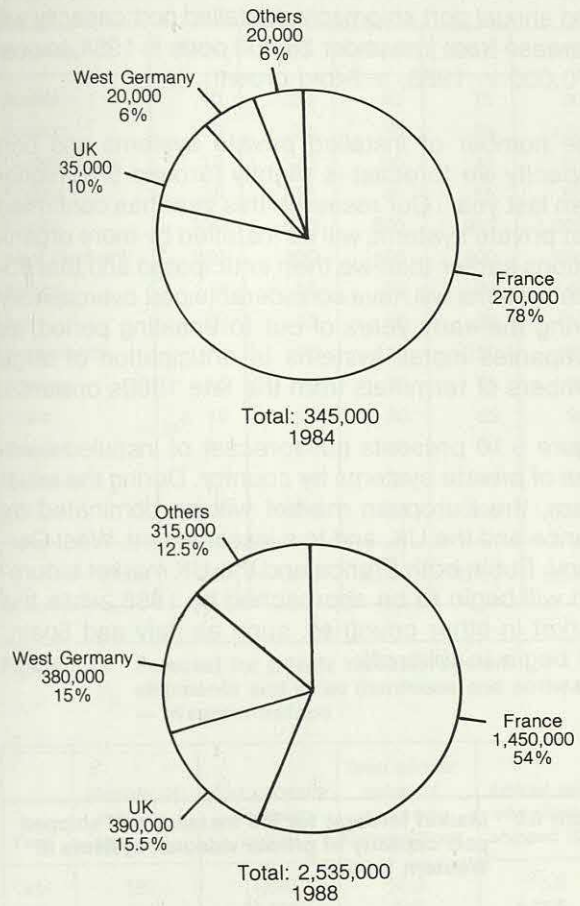
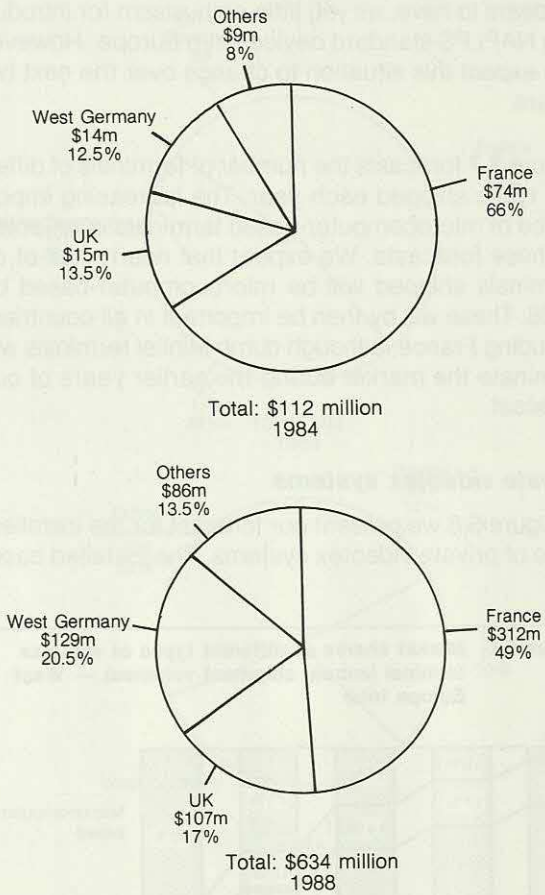


Figure 5.5 Geographic breakdown of annual value of terminal shipments

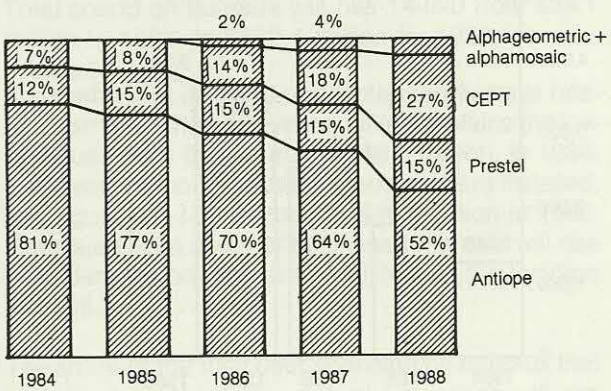


Because of the higher unit cost of CEPT terminals compared to Prestel terminals, West Germany's share of terminal shipment values will exceed the UK's by 1988.

Figure 5.6 presents our market forecasts for the proportion of terminals of different standards shipped each year. Again, the French Antiope standard dominates the standards scene, in terms of annual terminals shipped, for much of the 1980s. From 1986 onwards, CEPT-standard terminals will begin to be shipped in greater numbers, and they will represent over a quarter of terminals shipped in 1988. Also, from 1986 terminals with alphageometric capability will begin to be shipped in significant numbers and their share of the market will rise to 6% by 1988. Alphaphotographic terminals will have an insignificant share of the market, even by 1988.

The share of the market attributed to terminals with an alphageometric capability is lower than the share we were forecasting last year. There are a number of reasons for this. The first reason is the slowdown in German CEPT (level 3) standard terminal shipments, as a high penetration of level-3 standard terminals would have led to greater pressures to introduce CEPT level 4 which incorporates alphageometric capabilities. The second reason is the continu-

Figure 5.6 Market shares of terminals of different videotex standards (annual shipment volumes) — West Europe total



ing uncertainty over the policies likely to be adopted by PTTs — particularly the French PTT — towards enhanced-display standards, and the fact that IBM appears to have, as yet, little enthusiasm for introducing NAPLPS-standard devices into Europe. However, we expect this situation to change over the next two years.

Figure 5.7 forecasts the number of terminals of different types shipped each year. The increasing importance of microcomputer-based terminals is reflected in these forecasts. We expect that nearly half of all terminals shipped will be microcomputer-based by 1988. These will by then be important in all countries, including France, although dumb Minitel terminals will dominate the market during the earlier years of our forecast.

Private videotex systems

In Figure 5.8 we present our forecast for the installed base of private videotex systems. The installed base will grow from 1,240 systems in 1984, by over 200%, to 3,840 systems in 1988. Figure 5.9 shows our forecast for the installed port capacity on private systems, and annual port shipments. Installed port capacity will increase from just under 25,000 ports in 1984, to over 170,000 in 1988, a 7-fold growth.

The number of installed private systems and port capacity we forecast is slightly (around 5%) higher than last year. Our research this year has confirmed that private systems will be installed by more organisations earlier than we then anticipated and that private systems will have considerable port overcapacity during the early years of our forecasting period, as companies install systems in anticipation of large numbers of terminals from the late 1980s onwards.

