EUROPEAN VIDEOTEX MARKET OPPORTUNITIES

INPUT

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ABSTRACT

The European videotex market grew by 48% between 1984 and 1985 to reach almost $300 million. At the same time, the delivery of services to the general public via the videotex medium came to be a significant reality, with teleshopping, home banking, and other consumer services attracting attention in the U.K., West Germany, and especially France, where videotex traffic amounted to 15% of all communications on the national data network.

This report examines the characteristics and development of markets for videotex terminal devices, integrated systems, and computing services in both the public and the private videotex systems sector over a forward five-year period. The evolving roles of processing and professional services vendors and software product and integrated system suppliers as well as the terminal manufacturers are all included. The market opportunities are described, and the market values are forecast from the base year of 1985 through to 1990.

This report contains 160 pages, including 40 exhibits.

CONTENTS

EXHIBITS

1 INTRODUCTION

I INTRODUCTION

A. SCOPE OF THE REPORT

- This report is produced by INPUT as one of a pair of reports in a multiclient series on European Market Opportunities. The two reports cover:
  - Value added network services (VANS).
  - Videotex.
- These reports also form part of INPUT's continuing consulting and research programme for the Information Services Industry, the Software and Services Planning Service (SSPS).
- The present report describes the current status and future prospects and opportunities in the European market for videotex systems and services. This market comprises:
  - Terminal and communications equipment sales.
  - Software products and software systems.
  - Processing services, including information database services.

- Complete systems, supplied on an integrated system (turnkey) basis.

- Transmission charges for data and text.

- Other fees, including maintenance and professional services such as consultation.

- For the purposes of this study videotex is defined in the narrower sense of 'interactive videotex' markets, though some aspects of teletext as an adjacent technology are dealt with in Chapter VI. The definition of videotex is synonymous with the term 'viewdata', often encountered in the U.K. and other English-speaking countries. See Appendix A for a full list of the definitions applicable in this report.

- The emphasis in this report is placed on those areas of the market which correspond to the field of the traditional information services vendors. The areas of hardware, maintenance, and transmission charges have been touched on, but are not dealt with in a detailed fashion.

B. METHODOLOGY

- Primary research for this study was undertaken in the four major European country markets, namely France, Italy, the U.K., and West Germany. Users, information and service providers, manufacturers, and other vendors were all included in the research.

- In some cases, users interviewed made use of videotex for their own internal organisational purposes, as well as providing information or services on the open market via a videotex-based networking system. So the classes of organisation interviewed overlapped one with another in certain instances.

- Exhibit I-1 contains a table which shows the numbers in the user sample from each country. A total of 70 respondents were interviewed, which included information and some service providers. The majority of these providers offered their services on a videotex network on a no-charge basis, but they all qualified as users because they used the software, equipment, network services, and professional services furnished by the vendor community.

- Four users were planning to use videotex within the five-year forecast period of this report and were included as representative of future usage.

- Because of the immature and 'pilot' nature of the Italian market, INPUT'S locally-based interviewers were not able to discover representative users for that market, although Italy did contribute to the vendor sample.

- Exhibit I-2 shows the maximum, minimum, and average user expenditures budgeted for 1985 in each country user subsample. The French and West German average expenditures correlate exactly, while the larger figure for the U.K. is increased considerably by the inclusion of a respondent organisation which claims to run the largest private videotex service (PVS) in Europe.

- The user sample commanded worldwide sales revenues in 1984 of almost $58 billion and employs almost 800,000 staff, chiefly in Europe. It included companies with annual turnovers less than $2 million as well as one or two financial organisations with annual interest and fee revenues of over $10 billion. (Local currency revenues have been converted to U.S. dollars at the 1984 exchange rates given in Appendix B.)

- The nature of the vendor sample is illustrated in Exhibit I-3. A total of 37 interviews were conducted among four types of vendors (as classified by main sales activity). These were mostly done using the face-to-face method (33), whereas the user interviews were split between mail, telephone, and face-to-face in the ratio of 36:14:20.

EXHIBIT I-1

VIDEOTEX USER INTERVIEW PROGRAMME

COUNTRY	NUMBER OF INTERVIEWS				
	User Only	Information or Service Provider Only	User and Information/ Services Provider	Likely to Be Active Within 1-3 Years	Total
France	10	4	14	1	29
United Kingdom	12	4	8	3	27
West Germany	1	–	13	–	14
Italy	–	–	–	–	–
Total Europe	23	8	35	4	70

VIDEOTEX EXPENDITURE BUDGETS FOR 1985 AS REPORTED BY USERS

COUNTRY	Number of Respondents	VIDEOTEX BUDGETS 1985 ($ Thousands)		
		Range		
		From	To	Average
France	29	$1.3	$1,301	$215
United Kingdom	27	1.5	12,857	738
West Germany	14	3.7	1,129	203
Italy	-	-	-	-
All	70	$1.3	$12,857	$414

VIDEOTEX VENDOR INTERVIEW PROGRAMME

COUNTRY	NUMBER OF INTERVIEWS BY TYPE OF VENDOR*				
	Hardware Supplier	Software Products/ Professional Services	Processing/ Network Services	Integrated Systems House	Total
France	1	3	5	-	9
United Kingdom	3	3	4	2	12
West Germany	1	3	6	-	10
Italy	1	2	2	1	6
Total Europe	6	11	17	3	37

*Classified by largest sales activity

- The largest group of vendors fell into the processing and network services category, followed by software products and professional services houses. For France and West Germany we have included interviews with the PTT departments responsible for providing the videotex bearer networks in those countries.

- The total sample of vendors was:

  - Responsible for 1984 sales revenues of $2.9 billion.

  - Giving employment to almost 54,000 staff.

  - Involved in the videotex market with revenues totalling $124 million in 1984, representing over 4% of their total revenues.

  - Managing growth in the videotex area of anything between 10% and 200% per annum between 1984 and 1985.

C. REPORT STRUCTURE

- The remaining chapters of this report are organized as follows:

  - Chapter II is an executive summary providing an overview of the contents of the entire report.

  - Chapter III contains an analysis of the markets for videotex services and expected growth rates and market forecasts.

  - Chapter IV provides some examples of major users of videotex technology.

- Chapter V discusses the videotex environment in the four major country markets studied.

- Chapter VI examines the likely impact of other technologies considered to be closely related to videotex issues and market development.

- Chapter VII is an analysis of user attitudes towards and user requirements of videotex systems.

- Chapter VIII outlines the market opportunities that result from the likely development of videotex technology and systems.

- The appendices provide a definition of the terms used, currency conversion rates used, and the vendor and user questionnaires.

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

- This Executive Summary is designed in a presentation format in order to:
  - Help the busy reader quickly review key research findings.
  - Provide a ready-to-go executive presentation, complete with a script, to facilitate group communication.
- The key points of the entire report are summarised in Exhibits II-1 through II-7. On the left-hand page facing each exhibit is a script explaining its contents.

A. VIDEOTEX OPPORTUNITIES

- The videotex market in Western Europe is forecast to grow at 36% per annum for the next five years, taking its value from $324 million in 1985 to $1.5 billion in 1990. This growth is driven by the French market, where PTT policies have popularised the Teletel system by using the mechanism of distribution of home terminals to support the Electronic Telephone Directory project.

- Videotex offers opportunities to information services companies in three areas:

  - Providing, building, and installing the facilities of the system:

    . Traditional activities for the network service suppliers, the systems companies, and software houses.

  - Running their own processing services on the videotex networks, both private and public.

  - Running videotex processing services for other companies (remote facilities management).

- Videotex has reached a watershed in its development, at which:

  - It has to date proved its capacity to act as a catalyst technology in introducing information services to the general public.

  - It now justifies and will reward commitment on the part of terminal and service vendors.

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EUROPEAN VIDEOTEX MARKET

- 36% AAGR
- $1.5 Billion by 1990
- French Market Dominant
- Many Opportunities

B. EUROPEAN VIDEOTEX COUNTRY MARKET GROWTH

- France is the major European market for videotex systems and services, taking a 63% share in 1985 at $204 million, rising to a 67% share in 1990 with $1,002 million.

- France has adopted videotex technology as the principal consumer-oriented networking method. Videotex traffic on the Transpac packet-switched network has risen four-fold in the last 12 months and now takes over 15% of the network's capacity.

- Bringing videotex into the mainstream of computing in France has been achieved by:

  - Opting for a very basic and simple terminal, the Minitel (instead of TV-set derivatives).

  - Incorporating keyword searching into the database access method.

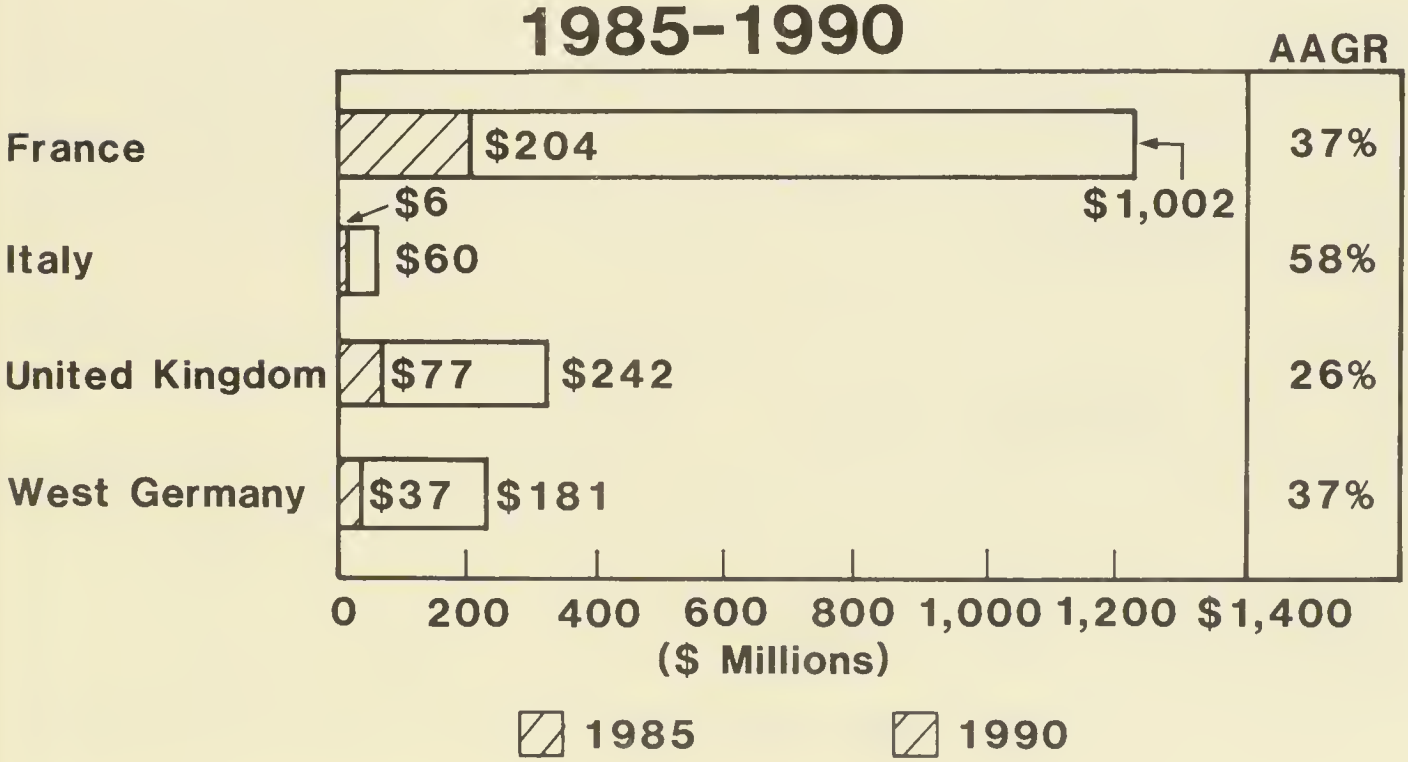
- The U.K. and West German markets will grow at the slower rates of 26% and 37% average annual growth (AAGR), respectively. Growth is restricted by the higher purchase price of videotex terminals in these countries.

- Italy will grow at the higher rate of 58% AAGR.

- Europe's overall installed base of videotex terminals will grow from a total of 1.5 million at the end of 1985 to almost 13 million by the end of 1990.

- No PTT has yet copied the French example of distributing 'free' home terminals. INPUT forecasts that videotex terminal prices will drop to an average of around $250 each by 1990.

EUROPEAN VIDEOTEX COUNTRY MARKET GROWTH 1985-1990



C. TERMINAL AND SYSTEMS OPPORTUNITIES

- The videotex terminal equipment market will grow from an 'if sold value' of $106 million in 1985 to $822 million in 1990.

- It will then double again in size by 1990 when it will have reached over $900 million.

- This rapid growth, an average annual rate of 51%, is driven by the increasing average price of terminals in the largest submarket, France. French terminal prices are forecast to rise from an average of $70 in 1985 to over $200 in 1990 as the number of terminals distributed 'free' (currently 80% of total installations) is decreased. This results from the growing requirement for facilities not provided on the basic model Minitel.

- Videotex terminals will increasingly be expected to provide more than the basic videotex facilities:

  - Incorporation of a telephone handset.

  - Higher line speeds.

  - More buffer memory for electronic mail and other office automation features.

  - Software.

- The systems market for communications equipment and software and for integrated systems will rise from $57 million in 1985 to $151 million in 1990. The key feature of this market is the high amount of professional services with which it is associated, with many of the larger public systems requiring advanced software skills from the systems houses.