Figure 5.10 presents our forecast of installed numbers of private systems by country. During the initial years, the European market will be dominated by France and the UK, and to a lesser extent, West Germany. But in both France and the UK market saturation will begin to be approached by 1988, while the market in other countries, such as Italy and Spain, will begin to take off.

Figure 5.7 Market shares of different types of videotex terminal (annual shipment volumes) — West Europe total

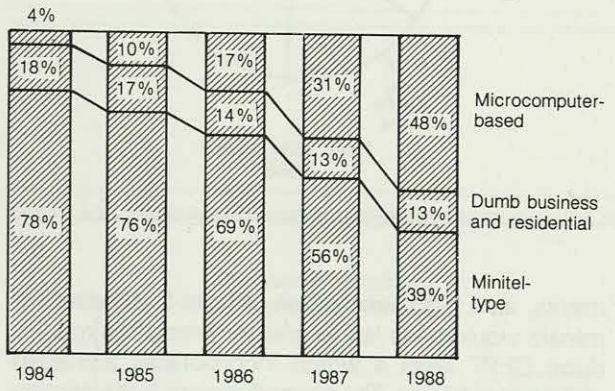


Figure 5.8 Forecast of the installed base of private videotex systems in Western Europe

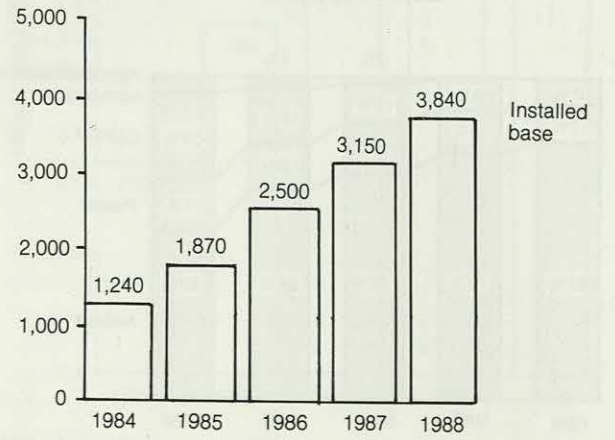


Figure 5.9 Market forecast for the installed and shipped port capacity of private videotex systems in Western Europe

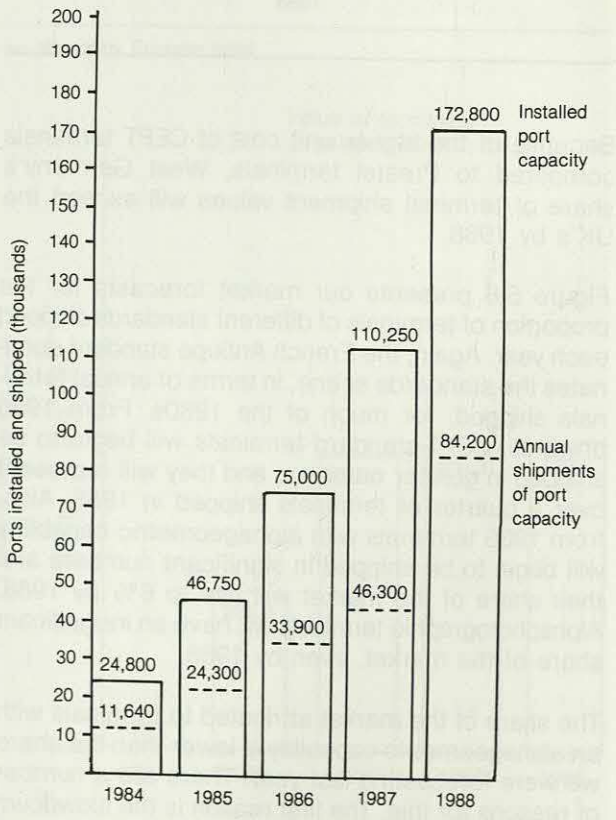


Figure 5.10 Country-by-country forecasts for the installed base of private videotex systems

Country	1984	1985	1986	1987	1988
Austria	40	50	60	75	90
Belgium	30	50	70	95	120
Denmark	10	20	30	40	50
Finland	30	35	45	55	65
France	350	600	800	950	1,025
West Germany	200	300	450	600	850
Ireland	5	10	20	30	40
Italy	20	35	55	80	110
Netherlands	70	90	115	150	180
Norway	10	20	35	60	80
Spain	10	20	30	55	85
Sweden	40	50	65	80	100
Switzerland	25	40	50	80	120
UK	400	550	675	800	925
Total	1,240	1,870	2,500	3,150	3,840

Figure 5.11 Forecast for private videotex system shipments and value (hardware and software) — Western Europe

Year	Number of systems shipped[1]	Port capacity shipped (ports)[2]	Total annual value of systems shipped ($m)[3]	Annual value of software shipped ($m)
1984	582	11,640	55.3	16.6
1985	724	24,300	79.9	24.0
1986	818	33,890	98.2	34.4
1987	965	46,275	117.9	41.3
1988	1,170	84,150	166.3	66.5

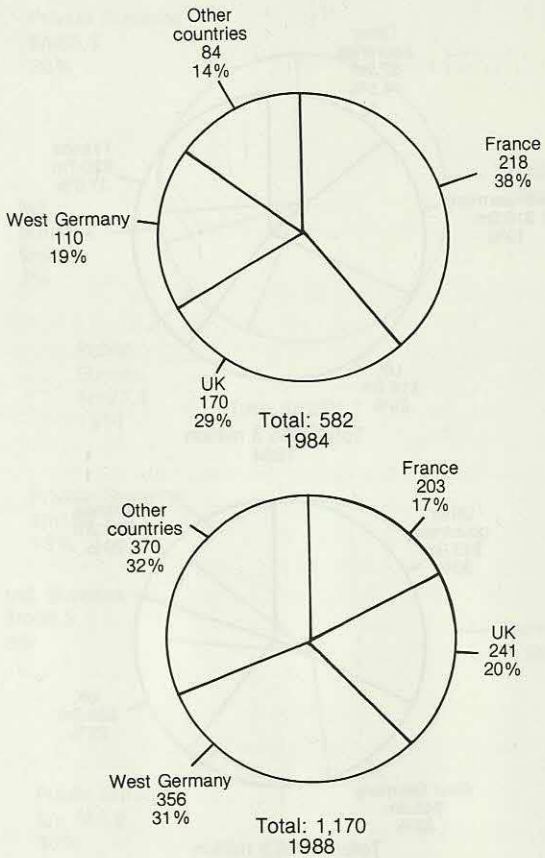
Note: [1]Systems shipped include replacements.
[2]Ports shipped include replacements and capacity increases.
[3]Includes software.

In Figure 5.11 we provide our market forecasts for the number of private videotex systems and ports shipped each year, from 1984 to 1988. The number of systems shipped each year, including replacements, will nearly double by 1988. Port capacity shipped will grow faster (as systems are upgraded and enhanced) from 11,640 ports in 1984, to 84,150 ports in 1988; a 7-fold growth.

Revenues from the sale of private systems (hardware and software) will grow three-fold over the next five years, while the value of videotex software sales will grow four-fold.

The geographic breakdown of annual system shipments by volume and value is provided in Figures 5.12 and 5.13. In terms of annual system shipment volumes, France and the UK dominate the market in 1984, but by 1988 the markets in West Germany and other countries will have grown substantially and will represent a larger market share.

Figure 5.12 Geographic breakdown of private videotex system shipment volumes



Public and independent videotex bureaux

In Figure 5.14 we provide our forecasts for the annual spend on videotex bureaux (including both PTT-run and private bureaux) for both residential and business subscribers.

Total spend on bureaux will rise 14-fold from $34.1 million in 1984, to $482.4 million by 1988.

The number of installed residential terminals is relatively small in the early years, which explains the low revenues from this source, at $6.8 million, in 1984. However, as more residential terminals are installed, this figure will rise 25-fold, to $167 million in 1988. Revenues from users of business terminals will rise considerably too (almost 12-fold) to over $315 million in 1988.

The share of the total user spending on bureaux that is earned by the PTT-run public services will, we believe, remain at around 80% overall for the next

Figure 5.13 Geographic breakdown of forecast value of private videotex systems shipped

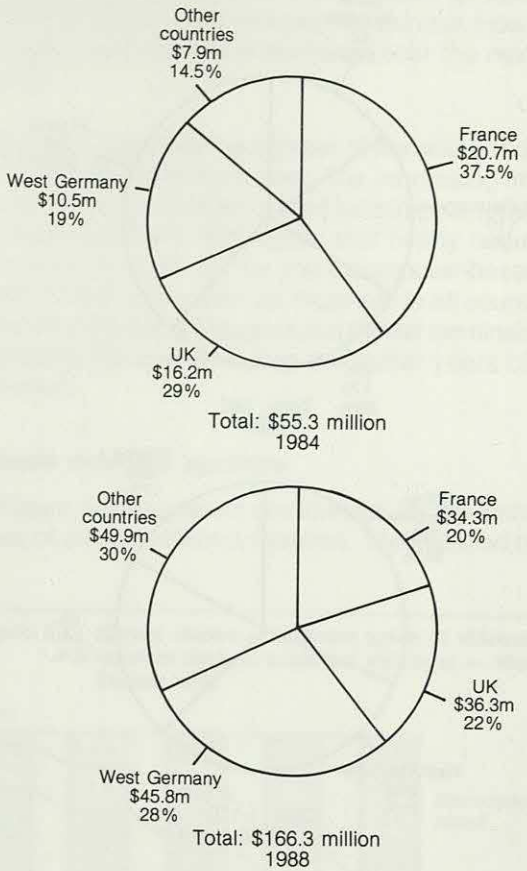


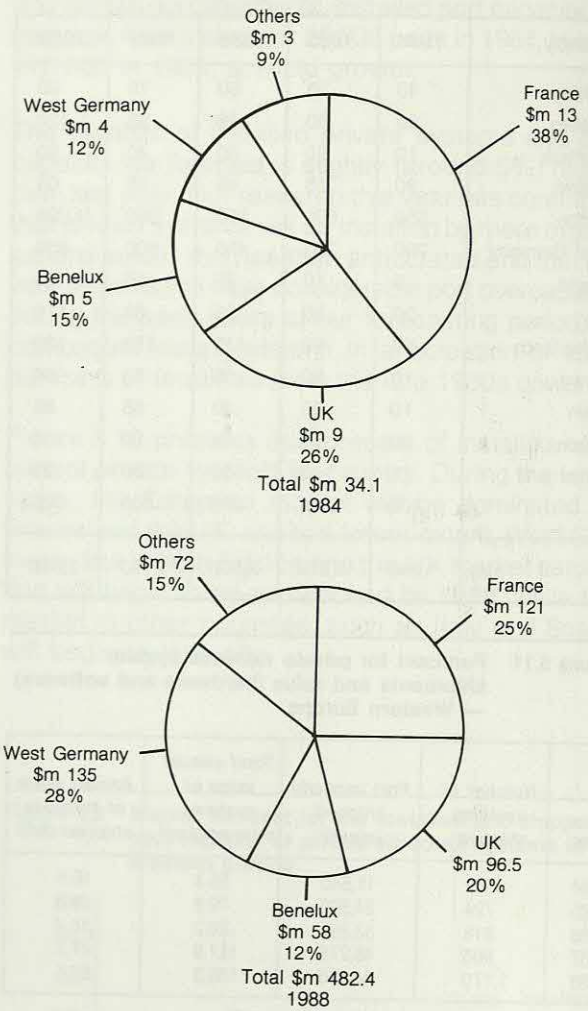
Figure 5.14 Forecast of annual user spend on public and independent videotex bureau access

Year	Bureau spend ($m)				
	Residential terminals	*Business terminals*	*Total*	*Independent bureaux*	*Public bureaux*
1984	6.8	27.3	34.1	6.8	27.3
1985	16.6	67.0	83.6	20.9	62.7
1986	54.9	150.6	205.5	51.4	154.1
1987	90.7	248.9	339.6	67.9	271.7
1988	167.0	315.4	482.4	96.5	385.9

five years, though this will vary widely between different countries. For example, it will be very much lower in France, where the PTT has adopted a policy of encouraging independent bureaux, than it will be in West Germany, where the Bildschirmtext system architecture is specifically designed for the provision of information services held on the PTT's computers.

Our forecasts refer purely to bureau access, whether this is based on connect-time charges, frame-access

Figure 5.15 Geographic breakdown of annual revenues from bureau access



charges or subscription-based charges. It includes gateway calls but it does not include telecommunication charges, nor does it include any charges made by bureaux to information providers for the creation and maintenance of videotex services. (To some extent this is misleading since much information is offered free of charge. Where this is the case, the information provider is, in effect, compensating the bureau for user-access charges.)