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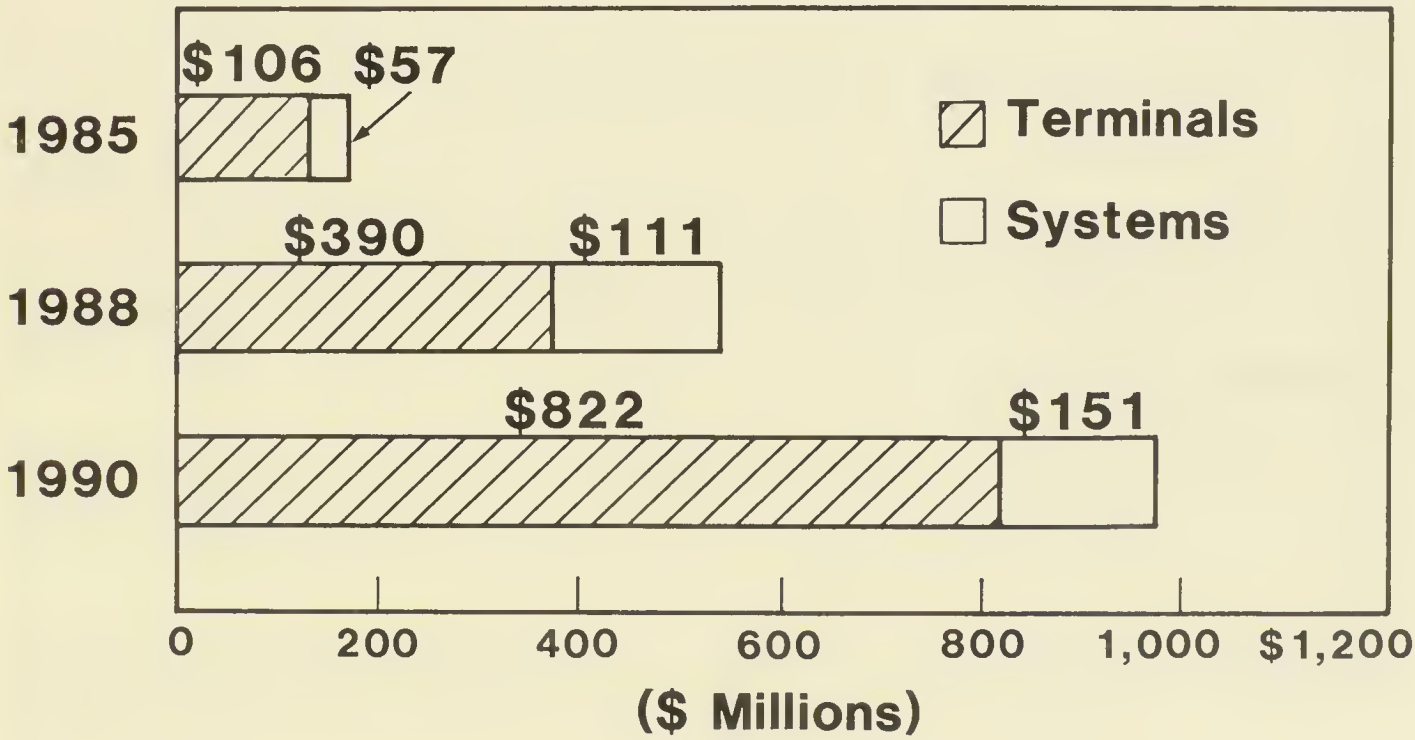
TERMINAL AND SYSTEMS OPPORTUNITIES 1985-1990



D. INFORMATION SERVICES OPPORTUNITIES

- Software products for the videotex market will grow at an AAGR of 30%, but will remain throughout the forecast period as the smallest growth segment for two principal reasons:

  - Dominance of the market by French purchasing habits, in which systems are sold as tailored projects based on software kernels.

  - Consumer market users will expect software facilities to be bundled into their terminals as embedded features.

- Processing services include: RCS; value-added network services, delivered in videotex mode; and facilities management (FM) of services on behalf of other general services vendors such as banks, insurance companies, and mail order houses.

- Processing services will almost triple at an AAGR of 23% to go from $63 million in 1985 to $178 million in 1990, with France maintaining its market share at the 75% level.

- Professional services will grow at an AAGR of 28% from $78 million in 1985 to $263 million in 1990, with France taking over 60% of the market throughout the period.

- Services opportunities will grow faster in the consumer applications field (an AAGR of 29%) than in that of business and professional applications (an AAGR of 24%), but will not catch up with them in absolute terms. The 1990 figures will be $292 million for business and professional applications against $220 million for consumer applications.

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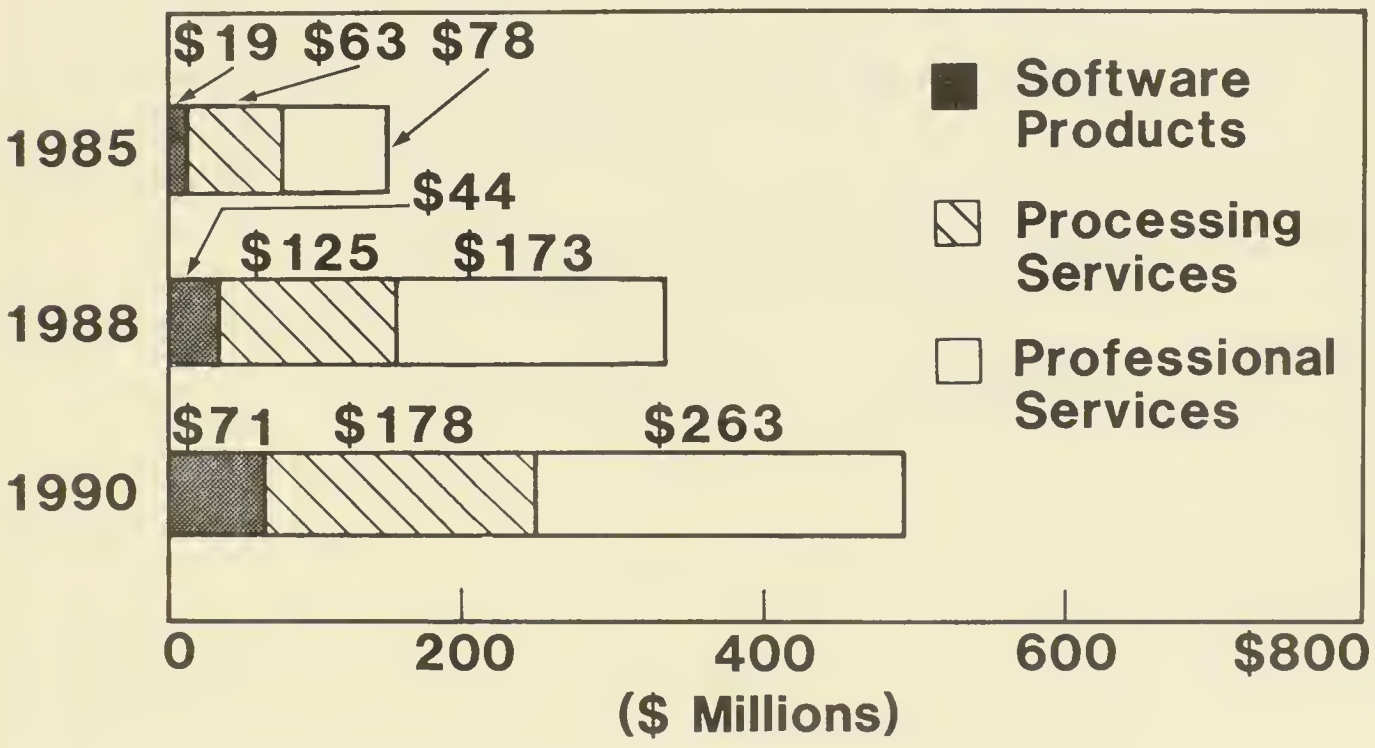
INFORMATION SERVICES OPPORTUNITIES 1985-1990



E. VIDEOTEX - THE NUCLEUS OF A PUBLIC INFORMATION UTILITY

- Videotex is the first computer-based information service to have found equal acceptance with:
  - Business, commerce, industry, and the professions.
  - The general public as consumers.
- In neither case has this acceptance been won easily, but it is the partial nature of this success which helps to maintain the equilibrium between these two aspects and confers its true role as the first generation of communications technology specifically designed to work across the interface between business and the consuming public.
  - Other forms of teleprocessing have been confined to the business sector.
    - RCS.
    - On-line database inquiry.
- INPUT believes that the future role of videotex is to act as the nucleus of a public information utility round which will gather a set of complementary services covering single and multiple media:
  - Text and data.
  - Image and pictures.

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VIDEOTEX

- Public Information Utility
  - Business/Professional/ Consumer
  - Common User Interface
  - Convergence of Media

F. RECOMMENDATIONS FOR PROCESSING SERVICES VENDORS AND TERMINAL SUPPLIERS

- Videotex is the first example of a computer utility aimed at the general public. It will continue to evolve, at the same time converging with the growing markets in business communications and office automation.

- PTTs are committed to its future and have used it to gain experience in selling user-friendly services on a computer-based network.

- Processing services vendors must avoid being squeezed between the PTTs acting as network services vendors and companies entering the videotex market to deliver their products/services directly to the general public.

- Videotex terminal suppliers run the risk of losing their initial market positions to terminal suppliers entering from the DP and office automation sectors.

- An offensive strategy is called for in both cases, and this will involve:

  - Understanding the long-term evolutionary process of the computer-based information utility.

  - Taking up a position regarding desired future markets.

- Two principal questions must be settled:

  - To supply business or consumer markets, or both?

  - To provide end-user services or merely support other services vendors, or a combination of both?

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RECOMMENDATIONS - 1

- Processing Services
  - PTT/Direct Product Delivery Squeeze
- Terminals
  - Market Erosion
- Offensive Marketing Strategies Required

G. RECOMMENDATIONS FOR SYSTEMS HOUSES AND SOFTWARE PRODUCT VENDORS

- Smaller systems and software houses must strive to identify niche markets, taking care to:
  - Avoid overstretching their resources.
  - Ensure new opportunities are created in sufficient time to replace declining specialist areas.
- Leading systems houses must package their offerings to target specific markets which have been included in a strategic plan.
- Increased use of 'kernel-based' systems products will enhance the ability of both groups to add value in the form of facilities specific to a particular contract.
- Vendors of micro-based products should target their offerings to terminal and PC manufacturers, stressing their experience in producing user-friendly products.
- Vendors to the IBM mainframe sector should move into the videotex field by acquisition of young specialist companies with successful track records in the communications and videotex fields.

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RECOMMENDATIONS - 2

- Systems Houses
  - Enhance Sector Added-Value
- Software Products
  - Target Terminal and PC Suppliers
  - Seek Entry Through Acquisition

III MARKET ANALYSIS AND FORECASTS

III MARKET ANALYSIS AND FORECASTS

A. OVERVIEW

- As a subsector of the telecommunications industry, videotex has been able to pursue a separate growth relatively untouched by the confusion existing in the wider communications area.

- It has, however, suffered from an excess of supply thrust, created by the availability of new technologies, over market pull, the demand created by user requirements for more specialised systems and services.

- Convergence of technology and the areas of successful implementation of the videotex concept dictate that it can no longer be considered as a separate stream of development. Its role must be found and acknowledged by both:

  - User companies with communications requirements which involve interfacing with noncomputer professionals.

  - Vendors hoping to supply the expanding communications market.

- A number of driving forces conspire to make videotex technology the best choice as an applications protocol for consumer applications throughout the second half of the 1980s:

- The increasing sophistication of consumer markets.

- The increasing complexity of service industries, both those supporting the basic manufacturing industries and those now creating completely new markets in both the consumer and professional areas.

- Diversification of the PTTs/common carriers into the information industry.

- Multinational companies looking for cheaper methods of achieving compatible global and local communications.

- Recognition in the U.S. of a text-only videotex market to complement and broaden the ASCII database market now becoming available to the 17 million U.S. owners of small computers.

- Implementation in Japan of a highly advanced CAPTAIN standard videotex system signalling acceptance of a role for videotex on the part of the nations of the Pacific basin.

- The advantages of choosing the videotex technology and protocol are becoming more obvious to users and suppliers:

  - In a world of confusing technology options, choosing a simple, user-acceptable 'protocol', backed by an increasing number of common carriers, offers a clear route, at least for a medium-term strategy. It overcomes the need to worry about false starts into technological cul-de-sacs and on the other hand avoids the temptation to sit out the current round of technology because the next one is always going to be better.

- The argument over videotex standards will become less critical as it becomes clear that gateways between different national systems are being discussed,

just as gateways to third-party computers opened a bridge between videotex and traditional computing.

B. INSTALLED BASE OF VIDEOTEX TERMINALS

- The growth of the installed base of videotex terminals in Western Europe went past the million mark in the middle of 1985, fueled by the installation of 800,000 Minitel terminals in France.

- The French PTT (DGT) is increasing the rate at which these terminals, of which there are currently three models in the field (M1, M2, and M10), are being installed in French homes free of charge to support the Electronic Telephone Directory project ('Annuaire Electronique'). The project is currently on course to have an installed base of 2.5 million by the end of 1986.

- Exhibit III-1 details the installed base forecast from 1984 to 1990, broken down by country and between business and consumer applications.

- Of the 1.5 million terminals forecast to be in place by the end of 1985, 1.3 million will be in France.