Figure 5.15 provides a geographic breakdown of user spending by country. In France, independent bureaux play an important role as they provide many of the services that PTT-run public bureaux offer in other countries. Indeed, some 20% to 25% of private videotex systems in France in 1984 are installed by bureaux. This explains the relatively high French market share of the bureau business in 1984. Compared to France and the UK, the West German bureau market was relatively undeveloped in 1984, but by 1988 we expect that West German bureau revenues will

be higher than in any other country because of the relatively high costs of implementing gateway links to Bildschirmtext, and the larger numbers of small businesses operating in West Germany. In the UK, France, Belgium and the Netherlands, many of the early bureau users will have installed their own private systems by 1988.

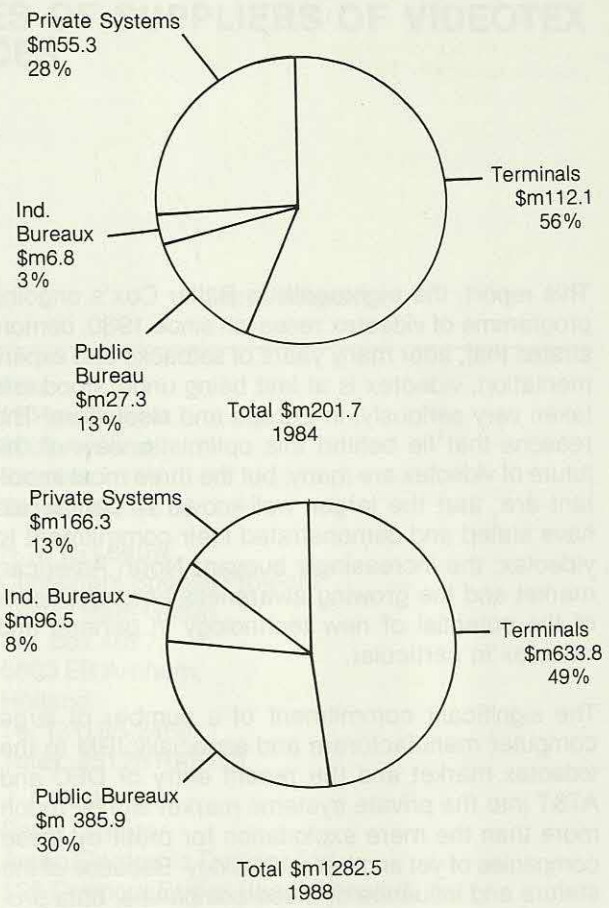
OVERVIEW OF SOURCES OF REVENUE FROM VIDEOTEX

We estimate the total value of the videotex market in Europe (excluding telecommunications*) to be just over $200 million in 1984, rising more than 6-fold to nearly $1,300 million, as shown in Figure 5.16.

But the shares of this business held by different types of products and services changes. Thus, private systems account for nearly a third of the market in 1984 in terms of the value of annual shipments. By 1988, although the annual value of the private videotex market is still high in absolute terms, it will decline as a proportion of the total to 13%. By contrast, the proportion of revenues accounted for by bureau access will grow considerably between 1984 and 1988, rising from 3% for independent bureaux and 13% for public bureaux to 8% and 30% respectively. The proportion of the annual market held by the terminal business is relatively stable, but it will decline slightly from 56% in 1984 to 49% in 1988.

*In our earlier report on private videotex systems, we estimated that telecommunications accounted for 7% of the total market in 1983, rising to just over 22% in 1988.

Figure 5.16 Breakdown of the annual value of the videotex market



CONCLUDING COMMENTS

This report, the eighteenth in Butler Cox's ongoing programme of videotex research since 1980, demonstrates that, after many years of setbacks and experimentation, videotex is at last being understood and taken very seriously, in Europe and elsewhere. The reasons that lie behind this optimistic view of the future of videotex are many, but the three most important are: that the larger well-known IT companies have stated and demonstrated their commitment to videotex; the increasingly buoyant North American market and the growing awareness amongst users of the potential of new technology in general and videotex in particular.

The significant commitment of a number of large computer manufacturers and especially IBM to the videotex market and the recent entry of DEC and AT&T into the private systems market signify much more than the mere exploitation for profit by these companies of yet another technology. Because of the stature and influence of these companies, data processing managers, traditionally often scathing of videotex and more often than not rejecting it out of hand, have begun to reappraise their position. And as videotex becomes integrated into the DP function it will benefit increasingly not only from better system experience but also from larger budgets, established procedures and professional systems management. At the same time, videotex will inevitably lose its identity as a distinct technology, becoming merely one of a number of alternative display and communications technologies available to system operators and terminal users.

It is significant that many of the large supplier companies mentioned in the preceding paragraph are American. It is hard to say whether their growing commitment to videotex is the result, at least in part, of a much greater interest in videotex in North America, or whether North American interest in videotex is a result of their commitment to the technology. However, the fact that the US has lagged some years behind Europe in its exploitation of videotex is something of an anomaly (if not unique) in the history of information technology for almost 30 years. The fact that it has taken videotex almost 10 years to reach its current level of development in Europe, may be due in part to the fact that it was not a tried and tested technology being exported from the USA by major computer suppliers.

Finally, videotex is also being taken increasingly seriously by users themselves. Especially as a result of the recent microcomputer 'revolution', users are becoming much more aware of how technology can benefit them. An increasing interest in and use of electronic media, including videotex, is one manifestation of this heightened awareness. And microcomputer technology will, in turn, have a fundamental impact on the videotex products that will prove successful in the market over the next five years.

Because of these and other related trends, we believe the outlook for videotex in Europe is extremely healthy for the next five years. (It may not, however, be as rosy as some European PTTs may believe or wish their potential customers to believe.) The spectacular success of the French Minitel distribution programme and the flourishing market for private videotex systems endorses our view that 1983/84 has marked the turning point for the videotex industry in Europe.

Although substantial investments will still be required, the industry has matured to the point where it is clear that the dominant suppliers are assured of at least five years of sustained rapid growth and profitability.