- France will thus have 88% of the installed base and is forecast to be still taking a 82% share in 1990, when the installed base throughout Europe will have reached the tremendous size of 13 million units.

- Without the boost of a 'trigger' product such as the 'Annuaire Electronique', it is not possible to 'fire' a new market of such potential size at anything like the rate experienced by France.

- Under the influence of classical market forces, slower growth must be expected due to the development of a circular 'chicken and egg' situation in

EXHIBIT III-1

FORECAST GROWTH OF INSTALLED BASE OF VIDEOTEX TERMINALS
IN WESTERN EUROPE

PRODUCT GROUP TERMINALS	INSTALLED BASE (Thousands) AT END						Annual Growth 1985-1990
	1984	1985	1986	1987	1988	1990	
Bus/Prof Total	263	630	1,174	1,894	2,894	5,886	57%
France	200	500	950	1,535	2,325	4,552	56
United Kingdom	50	104	176	271	400	820	51
West Germany	12	24	42	72	130	355	71
Italy	1	2	6	16	39	159	140
Consumer Total	328	850	1,593	2,561	3,738	7,056	53
France	300	800	1,500	2,400	3,450	6,050	50
United Kingdom	20	33	63	109	178	548	75
West Germany	8	16	28	48	98	378	88
Italy	0	1	2	4	12	80	140
All Total	590	1,479	2,767	4,455	6,630	12,942	54
France	500	1,300	2,450	3,935	5,775	10,602	52
United Kingdom	69	136	239	380	577	1,368	59
West Germany	20	40	70	120	228	733	79
Italy	1	3	8	20	50	239	140

which demand waits for a drop in entry price, while supply fails to achieve a low enough entry price to stimulate demand, and so on.

- This has been the experience of the U.K. which, five years from the inception of the Prestel service, achieved in 1985 an installed base of over 100,000 units for the first time, though some 45% of these were in the private videotex area and not connected to Prestel.

- The West German Bundepost has also experienced lower growth than anticipated. It had been thought that as a result of a high specification (CEPT level III), extensive advertising, and low initial running charges, its arrival on the videotex scene could bypass the slow lift-off phase endured by the U.K.

- The West German installed base estimates once again have had to be drastically revised downwards. INPUT predicts 40,000 Btx connections for the end of 1985, with almost three-quarters of a million in place by the close of 1990.

- The Italian system is still embryonic, but is expected to grow faster than those of any other nation, reaching 240,000 units installed by 1990.

C. BUSINESS/PROFESSIONAL AND CONSUMER APPLICATIONS

- In spite of the sometimes discouragingly slow uptake of videotex technology in markets which have not been subjected to the stimulation of distribution of 'free' terminals, there is an increasing momentum in the videotex market because:

  - The rapidly developing French situation acts as a 'reference sale' to other countries setting up networks.

- Applications, and serious applications at that such as home banking and teleshopping, have started to invade the consumer market.

- Japan and other countries in the Far East have commissioned systems.

- The U.S. has discovered a market for text-only videotex among owners of home computers (and is even expected by some forecasters to be set to overtake Europe in size within five years).

- The key factors driving the videotex market are:

  - The need for cheaper, simpler communications in business and professional life.

  - The development of consumer services--telebanking, telebroking, teleshopping.

- Exhibit III-2 illustrates the comparative growth of the markets:

  - Business/professional applications are forecast to grow from $216 million in 1985 to $796 million in 1990 an annual growth rate of 30%.

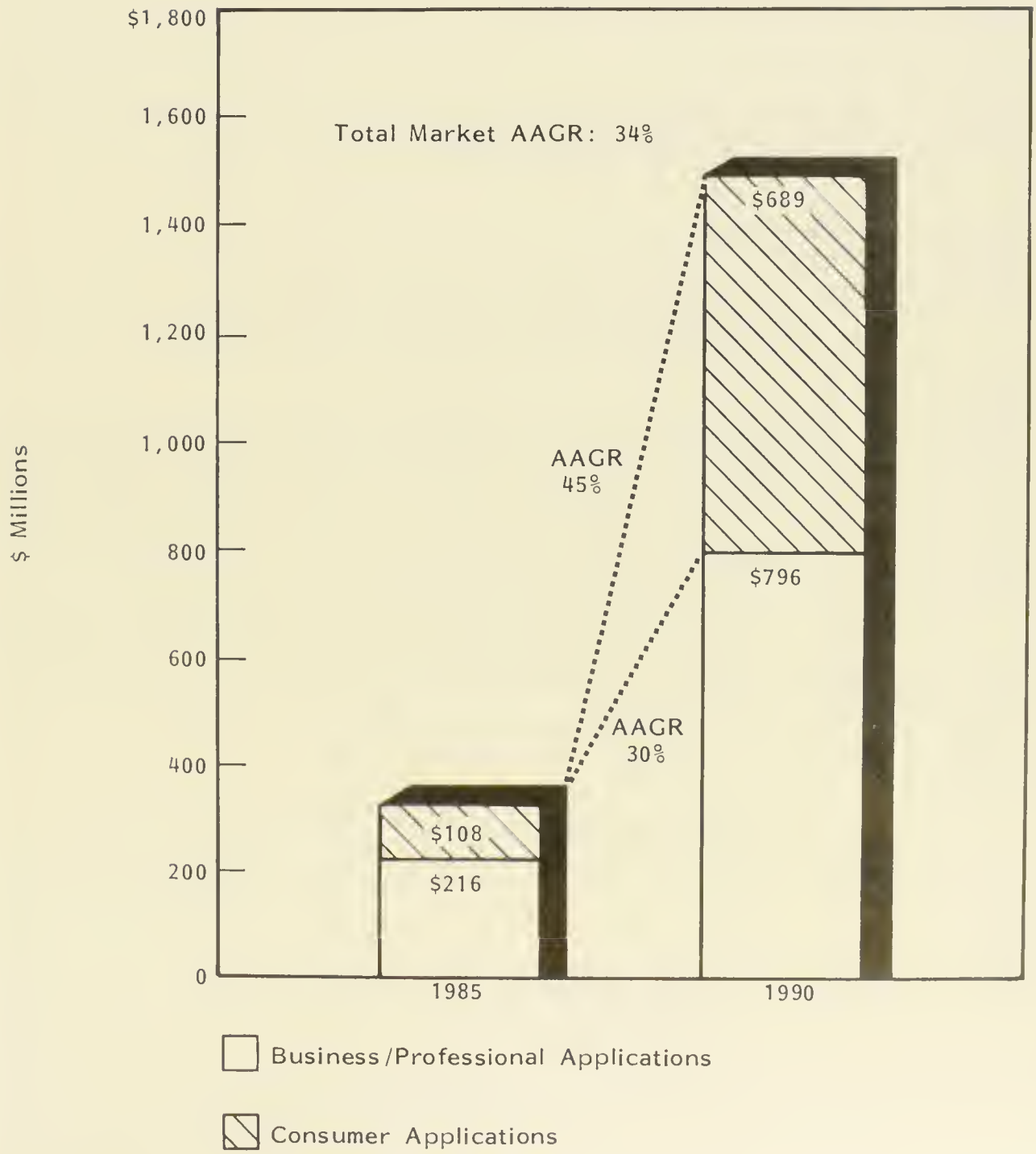
  - Consumer applications will grow faster, at 45% per annum, to move from just over $100 million in 1985 to just under $700 million by 1990.

- For the purposes of this report, business/professional applications are all those applications which do not involve the general public as consumers. Examples are wholesale order processing, inter-company electronic mail, and travel agent reservation systems.

- Consumer applications are those concerning the general public in database interrogation or transaction processing of some kind.

EXHIBIT III-2

EUROPEAN VIDEOTEX MARKET GROWTH
BUSINESS/PROFESSIONAL VERSUS CONSUMER



- Though these two categories do not correspond exactly with the distinction between domestic and business videotex terminals, since a business terminal may be used for private purposes and vice versa, there is obviously close mapping between the two uses of the terms.

D. COUNTRY MARKET SECTORS

- This report covers two types of videotex product and three types of computing services applied to videotex applications.

- The products are:

  - Terminals, defined to include all means of delivering a videotex page to a screen and any associated hard copy output peripherals.

  - Systems, defined as computers, peripherals, and communications equipment installed specifically to support videotex applications and networks. In some cases these systems may be installed with the necessary systems and applications software as integrated projects.

- These products are valued for market sizing purposes at their 'if sold value' (ISV), although in practice units may be hired, rented, leased, or purchased.

- The three information services categories are:

  - Software products.

  - Processing services.

  - Professional services.

- Their definitions are the standard INPUT definitions, as found in Appendix A.

- Exhibit III-3 details the market growth in each of the four country markets researched broken down by the five sectors mentioned:

  - The highest growth is forecast for the terminals market moving from just over $100 million in 1985 at 51% per annum to $822 million in 1990.

  - Software products starts from a low base of $17 million, but has the next highest growth rate (of 33%) to reach $71 million in 1990.

  - Professional services, processing services, and systems have progressively lower growth rates--27%, 23%, and 21% respectively--but maintain their market share ranking throughout the period.

  - Professional services draws ahead of the other two slightly in absolute terms, but all three lose market share under the pressure of the growth in the terminals sector.

- Throughout the five-year forward period, France retains over 60% of the market, increasing market share from 63% to 67%.

- The U.K. and West Germany will lose market share relatively against the faster growth of Italy for a number of reasons:

  - DP management are likely to remain relatively hostile to videotex.

  - Alternative communications protocols will be favoured.

  - Terminal prices are likely to remain too high.

EXHIBIT III-3

WEST EUROPEAN VIDEOTEX MARKET GROWTH, 1985-1990

	1985 ($ Millions)					1990 ($ Millions)					Average Annual Growth Rate 1985-1990				
	France	United Kingdom	West Germany	Italy	Total	France	United Kingdom	West Germany	Italy	Total	France	United Kingdom	West Germany	Italy	Total
Terminals	$ 63	$ 30	$ 11	$ 1	$105	$598	$112	$ 82	$ 30	$822	57%	30%	49%	96%	51%
Systems	32	12	10	3	57	75	34	28	14	151	18	23	23	36	22
Software Products	7	6	3	1	17	26	18	23	4	71	29	25	50	32	33
Processing	48	12	4	.2	64	136	25	13	4	178	24	16	27	82	23
Professional	54	17	9	1	81	167	53	35	8	263	26	26	31	52	27
Total	$204	$ 77	$ 37	$ 6	$324	$1,002	$242	$181	$ 60	$1,485	37%	26%	37%	58%	36%

IV SOME MAJOR USERS OF VIDEOTEX TECHNOLOGY

IV SOME MAJOR USERS OF VIDEOTEX TECHNOLOGY

A. OVERVIEW

- Historically, videotex systems have found greatest acceptance in vertical industries in which products and/or services have to be retailed to a large and widely dispersed customer base.

- Examples from the start-up days of the videotex industry in the late 1970s are:

  - The automobile industry, in which sales of vehicles have been vastly improved by inter-dealer cooperation in the establishment and working of a vehicle location system.

  - The travel industry, in which agents, tour operators, and transportation companies all benefit from increased customer service, higher load factors, and the greater operational planning capability which stems from inter-organisational communication via a videotex network.

- These early systems are still alive and well today. In fact, many companies that can benefit from them are still in the process of building or extending first generation systems.

- However, other industries with similar but, in some cases, more complex communication problems are now following in the footsteps of these pioneers:
  - Banking and finance.
  - Insurance.
  - Retail distribution.
  - Manufacturing in general.
- Exhibit IV-1 illustrates the industry sector breakdown of the user sample studied, showing a reasonably similar spread across industries in the three major country markets.
- Many companies are now starting to show interest in videotex systems, as much to improve internal company communications as for any reason connected with intra-industry relationships. Such companies form a segment of the user community embracing videotex as a solution to such cross-industry problems as:
  - Day-to-day collection of sales data from the field.
  - Communication with members of their staff who work from their homes.
  - Access to public databases to assist in the decision-making processes of management.
- If only business and professional applications are counted, the emphasis, when measured in terms of numbers of applications rather than by volume of transaction usage, is in favour of internal usage.

EXHIBIT IV-1

PRINCIPAL SALES-EARNING SECTORS OF THE USER SAMPLE
(By Number of Organisations)

INDUSTRY SECTOR	COUNTRY			ALL
	FRANCE	UNITED KINGDOM	WEST GERMANY	
Discrete Manufacturing	1	5	1	7
Process Manufacturing	6	5	2	13
Transportation	2	1	1	4
Medical	-	-	-	-
Services, Business and Technical	1	2	1	4
Utilities	1	1	1	3
Distribution, Wholesale	1	1	1	3
Distribution, Retail	4	4	-	8
Banking and Finance	3	4	3	10
Insurance	4	1	1	6
Government - Central	-	-	1	1
Government - Regional/Local	3	-	-	3
Education	-	-	-	-
Other, e.g. Agriculture, Publishing	3	3	2	8
All Sectors	29	27	14	70

- Exhibit IV-2 shows the breakdown by country of the respondents' applications according to the type of end-user targeted. Business and professional uses heavily outweigh consumer applications in all three countries surveyed, while applications serving outside organisations (third parties) show a markedly consistent clustering around the 30% level.

- Only in West Germany, where they have been strongly promoted by the Bundespost in the first launch and during the early months of its full Btx system, do consumer applications exceed the mean value for Europe.