APPENDIX 1

NAMES AND ADDRESSES OF SUPPLIERS OF VIDEOTEX PRODUCTS AND SERVICES

Supplier/agent

P. Clements
ADP Network Services
58 Halford Street
Rutland Centre, 3rd Floor
Leicester LE4 1TQ
U.K.
Tel: (0533) 536832

G. Simeone
AGI
Via Nomentana 106,
Rome,
Italy.
Tel: 869 625

Tristan Evans
Air Call Computers Systems Ltd
105-111 High St. (Air Call House)
Houghton Regis, Dunstable,
Bedfordshire LU5 EL.
U.K.
Tel: 0582 603123

E. Adolph
Alldata Service
Prinzregentenplatz 11,
8000 Munich 80,
West Germany.
Tel: (089) 418070

Allen Computer Services
Allen House,
40-48 Bernard Street,
London WC1,
U.K.
Tel: (01) 278 4595

R. M. E. Williamson
Marketing Services Director
Aregon International Ltd
17 Lincoln's Inn Fields,
London EC2A 3EG,
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Tel: 01-831 7536
Telex: 298977

Supplier/agent

Aria
12 Rue Colbert,
8000 Amiens,
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Tel: (22) 92 08 56

H. V. D. Leeuw
Consultant Special Projects
Assyst Raet Group
PO. Box 4077,
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Telex: 511407 wervh-d

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P. Gabriel
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Th. Sevenslaan 106,
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PO. Box 937,
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R. Cole
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Manor Way,
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Cosy Services BV
Hazerswoude,
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75017 Paris,
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APPENDIX 2

PRIVATE VIDEOTEX SYSTEM OPERATORS

This appendix lists the names of some 280 private videotex system operators in Western Europe together with details of each organisation's industry sector, location and system/supplier details.

The list has been drawn up from information provided by private system suppliers and from Butler Cox's own research. Not all suppliers were willing to allow us to publish the names of organisations that have bought their systems and several were willing to release a few names only as reference sales. For confidentiality reasons we can therefore only publish those names that suppliers have openly released and those that are 'common knowledge' (eg, from press reports, conferences, etc.).

We have also not included private systems used by system suppliers themselves except where a system is used by another part of the same group of companies as the supplier (eg, a parent company).

Therefore, the list represents about 70% of the names of private videotex system operators known to Butler Cox.

Organisation	*Industry/activity*	*Country*	*System details*
AAAA	Bureau	Netherlands	Systel
ABT	Tourism	Netherlands	Langton PIII/ Videogate
ADIDAS	Distribution	France	Videopac
ADP	Bureau	UK	IGS
AGB Cable & Viewdata	Services	UK	IVS-3
Aerztekasse	Medical	Switzerland	Betex
Aircall	Bureau	UK	Betex
Allied Breweries	Brewing	UK	Syfatel
Alldata	Bureau	Germany	
Allen C.S.	Bureau	UK	Computex
Alsothom		France	Télésystèmes
American Express	Credit	UK	Rediffusion
ANPE de Marseille		France	Videopac
Anglia Timesharing	Bureau	UK	Rediffusion
Airel	Bureau	France	Arcom
Arke Reizen	Travel	Netherlands	NCR Videotex
Assedic de l'Est		France	Videopac
Assemble Nationale	Government	France	Télésystèmes
Assyst RAET	Bureau	Netherlands	Betex, Videotex 100
Avis	Car rental	UK	Syfatel
AUS Intext	Bureau	UK	Mistel
BACS	Finance	UK	
Bank of England	Banking	UK	IVS
Bank Clearing Centre	Banking	Switzerland	NCR Videotex
Barclays	Banking	UK	Rediffusion
Barclays	Banking	Denmark	C. Rovsing
Bayerische Landesbank	Banking	Germany	
Bass UK	Brewing	UK	Viewbase
Beaufort	Bureau	UK	Thorntel
Beecham	Chemicals	UK	IBM
Belgian Inst. of Management	Association	Belgium	Computex
Bertelsmann	Publishing	Germany	Btx-Iris
Berliner Volksbank	Banking	Germany	
BHW	Finance	Germany	
BNP	Banking	France	Videopac
Bonair	Travel	Netherlands	Bulletin
BP Minerals	Mining	UK	Computex
British Airports Authority	Airports	UK	Telemachus
British Home Stores	Retail	UK	Microdata, Viewbase
British Gas	Gas	UK	IVS, MGS
British Leyland	Motor	UK	IVS-3
British Nuclear Fuels	Energy	UK	Bulletin
British Telecom	Telecommunications	UK	Computex, Mistel
British Steel	Steel	UK	Thorntel
BUE		France	Télésystèmes
Butlins	Tourism	UK	Computex
CAI		Sweden	Btx-Iris
CAS	Bureau	Germany	Dabit
CCF		France	CAP-Gemini
CCTA	Govt. agency	UK	Rediffusion
Central Beheer	Bureau	Netherlands	IVS
Centre-File	Bureau	UK	Rediffusion
CGI	Bureau	France	IBM
City of Bierl	Local govt.	Switzerland	NCR Videotex
CODHOR	Distribution	France	Videopac
Cognotec	Bureau	Ireland	Mistel
COI	Government	UK	Rediffussion
Commercial Union	Insurance	UK	Langton PIII/ Videogate
Compas	Bureau	Germany	IVS
Control Data	Bureau	Germany	CAP-Gemini
Courage	Brewing	UK	MGS
Courrier Picard	Publishing	France	Videopac
CSPB		France	CAP-Gemini
CTL	Bureau	France	HP9000
CXP		France	Videopac
Cycles Peugeot	Manufacturing	France	Videopac
DAAT	Distribution	France	Videopac
Datasolve	Bureau/ publishing	UK	Miracle
Datema	Bureau	Sweden	Systel
DBS	Credit	Netherlands	Megaview (Systel)
Deutsche Bank	Banking	Germany	Siemens
Deutsche Postreklame	Advertising	Germany	Btx-Iris
DER/AS	TV rentals	Denmark	ND Videotex
Debenhams	Retail	UK	Viewbase
Dextel	Publishing	Sweden	Mistel
DFPT	Education	France	Videopac
DHSS	Government	UK	Computex
Diapason		France	Videopac
Didot Bottin-Duplex	Bureau	France	Multitel
Distriphar	Pharmaceuticals	France	ICL/Own
Dornier	Electronics	Germany	Btx-Iris
Drac Besançon	Tourism	France	Videopac
Dresdner Bank	Banking	Germany	
DRFP	Local govt.	France	Videopac
ECGD	Govt. agency	UK	GEC