- The following sections of this chapter describe the current status of some important vertical market application areas, making reference in case study format to the experiences of some significant organisations included in the user sample.

- INPUT believes that vertical sector uses will remain a prime component of the videotex marketplace and will increase in importance as:

  - Escalating sales costs drive organisations to greater user of alternate distribution channels.

  - The growing installed base of terminals turns more consumer applications into viable business propositions.

B. TRAVEL

- Certain important characteristics of the travel industry have ensured that it was the first to adopt videotex technology as a cheap and acceptable medium for communications among and between its constituent 'players':

EXHIBIT IV-2

ANALYSIS OF THE USER SAMPLE'S VIDEOTEX APPLICATIONS*
BY TARGET END-USER BENEFICIARY

APPLICATION TYPE	COUNTRY (Percent)			ALL (Percent)
	FRANCE	UNITED KINGDOM	GERMANY	
Business/Professional				
Aimed At: In-House Staff	28%	35%	23%	30%
Outworkers and Tied Agencies	17	25	11	19
Outside Organisations	35	28	32	31
Subtotal Business/ Professional	80%	88%	66%	80%
Consumer				
Aimed At: General Public	20%	12%	34%	20%
All Applications:	100%	100%	100%	100%

*A total of 213 applications were mentioned by 70 respondents.

- Growing levels of income to spend on leisure pursuits in the nations of Western Europe.

- Early developments in realtime reservation systems in the airline companies, and the experience gained in interworking between them.

- An outward-looking international approach to sales and marketing.

- The need for fast, long-distance communications for the transport of voice, text, and data.

- Systems using videotex terminals and communications protocols in this sector fall into two main areas:

  - Information systems, consisting of databases containing timetables (of flights, trains, ferry sailings, etc.), fares, and general details, as well as details of tours, cruises, holidays, hotels, car hire, and leisure pursuits associated with the journeys.

  - Transactional systems in which reservations, bookings, ticketing, and settlement arrangements can be handled on-line through a videotex terminal on the booking clerk's desk or even in the home.

- Integration between the two areas is often close, particularly in the business of selling cheap, end-of-season, 'late availability' packages.

- There are four types of organisation with potential involvement in the networking systems needed to support these applications:

  - Transportation companies--airlines, railways, shipping and ferry companies, coach operators--with seats to sell, and reservation and seating systems in place on large mainframe computers.

- Tour operators selling all types of travel and leisure packages to the businessman and the general public in which the transportation element is but one component. They use booking systems on mainframe or minicomputers, depending on the size of a particular firm.

- Travel agents, acting on behalf of all types of travellers and onward selling the services of the transporters and tour operators--equipped principally only with terminals--of varying degrees of sophistication.

- Service companies offering communications services on behalf of or to any groupings of the other organisations--groups of airlines, consortia of travel agents, etc. These companies may be equipped with nation-wide networks and large computer complexes, or they may use publicly available networks for part or all of the transmission paths.

- Major problem areas facing operators in this market are:

  - Efficient use of terminals in the working environment of a low-profit, high-volume business.

  - Provision of user-friendly software which encourages use of the system without wasting the time of the booking clerk.

  - Saturation or near saturation of the volume end of the holiday business and the move toward a more specialised, individual approach to the supply of leisure pursuits. Concentration of the business in the hands of fewer large concerns inevitably leads to an impersonal service which is inconsistent with customer needs.

- Looking forward to the next three years of system improvement, the trends indicate that:

- In the retail sector of the business, some of the problem areas would be relieved by direct selling via home terminals.

- On-line ticketing systems are required in travel agent offices, with printers of letter quality or near letter quality.

- Integration of videotex terminals with travel agents' other office DP systems will bring more intelligent terminals onto the booking clerk's desk.

- Integrated voice/data terminals will affect work ergonomics.

C. INSURANCE

- The insurance industry is one of the latter ones to join the growing number of industries embracing videotex as a communications medium. Its use of tied agents, local sales offices, and independent brokers creates a wealth of quotation, contract, and premium renewal information flowing between the different parties. A number of applications lend themselves to development on an inter-organisation computer-based data network:

  - Obtaining a preliminary quotation by consulting the insurance company rates and proposal calculation systems.

  - Interrogation of insurance company files to assess progress on individual contracts and premiums.

  - Printing of contracts in agents' offices.

  - Message switching and electronic mail between offices equipped with terminals.

- The research disclosed two basic types of videotex solution being applied at two different levels of complexity, as illustrated in Exhibit IV-3.

  - The single-company internal system serving tied agents who may be single self-employed units or corporate entities, such as building societies or solicitors.

  - The consortium system in which a computing services company manages a joint database interrogation and data handling system on behalf of its members.

- Examples of the first solution were encountered in France, the U.K., and West Germany. The current state of development was partial in the three principal system examined:

  - In one case, only 500 out of 3,000 terminals had been installed to date, and full coverage of all agents would not be achieved until late 1986.

  - In another, all 600 or so agents were linked, but not all applications had been implemented and further hardware in the form of printers still must be connected to the terminals to support contract printing on demand.

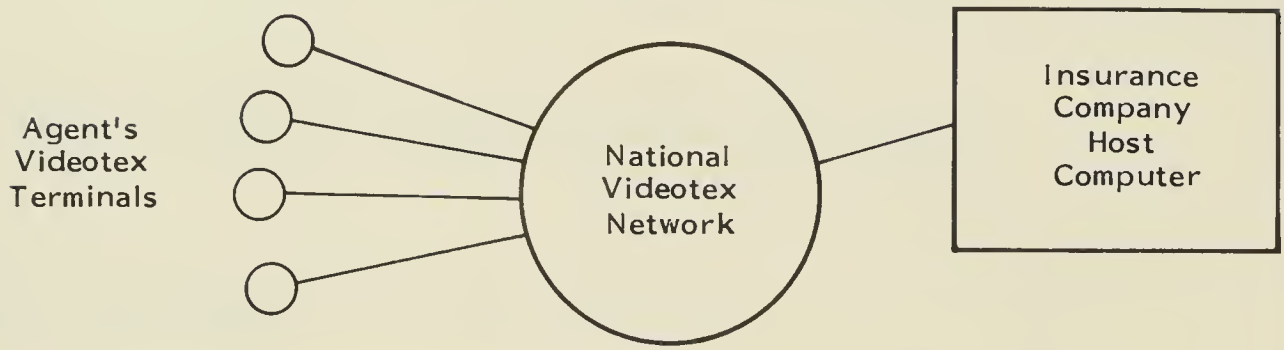
  - In the third, which has had over five years experience with linking simple portable terminals, a start is planned within six months for a complete upgrade of the terminal population of almost 1,000 over the course of a five-year period.

- An example of the consortium approach has been piloted by IBM in the U.K. A publisher of trade magazines is planning a system in France to handle the requirements of smaller insurance companies, those unlikely to be able to provide or afford their own in-house systems.

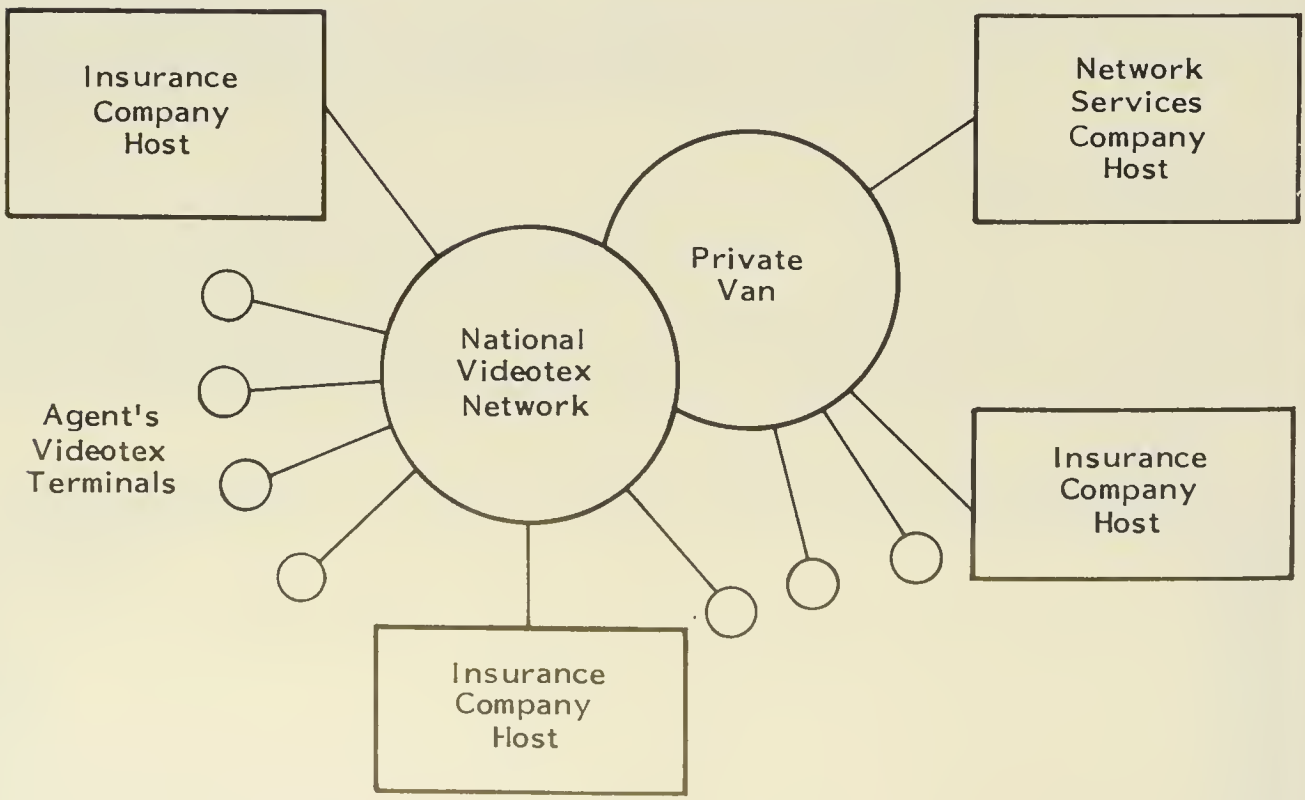
EXHIBIT IV-3

INSURANCE INDUSTRY VIDEOTEX NETWORKS

A. Single-Company Application



B. Closed User Group System



- Difficulties reported by more than one user centred around the attitude of end users to the benefits they would obtain from the system.

  - On the one hand, videotex was regarded by some as a gadget, only suitable for simple tasks, while in other cases expectations exceeded the capability of the terminal.

- There is, therefore, a strong trend toward the provision of local intelligence to at least the level of a 16-bit PC-like microcomputer with, in a high proportion of sites, a suitable near letter quality printing device.

D. BANKING AND FINANCE

- The securities industry has been a prime user of videotex display systems since 1980 when the London Stock Exchange chose to supplement its market prices closed-circuit TV system with a completely new private videotex service called TOPIC.

- TOPIC has had a revolutionary effect on the conduct of the share-dealing community in London, and its influence has spread to other European securities markets.

- The use of videotex in the securities dealing sector has been more for its qualities as a display medium than for its communication protocol. It aids the fast assimilation of rapidly changing information; secondary, but still very important, is its ability to assist in data transmission from market floor to the broker's office or to banking halls.

- In this latter capacity, videotex shares the honours with a number of competing and complementary on-line information systems, all fighting for

space and attention on the desk of the modern securities salesman or securities analyst, services supplied by Reuters, Extel, Telerate, Dafsa, Datastream, VWD, and Telekurs.

- The financial sector is hence an area of overlap between traditional database services based on ASCII terminals at 300 or 1,200 bps and the videotex market with its key features of a clear colour screen, easy-to-use procedures, and menu facilities.

- The entry of videotex into the retail banking sector will have no less of a revolutionary impact, and one which promises to be on a quite exceptionally extensive scale - at the level of the individual household, driven by:

  - The ever-increasing cost of running a network of branches in every high street.

  - The essentially private nature of personal financial transactions.

- All major retail banks will have to re-examine the strategic implications of 'home banking' via the television or home terminal of the future.

- The user sample contained home banking service providers from France, the U.K., and West Germany. Different reasons for market entry were given in each country:

  - In France, Credit Commercial de France (CCF) has led the way with a rapid increase of home banking accounts in 1985--up from 18,000 on the January 1 to 60,000 in July, a monthly uptake of 7,000. The desires to innovate and to take advantage of the large terminal base have both been strong motives, as well as an acknowledgement that this latest generation of banking services is being achieved with a considerably lower level of investment than has been the case for earlier generations of system (such as the move to credit cards).

- In West Germany, until the response times are improved for Btx transaction systems, the 150 or so banks offering account interrogation and limited payment facilities wish to restrict their investments but see the French example as one they must inevitably follow if they are not to lose competitive advantage.

- In the U.K., the handful of home banking service suppliers are motivated to be early entrants in a new market which they see as developing into tele-supermarkets offering a whole range of financial services to a public becoming more aware of share ownership and other financial investments.

- In the U.K. and West Germany, ownership market growth will be retarded by the still relatively poor public image of videotex, but it is only a question of time before they follow the French lead. Similar moves are reported from other European countries, including Italy.

- Exhibit IV-4 shows the network configuration supporting home banking for the customers of West Germany's third largest bank.