APPENDIX 2 PRIVATE VIDEOTEX SYSTEM OPERATORS

Organisation	Industry/activity	Country	System details
Elanders	Printing	Sweden	Langton PIII/ Videogate
Enidata	Systems	Italy	IVS
English China Clays	Manufacturer	UK	Thorntel
Esselte	Printing	Sweden	Langton PIII/ Videogate
Factors Trust	Finance	UK	Bulletin
Fernuniversität	Education	Germany	IBM
Finsbury Data Services	Bureau	UK	IVS
Foote Cone & Belding	Advertising	UK	Computex
Ford	Motor	UK/others	Rediffusion
French Lawyers Assoc.	Association	France	Betex
Friends Provident	Insurance	UK	IBM
GAD	Bureau	Germany	
Gateshead Borough Council	Local govt.	UK	Rediffusion
GCAM-Artemis	Bureau	France	BRS
Geest Computers	Bureau	UK	Bulletin
GFI	Bureau	France	Télésource
GIZ	Bureau	Germany	Siemens
GSI	Bureau	France	
Gites Rurale du Limousin		France	Télésystèmes
Glamorgan Library	Local govt.	UK	Viewbase
Global	Travel	UK	Bulletin
Gotabanken	Banking	Sweden	Avi-Net
Grand Metropolitan	Tourism	UK	IVS
Greater Manchester Youth Authority	Charity	UK	Viewbase
Greenwich Borough Council	Local govt.	UK	Viewbase
Gruner & Jahr	Publishing	Germany	Betex
Hanger Lane Computing	Bureau	UK	IVS, PIII
Helsingin Telset	Bureau	Finland	Mistel
Henkel	Manufacturer	Germany	
Horizon	Travel	UK	Rediffusion
Host Group	Brewing	UK	Microdata, Viewbase
Hotel Vision	Tourism	Germany	Btx-Iris
Howson Algraphy	Bureau	UK	Incotel
ICC	Publishing	UK	Alphavision
ICI Agriculture	Chemicals	UK	Rediffusion
ICV	Fin. publishing	UK	Mistel
IDETA	Retail	Netherlands	Mistel
IDO	Bureau	Germany	Betex
Immovideo	Property	Belgium	Mistel
Imperial Brewing & Leisure	Brewing	UK	MGS
Inova Instr.	Agriculture	UK	Miracle
Institute for Industrial Research	Bureau	Ireland	IVS
Italtel	Telecommunications	Italy	HIS, Modcomp
International Commodities Clearing House	Finance	UK	Rediffusion
Jetair	Travel	Belgium	Bulletin/Own
Kansallis-Osake-Panki	Banking	Finland	Systel
Kaufhof	Retail	Germany	
Kent County Council	Local govt.	UK	Computex, Bulletin
Keski Suomen	Bureau	Finland	Mistel
Kirfavalitys Oy	Wholesale	Finland	Systel
KLM	Airline	Netherlands	Modcomp
Kopke Banking	Banking	Finland	Systel
Kreditkassen	Banking	Norway	Mistel
Landwirtschafts-ministerium Bayern	Government	Germany	IBM/own
La Redoute		France	CAP-Gemini
Legal & General	Insurance	UK	
Les 3 Suisses	Mail order	France	CAP-Gemini
Liber	Bureau	Sweden	
Littlewoods	Mail order	UK	IVS
Liverpool Garden Festival	Exhibition	UK	ITM Rotaview
Lloyd Anversois	Publishing	Belgium	IVS
London Stock Exchange	Stock exchange	UK	Modcomp
Loewe-Opta	Electronics	Germany	Btx-Iris
LRC Products	Manufacturing	UK	Brown's Box
LTU	Tourism	Germany	Btx-Iris
Lucas	Manufacturing	UK	Rediffusion
Mairie de Nantes	Local govt.	France	Videopac
Mairie de Hetz	Local govt.	France	Videopac
Manchester International Airport	Airport	UK	Computex
Manpower Services Commission	Govt. agency	UK	Miracle
Mecca	Bookmakers	UK	
Medicall	Medical	Belgium	Mistel
Meteorological	Meteorology	Finland	Mistel
Midland Bank	Banking	UK	
Migros	Various	Switzerland	Betex
Milan City	Local govt.	Italy	Videopac
National Homes Network	Property	UK	Computex
NCM	Insurance	Netherlands	Mistel
NCR	Electronics	Switzerland	NCR Videotex
Neckermann	Mail order/travel	Germany	IBM
Newham Borough Council	Local govt.	UK	Viewbase
NOB Wegtransport	Transport	Netherlands	Systel
Nokia	Various	Finland	Mistel
NMBP	Bureau	France	
Norska Televerket	Telecommunications	Norway	Avi-Net
Norsk Senter for Informatikk A/S	Bureau	Norway	Mistel
NSI	Bureau	Norway	Mistel
Northamptonshire County Council	Local govt.	UK	Bulletin
Northern Dairies	Distribution	UK	Computex
North Sea Ferries	Transport	Netherlands	PIII
Nottinghamshire Building Society	Finance	UK	Bulletin
NVA Skala	TV Rentals	Belgium	ND Videotex
Oesterr. Postsparkasse	Banking	Austria	Btx-Iris
Oesterr. Raiffeissenbank	Banking	Austria	Btx-Iris
Ogilvy & Mather	Advertising	UK	Metrotel
OKO Bank	Banking	Finland	Mistel
Olympic Holidays	Travel	UK	Sparta (Own)
Orda-B	Bureau	Belgium	Mistel
Otto-Versand	Mail order	Germany	
Paijat-Visio	Bureau	Finland	Mistel
Parc de la Villette	Education	France	Videopac
Patric Videotex	Bureau	Ireland	Rediffusion
Parisien Libere		France	Télésystèmes
PE Holland	Electronics	Netherlands	Systel
PG Group	Systems	Finland	Systel
Philips	Electronics	Germany	Btx-Iris, Dabit
Philips	Electronics	Netherlands	Systel
Pilkingtons	Manufacturer	UK	Telemachus
PK Banken	Banking	Sweden	Mistel
Postel	Bureau	Sweden	Systel
Provinzial	Insurance	Germany	
Prudential	Insurance	UK	Videogate, IBM
Prysesa	Travel	Spain	Modcomp
Quelle	Mail order	Germany	IBM
Questel	Bureau	France	Télésystèmes
Rabobank	Banking	Netherlands	Betex
Radio Rentals	TV rentals	UK	Thorntel
RATP	Transport	France	Meta (SMT)
Reading University	Education	UK	Computex
Reiffeisen	Banking	Germany	Siemens
Resource Computers	Bureau	UK	Vision 32
Ribers Kreditinformation	Credit	Denmark	C. Rovsing
Ringier/Agentur 1818	Bureau	Switzerland	STR
Robert Gordon Institute	Education	UK	Mistel
Rockford District Council	Local govt.	UK	Bulletin
Royal Holloway College	Education	UK	Miracle
Royal Infirmary, Edinburgh	Health	UK	
Rumbelows	Retail	UK	PIII/Videogate
Sanoma	Publishing	Finland	Mistel
Scottish Mutual	Insurance	UK	Syfatel
Scottish & Newcastle	Brewing	UK	PIII