E. RETAIL DISTRIBUTION

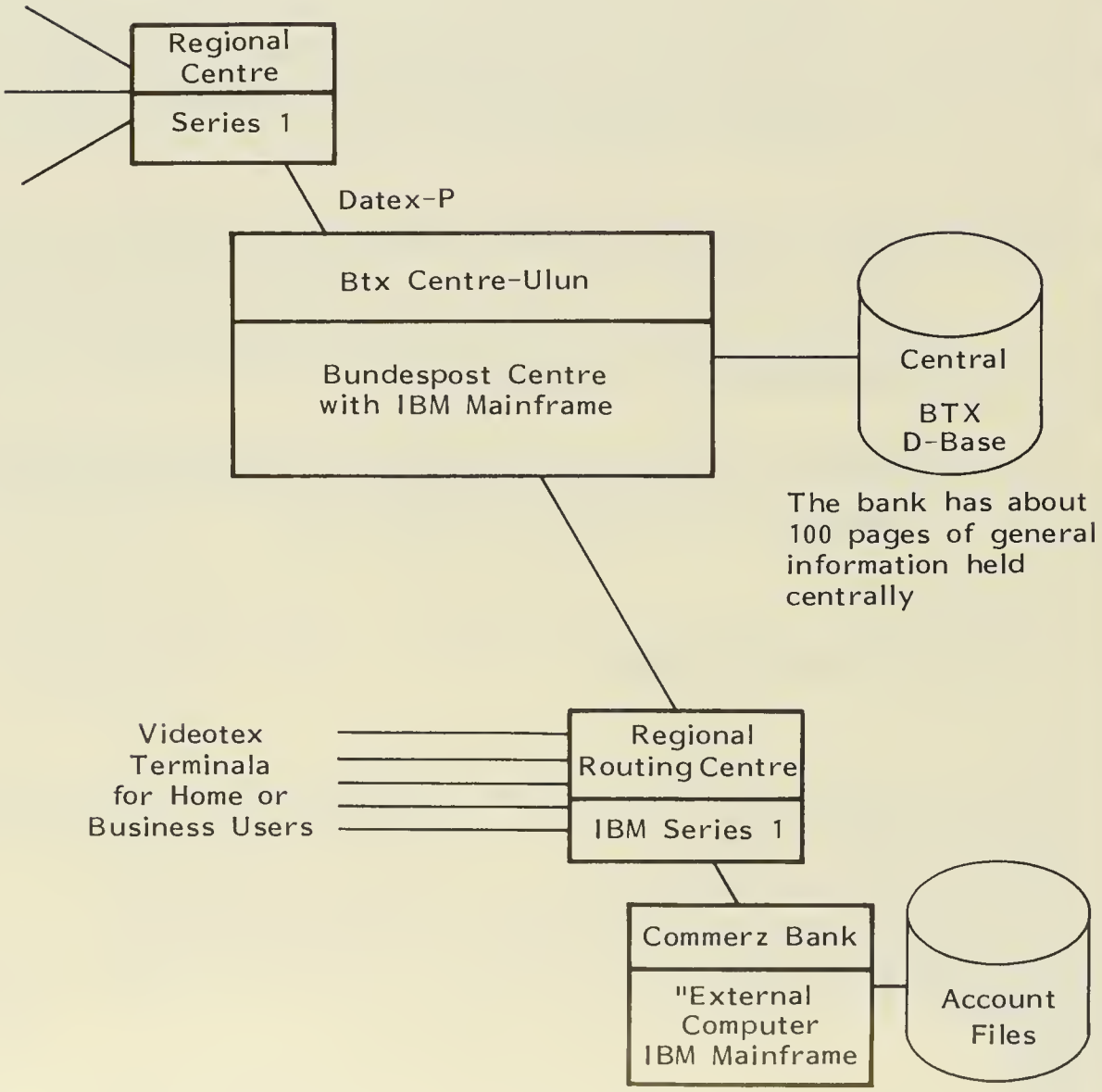
- Retail distribution possesses the key attributes for high applicability of the videotex solution:

  - Dispersed sales outlets.

  - The need for simple communications.

EXHIBIT IV-4

A WEST GERMAN TELEBANKING CONFIGURATION



- Mail order and electrical 'white goods' sales have these attributes to a greater than average extent. Three of the user sample fell into this latter category. These respondents reported that videotex had greatly improved communications between central stock holdings and retail shops (or the public itself in the case of the mail order house).

- There was an absence of major obstacles and a predicted steady expansion of the systems, along with parallel integration with traditonal data processing.

- Exhibit IV-5 shows a schematic diagram of a dual on-line system offering teleshopping from one of France's major mail order companies.

- Other retailers in the sample had yet to extend their systems to the stage of offering teleshopping on a large scale for the general public, but expected this to occur in the next few years.

F. A CROSS-INDUSTRY APPLICATION

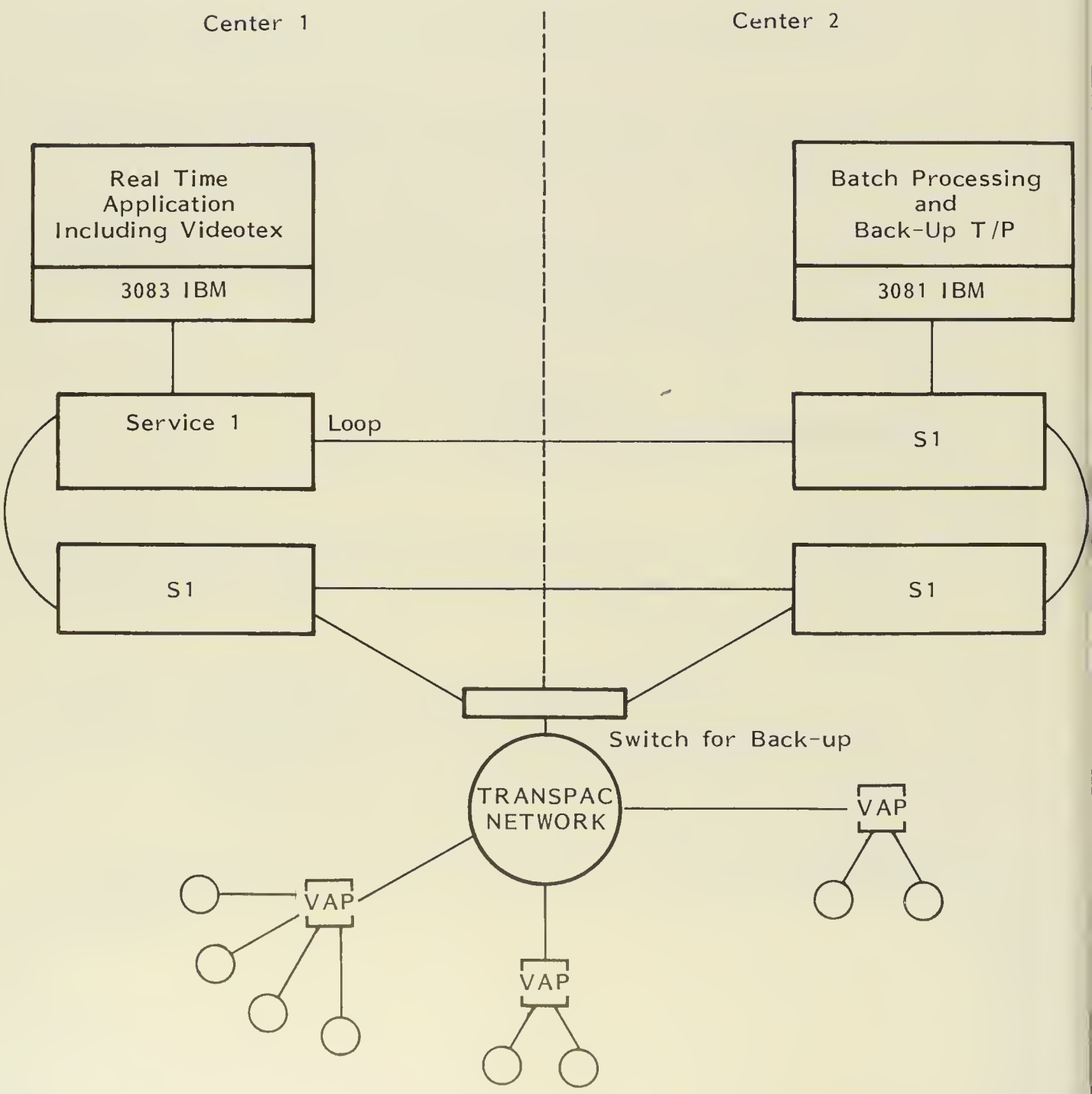
- With a dispersed direct sales force, Order Processing is an attractive videotex application to any manufacturer selling finished goods to the traders via a team of on-the-road salesmen.

- New orders can be entered remotely from home terminals and the progress of earlier ones enquired upon while at the same time allowing the transmission of messages and the compilation and circulation of sales statistics.

- For multinational concerns, there are benefits in having similar systems in all European countries, and hence there are requirements for terminals with multi-standard functionality and for the resolution of the various international standards.

EXHIBIT IV-5

A FRENCH MAIL ORDER HOUSE SYSTEM



- In particular, one company expressed the view that the advent of IBM's Videotex 370 product in the U.S. had given videotex a seal of approval that will make it that much more acceptable as a medium for national and international communications.

V VIDEOTEX DEVELOPMENTS IN THE MAJOR COUNTRY MARKETS

V VIDEOTEX DEVELOPMENTS IN THE MAJOR COUNTRY MARKETS

- Videotex has received large sums of investment money in three of the four country markets researched:
  - France.
  - U.K.
  - West Germany.
- In Italy, the situation is that of a pilot trial, which is acting as a stop-gap system until a definitive system is commissioned and installed.
- Exhibit V-1 details certain important statistics relating to the current state of European videotex development in a table comparing the four countries:
  - Sources of information including information providers (IPs) and sub-IPs.
  - Numbers of frames (pages) of information stored on public systems.
  - Numbers of host computers or external machines linked to the public system, and numbers of the services offered on them.
  - Number of ports in the public and private system sectors.

EXHIBIT V-1

KEY STATISTICS OF THE WEST EUROPEAN VIDEOTEX MARKET IN 1985

ALL EUROPE KEY STATISTICS	NUMBERS ANTICIPATED TO BE INSTALLED, ETC., AT END OF 1985							PER MONTH	
	IPs/ Sources	Frames (Thousands)	Hosts/ Gateways	Services Offered	Ports- Public	Ports- Private	PVSs (Private Videotex Systems)	Calls (Millions)	Connect- Hours (Thousands)
Totals	6,100	1,053	347	1,815	20,200	22,600	600	15.9	1,045
France	600	0	150	1,500	10,000	12,000	0	12.0	800
United Kingdom	1,400	337	57	100	3,000	9,000	600	3.0	200
West Germany	3,900	663	130	200	7,000	1,500	0	0.8	40
Italy	200	53	10	15	200	100	0	0.1	5

- Numbers of private systems operating autonomously from the public system.

- Estimates of the monthly usage in terms of number of calls to the national public systems and number of user connect-hours.

A. FRANCE

1. GENERAL

- France is the leader in European videotex with over one million Minitel terminals expected to be in place by the end of 1985, of which 15% are rented from the DGT (PTT) and the other 85% have been delivered free of charge to business and domestic users under the umbrella of the DGT's Annuaire Electronique (electronic telephone directory) project.

- The Annuaire project went live in the first half of 1985 and is now receiving about two million calls per month.

- The architecture of the French system has contributed to its leadership status, as has the public policy of distributing Minitels free to telephone subscribers.

- The Teletel architecture precludes the DGT from acting as a videotex processing services vendor. It concentrates on providing access points, an access method, and billing methods for videotex users wishing to take advantage of services offered by hosts connected to the network. The Transpac packet-switched system serves as the main data trunking channel.

- Consequently, the PTT is not seen as a competitor by information and service providers and is free to pursue its chosen functions of:

  - Network provision and maintenance.

  - Nurturing the market.

- The DGT introduced in September 1984 a third billing method, the 'kiosk' option, in which the user is charged by the DGT for both data transmission and services on a time-connected basis. The services portion (approximately 5/8ths) is later returned to the service provider. This method brought in 17 million francs in 1984 and is expected to net several times that in 1985 due to intense interest from suppliers and users alike.

- Exhibit V-2 illustrates the current and future forecasts for the French market, split between business/professional applications and consumer applications. Though business applications are in use on only 40% of the user terminal population, they accounted for 65% of the 1984 market. By 1990, business applications will only take 45% of the market as more consumer applications become fee or rental earning.

- Major applications reported by the users are:

  - Electronic mail/text messaging - 65%.

  - Industry-specific information/database consultation - 52%.

  - Order processing/stock control - 31%.

  - Company publicity/news bulletins - 25%.

- Transactional systems for specific industries, such as account enquiries on bank accounts, or contract handling for insurance premiums came fifth, with 20% of users being involved.

EXHIBIT V-2

GROWTH OF THE VIDEOTEX MARKET IN FRANCE

TYPE OF APPLICATION	MARKET SECTOR		MARKET SIZE					
			Actual 1984 (ff Millions)	Forecast 1985 (ff Millions)	1985/84 AAGR (Percent)	Forecast 1988 (ff Millions)	Forecast 1990 (ff Millions)	1990/85 AAGR (Percent)
Business and Professional	Terminals	Units (Thousands)	ff160.0	ff300.0	88%	ff790	ff1,200	32%
		Value	217	414	90	1,278	2,566	44
	Systems		57	113	98	216	291	21
	Software Products		23	28	22	56	94	27
	Processing Services		190	254	34	517	752	24
	Professional Services		163	235	44	536	827	29
	Total		ff650	ff1,044	61	ff2,603	ff4,530	34%
Consumer	Terminals	Units (Thousands)	240.0	500	108%	1,050	1,350	22%
		Value	24	85	254	978	2,745	100
	Systems		96	141	47	282	367	21
	Software Products		18	28	56	85	132	36
	Processing Services		81	122	51	273	461	30
	Professional Services		126	179	42	404	649	29
	Total		ff345	ff555	61%	ff2,022	ff4,345	51%

- Many systems have still to be extended or upgraded from a pure information system into one which also handles transactions, but this process is underway and represents enormous potential for use of the network.

2. TELECOMMUNICATIONS ENVIRONMENT

- In June and July 1985, the exceptional growth of the installed base of Minitel terminals, up from 100,000 to 500,000 during 1984 and moving through the 800,000 mark in mid-1985, had been coupled with the onset of new consumer applications such as games and home banking.

- The consequent saturation of the Transpac call logging equipment caused the Teletel network to stop functioning altogether; in one or two cases for some hours. Most users and vendors interviewed were convinced this was a temporary hitch caused by accelerated terminal usage, the objective for which the system was designed.

- User comments on this and other questions connected with networking are given in Exhibit V-3. An equivalent vendor comment was that the DGT was the only PTT which had marketed its national videotex system correctly.

- Factors which will affect usage of the system but remain within the jurisdiction or influence of the DGT are:

  - Price rises for data transmission will to some extent depend on the need for the network to be upgraded to cope with increasing traffic. Foreign suppliers to the videotex field are convinced of the Transpac network's ability to be expanded and paid compliments to its design and architecture.

  - Minitel has limitations, and it is not clear to what extent its future replacements will be done to DGT design or provided by the industry;

EXHIBIT V-3

USER COMMENTS ON THE FRENCH TELECOMMUNICATIONS ENVIRONMENT

- 'Hacking' is a major problem in any videotex system.
- Transpac overload in June this year will prove to be only a temporary problem.
- Transpac saturation only affects us slightly, as we do not operate in realtime.
- The French videotex success is due to the Minitel, which allows one to go from the written word under some form of code directly into a DP format.
- We find that our staff are pleased to be using up-to-date technology, though some of their initial reactions were adverse.
- One day we might be using an internal private network.
- Minitel response is too slow for good communications with our insurance agents in any sophisticated application.
- Current videotex terminals are 'uncomfortable' and therefore unproductive.
- Price rises are to be expected from the PTT and will slow down growth.

hence, there is a danger that the current level of videotex technology could have too long a product life cycle without any clear successor path.

- Limitations on line speed affect the use of disk-based PCs such as the IBM PC/AT for work involving bulk data transmission via Teletel.

- The integration of videotex with office automation as outlined to INPUT by several French vendors needs clear guidelines on the convergence of voice, text, data, and image transmission.

3. MARKETING ENVIRONMENT

- The vendor's perceptions of the factors which act to promote or to depress the videotex sector are summarised in Exhibit V-4. The overall reaction is consistently positive with 21 positive factors mentioned by the 10 respondents against 11 negative factors.

- The concentration of the French market for information services amongst a limited number of relatively large companies was emphasised by the small number of competitors mentioned. In order by number of mentions they were:

  - Cap Gemini Sogeti - 2.
  - GFI - 2.
  - Telesystemes - 1.
  - Steria - 1.
  - SPI - 1.
  - IBM - 1.

EXHIBIT V-4

FRENCH VENDOR PERCEPTIONS OF MARKET IMPACT FACTORS
(By Number of Mentions)

FACTORS	IMPACT RATING			Ranking
	High	Medium	Low	
Fostering Growth				
PTT (DGT) Policies	4	1	-	1
Ease of Use/Functionality of Minitel	2	1	1	2
Size of Terminal Installed Base	3	-	-	3
User Awareness	-	1	1	4=
Own Marketing Image	-	2	-	4=
Spread of Micros	-	-	2	4=
Others	1	1	1	
Total	10	6	5	
Impeding Growth				
Too Expensive to Browse	-	1	1	1=
DP Management Hostile	-	1	1	1=
Invoicing Overhead for Consumer Applications	-	1	1	1=
Incompatible Standards/Protocols	1	-	-	4=
Speed of Transmission Limited to 1,200 bps.	1	-	-	4=
Others	-	3	-	
Total	2	6	3	

- Various unnamed small service companies using minicomputers to support their applications.

- These last were partly responsible for the highly competitive and cost-conscious marketplace for videotex database services, with 100 francs per connect-hour being the generally accepted ceiling to the market price.

- One vendor was of the opinion that it would take several months before his management knew whether each new service would be commercially viable. There was not enough experience in certain application areas to know this before launch.

B. U.K.

1. GENERAL

- The British videotex (viewdata) market was pioneered by the then British Post Office with its Prestel information service based on the telephone network, adapted television receivers, and a series of specially installed database computers serving the U.K. Since the early days of the Prestel service in 1980, the British market has developed along two parallel paths:

  - The Prestel public network, never having met its original targets for penetration of the market for consumer applications, has switched its marketing thrust in the direction of the business community and has now achieved an installed base of over 50,000 terminals, 55% of which are used for business and professional applications. It is reported to have met its profit targets for the first time this year.

- A whole series of private videotex systems (PVS) have been set up to serve individual companies and closed user groups of companies within particular industries. Some of these systems have been described in the previous chapter.

- At the end of 1985, INPUT expects the U.K. market to be supporting over 130,000 terminals, defined to include:

  - Prestel TV-style receivers, such as those sold by Sony, Philips, ITT, etc.

  - 'Standalone' adaptors for connection to home TV sets fitted with Teletext (broadcast videotex) receivers.

  - Microcomputers and intelligent computer terminals fitted with Prestel communications boards to accept data transmission in Prestel-compatible mode.

- These units are split roughly 50:50 between Prestel and the PVS sector, with the faster growth (over 3,000 units per month) currently being experienced in the private field.

- However, the trend is for the two sectors to coalesce in future years into an inter-connecting set of networks serving many multifunctional, multi-standard terminal types. Consumer applications, as shown on Exhibit III-1, are only run on 24% of the U.K. terminal population, but this is forecasted to have increased to 35% by 1990.

- Thus in 1985 the U.K. market passed through the 100,000 terminal size of installed base, but being more fragmented than the French market, was less able to take advantage of such a 'critical mass' of terminal outlets.

- The same figure was passed in France at the start of 1984, since which time usage has been doubling every six months. At the present time, connect-hours

for the Prestel network run at about 25% of those of the Teletel system in France. These and other statistics are shown in Exhibit V-1.

- Exhibits V-5 details the actual and forecast market sizes in the U.K. broken down by product/service sector.

- The most frequently mentioned applications reported by users were:

  - Industry-specific information access (especially to financial data using Citiservice or Topic) - 25%.

  - Order processing - 12%.

  - External database interrogation (cross-industry) - 10%.

  - Internal company news and external announcements - 12%.

  - Industry-specific transactional systems; e.g., home banking - 12%.

- Note the heavy bias toward 'information only' systems resulting from the large numbers of private viewdata users in the sample. By contrast, Prestel reports heavier growth and more interest in transaction-type systems:

  - Travel systems (over 95% of travel agents in the U.K. are Prestel customers).

  - Insurance broker quotation systems.

  - Home banking.

  - Telebroking.

  - Sales order processing.

EXHIBIT V-5

GROWTH OF THE VIDEOTEX MARKET IN THE UNITED KINGDOM

TYPE OF APPLICATION	MARKET SECTOR		MARKET SIZE					
			Actual 1984 (£ Millions)	Forecast 1985 (£ Millions)	1985/84 AAGR (Percent)	Forecast 1988 (£ Millions)	Forecast 1990 (£ Millions)	1990/85 AAGR (Percent)
Business and Professional	Terminals	Units (Thousands)	£13.0	£6.4	315%	£128	£245	35%
		Value	12.2	19.0	55	43	62	27
	Systems		4.5	5.5	22	12	16	24
	Software Products		2.0	3.2	60	6	10	26
	Processing Services		4.7	6.3	34	11	14	18
	Professional Services		4.7	6.3	34	13	20	26
	Total		£28.1	£40.3	43%	£85	£122	25%
Consumer	Terminals	Units (Thousands)	4.0	13.0	225%	69	250	81%
		Value	1.6	2.4	50	11	28	63
	Systems		1.7	3.2	88	8	11	28
	Software Products		0.8	1.6	100	2	4	20
	Processing Services		1.6	2.4	50	4	6	18
	Professional Services		3.9	5.5	41	13	23	33
	Total		£9.6	£15.1	57%	£38	£72	37%

*Constant 1985 U.S. Dollars 1985, 1988, 1990.
Actual 1984 U.S. Dollars 1984.

2. TELECOMMUNICATIONS ENVIRONMENT

- The U.K. is leading the way in the loosening of the European PTT monopoly structures. The privatisation of British Telecom (BT) and the granting of a duopoly status to it and Mercury (part of Cable and Wireless) have resulted in the formation of a more dynamic and market-oriented company.

- However, Mercury is currently relatively small and specialised so that to all intents and purposes a public monopoly has been transformed into a private one, with BT dominating the scene.

- Users still regard BT as the sole supplier. It is looked upon to provide adequate service, and there is an almost universal assumption that the service will be unsatisfactory to some degree.

- Exhibit V-6 lists a number of user comments relating to dealings with BT. There is a general acknowledgement that quality has improved since liberalisation was set in train, but that there is still room for further improvement.

- Users were more apt to find fault with BT generally than with respect to Prestel service, but line quality at the local connection level was consistently criticised.

- Some service and information providers regard BT in the form Prestel as a threat to their operations. This results from:

  - The stronger and more focused BT marketing directed at specific niche markets and occasioned by the requirement to sell hard and well to ensure Prestel network survival.

  - Uncertainty about the future role of Prestel among all the other service ventures in which BT is currently engaging.

EXHIBIT V-6

USER COMMENTS ON THE BRITISH TELECOMMUNICATIONS ENVIRONMENT

- The U.K. is still badly lacking in the basics. BT is very telephone-oriented.
- Our main complaints are over delivery and the quality of BT lines. You have to keep chasing them. We've seen improvements in the last year.
- BT is infinitely better than it was two years ago. Kilostream and Megastream services are very good. Fibre optics is too expensive. We looked at it and it's not on.
- Prestel relies on PSTN lines and these are of very variable quality round the country.
- Considered a system to provide information to customers and prospects (mainly farmers), but found that Viewdata penetration in our market is too low.
- The best network option is not clear. What will BT provide that is easy for the user wanting a private viewdata system?
- Paying normal telephone charges is still a major hindrance to Prestel. Separate tariffing is required as for Teletel and Btx.
- BT line quality is patchy.
- We use two BT divisions who do not cooperate. They only come together at the very top ot the pyramid. This dichotomy is accentuated by BT's new thrusting middle management.
- We are looking at other networks, e.g., ISTEL and Travinet.
- Prestel has improved its service recently, but we ask: 'What future direction will it take? Will they start to dictate terms and conditions, and will they be able to provide the level of confidentiality we need.'

- The danger foreseen by INPUT is that with all sorts of technological possibilities being opened up by BT, the user will be left confused by so many choices.

- Videotex and Prestel protocol is now well established as a starter technology for emerging data communications applications. As such, it deserves to be fostered by provision of an upgrade or enhancement path if U.K. users are to be able to benefit from its current penetration levels.

3. MARKETING ENVIRONMENT

- Eighteen different competitors were named by the 12 vendor companies interviewed, but only three gained more than single mentions. These were:

  - IBM, four.

  - BT Prestel, two.

  - Aregon International, two.

- This list of perceived rivals ranged from the large computer manufacturers to small specialist software companies, taking in major system houses and network services firms along the way.

- INPUT expects the growth of the U.K. marketplace to maintain this type of market fragmentation over the next five years, but in individual sectors such as processing and integrated systems, fewer major companies are likely to take larger market shares with specific, well-targetted services and products.

- Exhibit V-7 contrasts the positive and negative factors perceived by vendors to be impacting the growth of the videotex sector. It is interesting for its omissions as much as for its inclusions:

EXHIBIT V-7

UNITED KINGDOM VENDOR PERCEPTIONS OF MARKET IMPACT FACTORS
(By Number of Mentions)

	IMPACT RATING			
	High	Medium	Low	Ranking
Fostering Growth				
Presence of Installed PC Base	-	1	4	1=
User Awareness	-	3	-	1=
Availability of Low-Cost Terminals	1	1	-	3
Maturity of the Market	-	2	-	4
Others	3	5	2	
Total	4	12	6	
Impeding Growth				
Problems of Marketing/Selling	1	3	-	1=
Price Competitiveness	-	3	1	2
Hostility of DP Management	1	2	-	3
Deregulation/Regulatory Environment	-	3	-	4
Others	-	4	3	
Total	2	15	4	

- Prestel is not seen as a 'player' stimulating the market, though IBM's presence was once mentioned in this vein.

- There is a lack of either positive or negative high rating factors, indicating the difficulty in seeing the future of the market clearly.

- A view of the market as 'hanging in the balance' is also confirmed by the almost equal number of mentions of both types of factor. This presents a series of challenging opportunities to Prestel, IBM, and other major suppliers. Success will require commitment and proper concentration of available resources at both the management and the engineering levels.

C. WEST GERMANY

1. GENERAL

- The German videotex trial which started in the Dusseldorf-Cologne area in the early 1980s was based on Prestel standards and Prestel-derived software.