Organisation	Industry/activity	Country	System details
Scottish Council for Educational Technology	Education	UK	Computex
SE Banken	Banking	Sweden	Avi-Net
Searveg	Bureau	Switzerland	NCR-Videotex
SGB	Banking	Belgium	IVS
SGIP	Bureau	France	Intertechnique
Shell	Oil	Netherlands	Rediffusion
SGZ	Bureau	France	Multitel
SHB Bank	Banking	Sweden	Mistel
SIP	Telecommunications	Italy	Mistel
SITS	Health	France	Télésystèmes
Skala Televisie	TV rentals	Netherlands	ND Videotex
Skala TV	TV rentals	Spain	ND Videotex
SKOP Bank	Banking	Sweden	Mistel
SLIGOS	Bureau	France	
SNCF	Transport	France	Videopac
Sok	Wholesale	Finland	Mistel
Sony	Electronics	UK	Mistel
Space Time Systems	Theatre systems	UK	Miracle
Sparkassenverlag	Publishing	Germany	Btx-Iris
Sporteus		France	Télésystèmes
Stockholm Fondbörs	Stock exchange	Sweden	Avi-Net
Talbot	Motor	UK	Rediffusion
Tampere Telset	Bureau	Finland	Systel
Target Life	Insurance	UK	Viewbase
TDU	Publishing	Sweden	Mistel
Telecontrol	Distribution	Austria	Btx-Iris
Teledatai Norr	Bureau	Sweden	Avi-Net
Telehansa	Distribution	Finland	Btx-Iris
Telemedia	Systems	Belgium	IVS
Telepress AG	El. publishing	Switzerland	STR
Teletietopalveli	Bureau	Finland	Mistel
Televerket	Telecommunications	Sweden	Avi-Net, Systel
T&N	Electronics	Germany	Btx-Iris
Thomas Cook	Travel	UK	IVS-3, Videogate
Thomson Holidays	Travel	UK	Own + Videogate
Thorn-EMI Hyr-TV	TV rentals	Sweden	ND Videotex
A/S Thorn-EMI Leie TV	TV rentals	Norway	ND Videotex
OY Thorn-Video TV	TV rentals	Finland	ND Videotex
Toeristik	Travel	Netherlands	NCR Videotex
Townsend Thoresen	Transport	UK	Modcomp
Tradicom		Netherlands	Megaview (Systel)
Transpotel	Transport	Netherlands	IBM
Travicom	Travel	UK	Videogate
TUI	Travel	Germany	IBM
Turun Sanomat	Publishing	Finland	Mistel
UCSL	Bureau	UK	IGS
UDAC	Education	Sweden	Mistel
UKAEA	Energy	UK	Computex
UK Army Signals	Government	UK	Computex
United Dairies	Distribution	UK	Betex
Université de Nancy	Education	France	Videopac
University of Surrey	Education	UK	Miracle
Verbraucherbank	Banking	Germany	IBM
Viniprix	Retail	France	Videopac
Viotex	Bureau	Switzerland	NCR Videotex
VISEA TV	TV Rentals	France	ND Videotex
Vola		Netherlands	Mistel
Volksbanken	Banking	Germany	Siemens
Volkswagen Audi	Motor	UK	Computex
Volvo	Motor	UK	Computex
Wales Gas	Gas	UK	
Wastel	Bureau	Finland	Mistel
Wehkamp		Netherlands	Mistel
West Yorkshire Police	Police	UK	Viewbase
Wings/OSL	Travel	UK	Computex
Zeda		Germany	Dabit

APPENDIX 3

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APPENDIX 4

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Temple Avenue
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Tel: 583 9811
Telex: 261040

THE BUTLER COX REPORT SERIES

The Butler Cox Report Series consists of nineteen reports, researched and issued since 1980.

VRS ★. An Introduction to Videotex.
Issued March 1980
An introductory volume describing videotex and its origins; its technological elements and its relations to other technologies; its raison d'etre and main applications. Although now over three years old, this report is still one of the best introductions to videotex that is available.

VRS-1. Videotex: The Key Issues.
Issued July 1980
This report focuses on the key role for videotex in the information technology market, and its strengths and weaknesses, problems and opportunities. It examines the factors that are conditioning the market's response to videotex; technical issues concerned with terminals, systems and interworking; and the commercial prospects for suppliers. The key issues raised are as relevant now as they were in mid-1980.

VRS-2. Videotex: International Standardisation.
Issued October 1980
International standardisation issues and efforts are described, at the peak of the standardisation battles that raged in Europe and North America in 1980. The report examines the technical, commercial and regulatory pressures leading to standardisation; it describes the dominant videotex standards, and looks to the future prospects for international standardisation. Although it does not describe NAPLP, this report is a concise summary of the issues that are still involved, and describes the main European standards, clearly and comprehensively.

VRS-3. The Economic Realities of Videotex.
Issued November 1980
This report is still unquestionably the clearest analysis of the costs and economics of public videotex services, as they are offered in Europe. Based on a mathematical model of public system operations, it examines cost and revenue flows from the point of view of system operators, information providers and users. It is directly relevant to all organisations who are, or are contemplating, providing information on public videotex services.

VRS-4. Human Factors in Videotex.
Issued January 1981
This report examines the ergonomic and human factors that will determine end-user acceptance, or rejection, of videotex. It looks at end users' needs, terminal design criteria and system design considerations. It clearly identifies the weaknesses and strengths of conventional videotex database design and access techniques, and gives guidelines for the design of systems that more closely meet users' needs. It is particularly relevant now. The move towards specially designed interactive applications for private videotex systems has highlighted the need to train systems designers and programmers to implement easy-to-use videotex applications.

VRS-5. Competing and Complementary Systems.
Issued March 1981
This report describes the services and products, aimed primarily at the home market, with which videotex is competing, and with which it has the potential to react synergistically. They range from cable TV to videodiscs; and from teletext to home computers. The report also describes the relationship of videotex to database and messaging services for the business market.

VRS-6. Private and In-house Videotex Systems.
Issued May 1981
This report was the first to publicly identify, describe and analyse private videotex systems and closed-user-group bureau services, and to identify their relevance to the development of the videotex market. It also identifies the convergence and overlap between public and private systems. Its case histories include Barclays Bank, British Leyland, the London Stock Exchange, Quelle and Verbraucherbank; all systems operators that have proved to have a major influence on the development of the private videotex system market in Europe.