- Subsequently, it was decided that since the country was not going to be as far and as quickly advanced in this market as its rivals in France and Great Britain, it would be sensible to skip the generation of early protocol standards and go for the first European standard set by CEPT (the Committee of the European PTTs).

- West Germany now prides itself in having the third largest terminal base in European videotex. Forecast by INPUT to have reached 40,000 units by the end of 1985, it is, however, an order of magnitude lower than the Bundespost's consultants' earliest forecasts, which have had to be continually revised downward.

- Nevertheless, given the experience of Prestel take-up in the U.K., the present installed base size is respectable after only two years of operation of the full CEPT level III system.

- There are four principal grades of equipment making up this installed base:

  - Decoders for adding to an existing home TV set to give it Bildschirmtext (Btx) capability. These are obtainable for around DM1,000 ($350) and are regarded as too expensive to be within the reach of more than the top 15% of salary earners. Together with the decoder, a new TV set costs over $1,000. Decoders account for an estimated 20% of the Btx connections installed.

  - Intelligent keyboards incorporating home microcomputer and decoder, of which a well-known example is the MUPID device. These retail for between DM2,000 and DM2,500 (averaging around $850) and account for another 30% of the base.

  - Special-purpose videotex terminals providing a range of capabilities including such features as storage, editing, and display of data are the largest part of the installed base at around 40%. Loewe Opta and Blaupunkt are active in this segment, and sets are sold to the information providers for between DM4,000 and DM5,000 (approximately $1,500).

  - The remaining 10% of the equipment is found in the PC sector, where a range of suppliers offer systems with Btx capability for anything up to DM12,000 (or $4,000) including IBM, TA, Nixdorf, and NCR.

- In recent months a new device with Btx capability, the BITEL, combining the Btx decoder function with integral telephone and small screen, has come onto the market from Siemens, selling at DM1,500 or $500. It is estimated to have taken no more than a 3% market share.

- The architecture of the Bildschirmtext system differs from that of either France or the U.K. It consists of a hierarchical (two-level) structure with database handling centres placed:

  - Regionally. Presently at 35 centres equipped with IBM Series 1s, through which local accesses to the system are routed and at which information requests will be accepted and answered.

  - Centrally. At a large mainframe complex in Ulm, handling network control and interregional communications and supporting a common central database.

- The Btx network combines features of Prestel and Teletel, offering:

  - More frames of information than Prestel - 660,000 against 330,000 in the U.K. (see Exhibit V-1).

  - A somewhat lesser number of external host machines than Teletel - 130 against 150 in France.

- Applications reported by our user group included:

  - Company news and promotional information - 64%.

  - Industry-specific data and information handling - 50%.

  - Industry-specific transaction systems; e.g., banking - 21%.

  - Electronic publishing - 14%.

- The 130 external computers connected to Btx in mid-July were split between industries as follows:

- Banking and finance - 22%.
- Electronics and computers - 17%.
- Service bureaux - 9%.
- Publishers - 8%.
- Insurance - 7%.
- Information brokers - 6%.
- Tourism - 5%.
- The rest - 26%.

- The service bureau industry expects this number to continue rising steadily and it believes that the Bundespost's decision to allow third-party systems and services to link to the network is the guarantee of the long-term success of Btx.

- Exhibit V-8 shows INPUT's projections for future market growth, based on the market measurements for 1984 and 1985.

2. TELECOMMUNICATIONS ENVIRONMENT

- West Germany has traditionally enjoyed good telecommunications, but with one of the highest tariffs in Europe. This has been coupled with a strongly monopolistic attitude on the part of the PTT who have extended this stance particularly to the area of strict control of modem and terminal devices allowed to connect to the network.

EXHIBIT V-8

GROWTH OF THE VIDEOTEX MARKET IN WEST GERMANY

TYPE OF APPLICATION	MARKET SECTOR		MARKET SIZE					
			Actual 1984 (DM Millions)	Forecast 1985 (DM Millions)	1985/84 AAGR (Percent)	Forecast 1988 (DM Millions)	Forecast 1990 (DM Millions)	1990/85 AAGR (Percent)
Business and Professional	Terminals	Units (Thousands)	DM 10.0	DM12.0	20%	DM 58	DM135	62%
		Value	17.6	20.3	15	64	99	37
	Systems		11.8	14.5	23	29	38	21
	Software Products		2.9	5.8	100	12	20	28
	Processing Services		7.3	8.7	19	17	23	21
	Professional Services		7.3	11.6	59	32	58	38
	Total		DM46.9	DM60.9	30%	DM154	DM 238	31%
Consumer	Terminals	Units (Thousands)	7.0	8.0	14%	50	180	86%
		Value	10.3	10.4	1	44	104	58
	Systems		6.8	10.2	2	23	32	26
	Software Products		2.9	5.2	79	23	41	51
	Processing Services		0.9	1.7	89	6	9	40
	Professional Services		7.3	13.0	78	23	32	20
	Total		DM28.2	DM 40.5	44%	DM119	DM 218	40%

- Data communications have thus tended to be the prerogative of the large organisation who can afford lines and line costs. The smaller and medium-sized companies have been less inclined to afford this area of cost.

- As a result, the country has not had such a highly developed market for computing services as the size of its GDP might warrant, since the regional service bureau organisations have been much slower in converting their users away from the 'old-fashioned' batch processing methods.

- The advent of Btx is set to change all that. The reason is the specially low cost of a Btx modem set designed by the Bundespost to attract the home Btx user, but which in fact has been 'discovered' by the business and professional user. Fifty-four percent of users use Btx solely for business purposes.

- Btx has found some favour with business users and with service providers such as banks. A technical problem, the slow response times currently being experienced, will need to be eradicated. The problem's persistence encourages hostility on the part of a proportion of DP managers, who are naturally suspicious of new developments which threaten to bypass their systems.

- Some specific comments on the environment came from within the respondent group interviewed:

  - 'The Bundespost has now realised it was wrong to angle its initial advertising to catch the man-in-the-street. It is at the moment spending more than DM5 million on advertising to the business user.'

  - 'They should have realised from the English experience how difficult it is to stimulate the consumer market from day one. The general public need to be able to afford novelties, but also to see a genuine use for new devices, and that cannot be demonstrated until the professional user has encountered serious applications in his place of work over the course of a number of years.'

- 'The big expansion of Btx, hoped for by everyone, will only come if and when the entry cost of a terminal or decoder is cut drastically, say in half--from the present floor price of DM1,000 upwards to say DM600-800, for example.'

- 'The manufacturers have been promising cheaper devices based on the EROMs for some years now. I shall believe it when it happens. Maybe someone will introduce a cheap device at the 1985 Berlin Funkausstellung in September!'

3. MARKETING ENVIRONMENT

- Current traffic is running at the rate of between 15 and 20 thousand calls per day with a similar number of frames being accessed. With almost 4,000 information and service providers in the system this gives an average of between four and five calls each per day.

- This is much too small to make for a viable service. However, many providers see Btx as an alternative or extra channel for the distribution of a service or information about a service:

  - Lufthansa provides scheduled flight information in a paper publication, over the telephone to enquirers, and now through Btx.

  - Several hundred banks are scrambling to offer telebanking facilities to keep up with each other in service to clients. Business clients are usually the favoured targets because of their greater ability to afford extra charges.

- The ten vendors interviewed saw themselves in competition with four different groups of competitors:

- The traditional large service bureaux, with regional offices and national operations, obtained over 50% of the mentions.

- Specialist service companies founded to serve the Btx market took another 23%.

- Publishers took 11%.

- Small, 'adventurous' software houses also took 11%.

- In the first category, only Rhein-Main Rechenzentrum (RM) and GSI-Datel received more than one mention, three and two respectively.

- Analysis of vendors' perceptions of market driving forces, as shown in Exhibit V-9, yields two main conclusions:

  - The views of respondents come down on the moderately pessimistic side, with 21 mentions of market inhibiting factors against only 17 mentions of plus factors.

  - Though IBM was responsible for the installation of the Btx system, no one mentioned that company's participation as a market stimulant. IBM is marketing the Editel editing software packages built by Cap Gemini Sogeti Deutschland and aimed at PC users. Up to 1,000 systems are expected to be called off over the next 12 months.

- INPUT judges that the West German videotex market is following fairly faithfully the path traced by the U.K. with the Prestel experience.

- Btx will become an important market, but in the medium-term, when business and professional users have started to benefit from the increased communications capabilities which are its potential.

EXHIBIT V-9

WEST GERMAN VENDOR PERCEPTIONS OF MARKET IMPACT FACTORS
(By Number of Mentions)

	IMPACT RATING			
	High	Medium	Low	Ranking
Fostering Growth				
Cheap Modems for Business Use	2	-	1	1
Penetration of Business Micros	1	2	-	2=
Possibility of Closed User Groups	1	2	-	2=
Local Call Access Inexpensive	1	-	-	4=
Future Impact of ISDN	1	-	-	4=
Others	-	6	-	
Total	6	10	1	
Impeding Growth				
Initial Equipment Cost too High	5	2	-	1
No Really Useful Information on Offer	3	1	-	2
Terminal Base is too Small	1	-	1	3
Datex-P Problems/Costs	-	2	-	4
Others	2	3	1	
Total	11	8	2	

D. ITALY

1. GENERAL

- The Italian system, called Videotel, has been in operation on a trial basis since the end of 1982. It is run by the public telephone company SIP and extends to only six major cities.

- The standard chosen for this experimental phase was the British Prestel, but when moved to its full-scale system CEPT level III will be implemented. The current system runs on GEC hardware and supports only 200 ports.

- The number of users has risen from the 1,000 at the start of the trial to around 2,500 in mid-1985. Business users account for 80% of this number and are usually well-known companies with considerable investment already in data processing and office automation.

- There are about 200 information providers giving a ratio of 1:12 with the user population.

- The industry is now waiting for the passage of a new law setting up the full system eventually throughout the entire country. This is expected to be enacted in November 1985 and will probably extend to some liberalisation of the regulatory environment for videotex.

- During the pilot stage it has been illegal for anyone except SIP and RAI (the state radio and television authority running a separate teletext experiment in parallel with Videotel) to sell or rent the terminals.

- Sanctioning a monopoly in this way has stifled at birth any attempt to develop a market in private videotex systems. Only a handful of software products for videotext have been sold to date in Italy.

2. TECHNOLOGICAL ENVIRONMENT

- The pilot system was based on the Mistel software from the ITT group. This product was adapted to meet the requirements of the local market under a project commissioned by SIP.

- It is SIP's intention to proceed in 1986 to CEPT level III running in conjunction with CEPT level I. To this end, a tender was issued to six companies including IBM, GEC, Olivetti, and Italtel. It was recently announced (November 1985) that GEC had been awarded the contract.

- Terminals to support CEPT level III have been promised for June 1986, but this date could easily be missed. Meanwhile, software to support videotex on PCs has appeared on the Italian market, but without making any particular sales impact.

- SIP is planning to spend $25 million over the next five years, having already invested over $5 million to reach the present stage.

3. CURRENT MARKET STATUS

- The majority of pages can be consulted free of charge. Those most often accessed cover:

  - The economy.

  - Tourism.

  - Leisure pursuits.

- News items.

- General information.

- A few closed user groups charge subscribers a page access charge.

- There are a handful of external computers connected via Gateways to the Videotel system. All are information providers:

  - AGI (Agenzia Giornalistica Italia).

  - Banca Populare di Milano.

  - Ministero PT.

  - Seat-Sarin.

  - Sipe Optimation.

- It is estimated that:

  - Of the 200 information providers, only 30 offer information of real interest to users, and perhaps only 10 are able to effect proper updating of their files to maintain this interest continuously.

  - The average user accesses the system every other day, giving a total monthly connect-time of 7,500 hours.

- In 1985, SIP will invoice users to the extent of $1 million, of which 70% will come from the hire of equipment. The information providers will have revenues equal to 50% of that; i.e., about $500,000. Exhibit V-10 gives the detailed estimates of market size together with INPUT's forecasts for the growth of the market through to 1990. These figures include development expenditures by all participants in the sector:

EXHIBIT V-10

GROWTH OF THE VIDEOTEX MARKET IN ITALY

TYPE OF APPLICATION	MARKET SECTOR		MARKET SIZE					
			Actual 1984 (£ Millions)	Forecast 1985 (£ Millions)	1985/84 AAGR (Percent)	Forecast 1988 (£ Millions)	Forecast 1990 (£ Millions)	1990/85 AAGR (Percent)
Business and Professional	Terminals	Units (Thousands)	£0.4	£1.4	250%	£23	£75	122%
		Value	548	1,950	256	17,550	48,750	90
	Systems		2,556	2,535	0	9,750	17,550	47
	Software Products		-	195	-	1,950	5,850	97
	Processing Services		183	390	113	3,900	5,850	72
	Professional Services		730	1,365	87	7,800	9,750	48
	Total		£4,017	£6,435	60%	£40,950	£87,750	69%
Consumer	Terminals	Units (Thousands)	0.1	0.4	300%	7	49	162%
		Value	183	390	113%	5,850	19,500	119%
	Systems		2,556	3,510	37	9,750	15,600	345
	Software Products		0	0	0	1,950	3,900	-
	Processing Services		0	195	-	1,950	3,900	82
	Professional Services		183	585	220	5,850	7,800	68
	Total		£2,922	£4,680	60%	£25,350	£50,700	61%

- Users.

- Information providers.

- SIP itself.