VRS-7. Regulatory and Policy Issues.
Issued July 1981
A definitive study of national and international regulatory and policy issues, and their actual and potential influence on the development of videotex in Europe and North America. Issues that are addressed include: communications and broadcasting regulations, privacy and data-interchange legislation, and copyright issues. The report examines these issues and their effect on the different industries involved in videotex; from newspapers to PTTs. It also sets out the regulatory policies that apply in the US, Canada, France and the UK.

VRS-8. Videotex Networks.
Issued September 1981
This report clearly describes and analyses alternative videotex network and gateway architectures, and their implications. It reviews the existing and planned public videotex networks in the UK, West Germany and France, and describes telephone and cable-network developments in Canada and the US.

VRS-9. Videotex Applications and the Market Response.
Issued October 1981
With its emphasis primarily on public videotex services for the residential and business markets, this report describes the main services offered in Europe, North America and Japan, and analyses the market's response to the services on offer. It identifies the types of services most likely to prove profitable in the short term, and the share of total revenues likely to accrue from information provision and advertising-based services in the long term. It identifies alternative strategies for overcoming the problems of critical mass in the residential market. It is still as relevant today as it was in late 1981.

VRS-10. The Future of Videotex.
Issued December 1981
This report addresses the key issues raised in the first report (VRS-1) of the Series. It highlights and summarises the main trends and forces identified in the earlier reports, and goes on to predict how videotex will develop and grow in the future. These predictions are proving remarkably accurate. One, in particular, is worth quoting: "Beyond about 1986, videotex will become less easily identified . . . as it becomes more of a general purpose utility; linking terminal users to . . . external service computers, and as it becomes more closely integrated with other information services in business and in the home".

VRS'82-1. Technology, Standards and Networking.
Issued May 1982
This report draws together, extends and updates reports 2 and 8 in the original Series. It examines technologies, standards and networking alternatives, within the context of an overall network architecture for open systems

interconnection. Communication media and standards, presentation alternatives and the support structures necessary to implement applications, are each discussed in turn. The main management implications are drawn out for those responsible for developing videotex services. This report remains a clear, concise and relevant statement of the main issues in the fields it addresses.

VRS'82-2. Relationship with Other New Media.
Issued July 1982
This report builds on report 5 in the original Series. It addresses the major developments in products, delivery vehicles and services that are applicable in the residential and business markets, and which are likely to have an impact on videotex during the next 10 years. Important trials and services using these new media, from Japan, France, West Germany and the US, are described. This report also evaluates the implications of these new developments for videotex, and examines the threats and opportunities that they represent for the main participants in the videotex industry.

VRS'82-3. Private and In-house Videotex Systems.
Issued October 1982
This report, published one year before the VRS'83 report, addresses the same subject. It provides a link between the earlier report (VRS-6) and the latest report. It also provides the basis for charting the progress of the industry and market, and for making year-on-year comparisons. The report examines the current (and future) trends in the technology of private videotex systems, and catalogues the commercially available systems on the market. It examines in-house and external applications and services, with reference to case histories from Europe and North America. Finally, it reviews the forces shaping the market, and projects its growth in the 1980s. Throughout the report, the main management implications for system operators and suppliers are highlighted and discussed.

VRS'82-4. The Costs and Economics of Videotex.
Issued November 1982
This report goes much further than Report 3 in the original Series, and it takes a wider perspective than public videotex services. Beginning with the basic costs of terminals, communications, and computer equipment and software — the components of videotex systems — the report goes on to examine the economic perspectives of videotex. These are viewed from the vantage points of the business user, the residential user and the service provider, and are illustrated with case histories of existing services. The report discusses strategies for approaching the market, and analyses some of the obstacles facing the prospective supplier of videotex services.

VRS'82-5. Videotex Services and the Market Response.
Issued December 1982
This report extends the earlier research and analysis of Report 9 in the original Series. It examines 17 public and private videotex services, being offered in Europe and North America, and the market's response to them. It reviews their business objectives, market strategies and future plans, and identifies some of the important lessons emerging from them. It focuses, particularly, on the applications being offered, and users' response to them. Finally, it reviews the three main market sectors for videotex services, and examines their future market potential, before closing with a discussion of the key strategic issues facing videotex industry participants.

VRS'83. Private Videotex Systems — Their Selection, Use and Future Prospects.
Issued October 1983
This report, the seventeenth in Butler Cox's Videotex Report Series, is a definitive analysis of the European private videotex system market. It surveys the offerings from 62 system suppliers, 60 videotex bureaux and 127 terminal manufacturers and distributors. It describes product and service features, and offers potential buyers guidelines on key selection criteria. It examines how private videotex systems are being applied, and offers a proven application selection and evaluation methodology. It describes 10 representative case histories, from four European countries, and identifies the strengths and weaknesses of videotex, compared with other media and technologies. It analyses the costs of hardware, software, terminals, and application implementation, operation and support. It also reviews the sources of revenue and benefit that are needed to justify investments in service provision. Finally, the report analyses the factors which are resulting in evolutionary product changes and to the growth of the market. It identifies and describes the main product generations likely to evolve over the next 10 years, and projects the size of the market for them. The market forecasts are broken down by the main country-market groups, and cover most products and services, by value and volume for shipments and installations.

ITMS. Information Technology: Its Impact on Marketing and Selling.
Issued December 1984
By 1995, sales and marketing teams will be fighting the competitive battle with new tools. Information technology — using computers, communications and screens — will present the value and utility of products to a wider yet more carefully selected customer base. We face the most important developments in sales and marketing since the advent of TV advertising. Companies who ignore these developments, whose sales and marketing strategies remain embedded in the pre-electronic past, face dwindling market share, rising costs and eventual eclipse. The most knowledgeable companies are planning now, asking themselves this simple but profound question: how do we sell to the institutions and citizens of the information society?

This report examines both current and likely applications for information technology products and services, and identifies the key threats and new business opportunities likely to emerge in the future.

VRS'85. Videotex in Europe.
Issued January 1985
This report, the nineteenth in Butler Cox's Report Series, provides

- A review of the current status and likely future outlook for videotex in Europe on a country-by-country basis
- An examination of the main developments in the North American videotex market, and their likely impact upon Europe
- A complete review of the videotex product and service supply industry in Europe, including product reviews and supplier market shares
- An analysis of the state of the industry in 1984, including shipments and installed-base statistics; the results of a major 'barometer' survey amongst users, to determine their attitudes, future plans and perception of key issues, and nine selected case histories
- Forecasts by product and country, for the period 1984 to 1988

The report, which is based on extensive and new research amongst suppliers, users and European PTTs, complements and extends the factual information and geographic coverage of Butler Cox's earlier report 'Private Videotex Systems — their Selection, Use and Future Prospects'.

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