Note also that because of the small size of some of the numbers in the early years, apparent discrepancies in growth rates have been caused by rounding.

4. FUTURE TRENDS

- SIP has in 1985 entered into the information provider business with a joint venture with a Milan bank to develop a home banking package, hoping to sell the resulting product to other banks. SIP also offers pages of general information.

- To provide good services in future, information providers must face the need for considerable investments. At the moment there is an inevitable mood of 'wait and see' until the new enabling legislation reaches the statute book.

- An immense amount of work will have to go into all aspects of marketing if the projected installed base of a quarter of a million is to be achieved by the end of 1990.

VI IMPACT OF ADJACENT TECHNOLOGIES

VI IMPACT OF ADJACENT TECHNOLOGIES

A. OVERVIEW

- With the convergence between videotex and some of the earlier markets (on-line database services, conventional data processing, office automation) already under way, it is natural to enquire how the medium will stand up to the challenge of the newer technologies currently arousing interest not only in the computing industry but also among the public at large:

  - Cable (TV and radio).
  - Satellite communications and broadcasting.
  - Fibre optics.
  - Cellular mobile radio.
  - Videodisk, CD-ROM, and optical disk.

- Videotex is going to be one of a number of competing and collaborating solutions which must coexist over the next several years. It will compete with these other technologies on a few key parameters:

- Cost.

- Services accessible.

- Ease of use.

- The particularities of its technological base will become less significant:

  - Graphics functions may in time range from the alphamosaic 'baseline' up to a GKS capability.

  - Local intelligence will vary widely, from the 'dumb' modified TV set to the power of a PC/AT.

  - Line transmission speed and/or communication bandwidth will become more available (though not necessarily cheaper) for the mounting of more sophisticated services.

- Exhibit VI-1 lists some vendor comments on this dynamic future for European and worldwide communications:

  - In France the key features are:

    . Faith in the wisdom and expertise of the DGT, without any clear idea of what its long-term plans are.

    . Interest in the convergence between videotex on the one hand and the audio-visual world and video communications on the other.

  - In the U.K., liberalisation of the telecommunications environment coupled with BT's involvement in a whole range of new ventures (themselves heavy with potential for mutual competitive impact)

EXHIBIT VI-1

VENDOR COMMENTS ON TELECOMMUNICATIONS DEVELOPMENTS

- I have not much idea about how telecommunications will develop in France. That is very much in the hands of the authorities.
- The transmission speed ceiling of 1200 bps. limits the use of PCs in videotex applications, especially the use of AT.
- As the French Telecomms authority, we in the DGT are open to what the user wants.
- Business videotex will evolve in conjunction with classical DP developments.
- Three years from now it will be a different generation of products with the accent on videocommunications.
- We are taking part in the French wired city project at Biarritz.
- The convergence of videotex is with videocommunications.
- Our current videodisk capability is interesting certain industries - automobile, retail, education.
- The videodisk pilot project requires a consortium with expertise in - high-quality film-making, potential markets, electronics, and computers.
- The government set up a national duopoly, with ourselves and one other consortium, to offer rapidly a country-wide cellular radio network.
- No one has made a case for Cable TV. What will the network deliver locally? It will need to be connected into a national service.
- New terminals will be introduced, with higher speeds possible after introduction of ISDN.
- New products will be needed for ISDN - in, say, five years.

makes it extremely difficult for companies to form and stick to sensible long-term communications strategies for their businessess.

- In West Germany, the Bundespost has at least signalled that it will develop an integrated digital network (ISDN) in a single-minded way. Users know where they stand even if they don't often like the price tag or welcome the relative stagnation (in terms of development effort) of the existing Datex networks.

- In Italy, being so far behind its major rivals in the maturity of its telephone system, there is potential to leapfrog a generation (or two?) of communications technology rather than remain in a semi-permanent state of always catching up.

- In making recommendations for clients who have to operate within this climate of change, INPUT's policy is to limit its technological planning horizon to five years, and within that framework to look at:

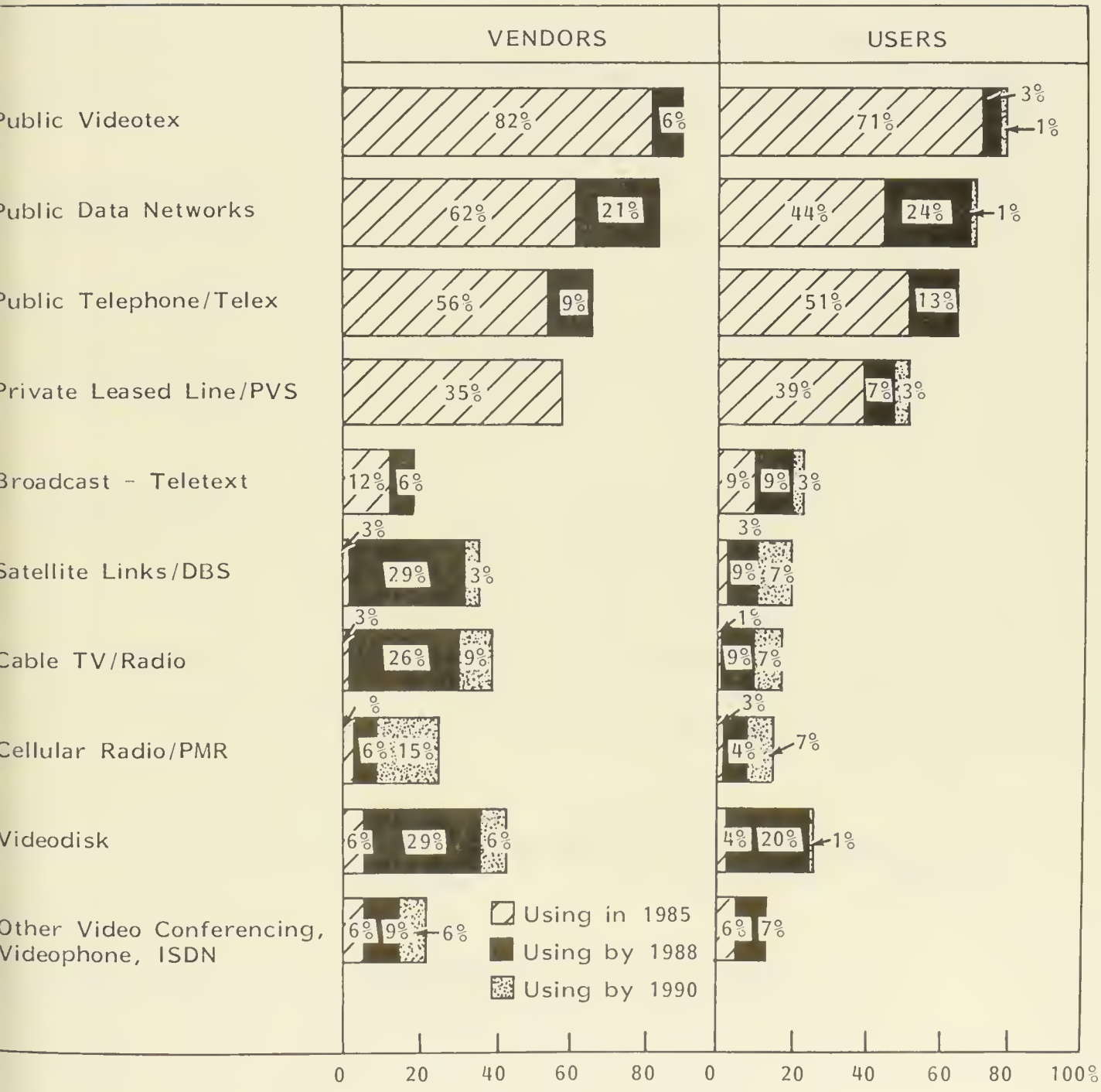
  - The first three years - medium-term strategy.

  - The second two years - long-term planning.

- Exhibit VI-2 is the result of an analysis of the vendor and user responses to the survey question relating to the existing use of telecommunications and to future uses envisaged. The two sets of respondents were asked to give the earliest date by which they would be using or offering services, using the given range of ten existing or emerging technologies or any others they mentioned.

EXHIBIT VI-2

TELECOMMUNICATION CHANNELS
VENDOR OFFERINGS VERSUS USER NEEDS AND USAGE



B. TELETEXT

- Sometimes called broadcast videotex, teletext is the technological twin of interactive videotex. Interactive videotex has now inherited the generic name videotex, its original title of viewdata only surviving in the U.K.

- Teletext has tended to lead a more sheltered and less controversial life than its twin brother, being confined within the relatively narrow market formed by the broadcasting authorities.

- However, it has not been without success. In the U.K. alone, for instance, over two million domestic TV sets have been installed with teletext capability, and it will soon be rare for a set to be sold there without it.

- It has the potential to work within videotex as a segment of the terminal population to which services can be provided, since a teletext TV set plus a decoder is equivalent to a modified TV set with integrated decoder.

- In the next three years this will become clear to vendors of consumer services in the U.K. who wish to follow in the footsteps of the Nottingham Building Society's Homelink or the Bank of Scotland's Homebank.

- An unnecessary dichotomy has grown up between these two technologies. The vendor sample appears to keep up with the user demand for teletext up to 1988, but thereafter falls off in interest.

C. SATELLITE COMMUNICATIONS

- These are regarded by users and vendors alike as not so much a delivery vehicle as a component part of a delivery vehicle. As such they are of

interest to the communications engineer and to the broadcasting authorities with their ability to deliver programmes directly to rooftop aerials.

- Direct broadcast satellites (DBS) and related TV broadcasting techniques are currently an area of political debate because of their potential for crossing national boundaries.

- For this reason the technology will either be delayed by committee discussion or controlled for the public good, or both. In any event, its applications are not competitive to videotex, which will only be able to profit from the increased communication capability available.

- As shown on Exhibit VI-2, vendors are well ahead of demand but tend to think more in terms of components of the delivery vehicle than do users. However, this is a signal for suppliers to question the capacity they intend to provide by 1988 if over 35% of them will have capacity while only 6% of users will need it.

D. CABLE

- This is a medium designed for the delivery of sophisticated multi-media services accessible in both broadcast and interactive mode. Its history relates it to the broadcasting field; it has been cast in the role of the chief delivery vehicle of future interactive services at the local level.

- It is a medium which will be cheapest to implement in the urban environment (with a relatively dense population), and in this respect it complements rather than competes with videotex's traditional emphasis on a widely dispersed audience.

- By 1988 almost 30% of vendors plan to be involved in cable services, but only 10% of users anticipate using them.

E. CELLULAR RADIO AND MOBILE COMMUNICATIONS

- This area deals principally with voice communication and has been a traditional preserve of the public services and utilities with their large fleets of mobile engineering staff. Its interest to videotex suppliers is twofold:

  - It provides an object lesson in how in the European context dynamic initiatives lead to a proliferation of standards - at this time at least four incompatible systems are being built or extended at national levels (British, French, West German, and Scandinavian)--and only in the second round will these have a chance of being made compatible.

  - On a more practical level, there will be a small requirement for data services on the cellular network and for connection to data services in the telephone network.

- Vendors are already offered videotex compatible protocols for operation in cellular radio systems, but these have still to be tested in large-scale implementation.

F. OTHER TECHNOLOGIES

- Videodisk technology, in terms of CD-ROMs or optical disks, was regularly cited by both sets of respondents. The interest on both sides lies in being able to improve the image/picture processing capability of the videotex systems in order to fulfill videotex's early promise of a full text, data, and graphics functionality.

- Clearly, the technology is still young and dependent on sufficient transmission bandwidth as well as reliable hardware and software before services can be offered commercially.

- Vendors are linking videotex and videodisk to make viable public access terminal systems (PATs). Several PTTs plan trial installations of PATs of different levels of technology (with and without videodisk) in the next 18 months.

- These terminals in shopping precincts, stores, and other public areas are included in INPUT's installed base forecasts. The multiplier for these sets is an order of magnitude lower than for domestic sets, but it is still an important component.

- That videodisk is a technology well past the stage of being a 'solution looking for a problem' is backed up by the user demand recorded in the survey. Twenty-two percent of users expect to have a requirement for a videodisk product or service by 1988.

G. THE CONTINUING ROLE OF VIDEOTEX

- Videotex is the first data communications protocol to be designed specifically with human considerations in mind. OSI and SNA, for example, were designed with technical issues in mind.

- Videotex can be called the 'horseless carriage' of the information revolution in that it builds on the body of a former technology, the printed page, while giving it a new form of distribution through the TV screen and telephone line.

- People communicate amongst themselves using four methods:
  - Text.
  - Data.
  - Image.
  - Voice.
- The first three have for long been mainly accessed in page format. Videotex has from its inception claimed to be able to represent all three adequately. As with any compromise solution, it does none of them as well as can be achieved by other more specialised media:
  - Text on word processors.
  - TP terminals for data.
  - Images on full graphics workstations.
- However, it is this ability to be a general-purpose user-friendly solution, the first of its kind in the field and therefore carrying many peoples' investments, which will ensure its survival as the leading protocol for non-voice communications with the general public.

VII USER ATTITUDES AND REQUIREMENTS

VII USER ATTITUDES AND REQUIREMENTS

A. GETTING STARTED

- An increasing number of users have been moving to videotex over the last three years, as shown by the data presented in Exhibit VII-1, with all countries represented in the survey reporting such increases.

- The sample was well spread across the previous five years, but was not expected to show the full representation of 1985 new entrants since no interviews were conducted after the third quarter.

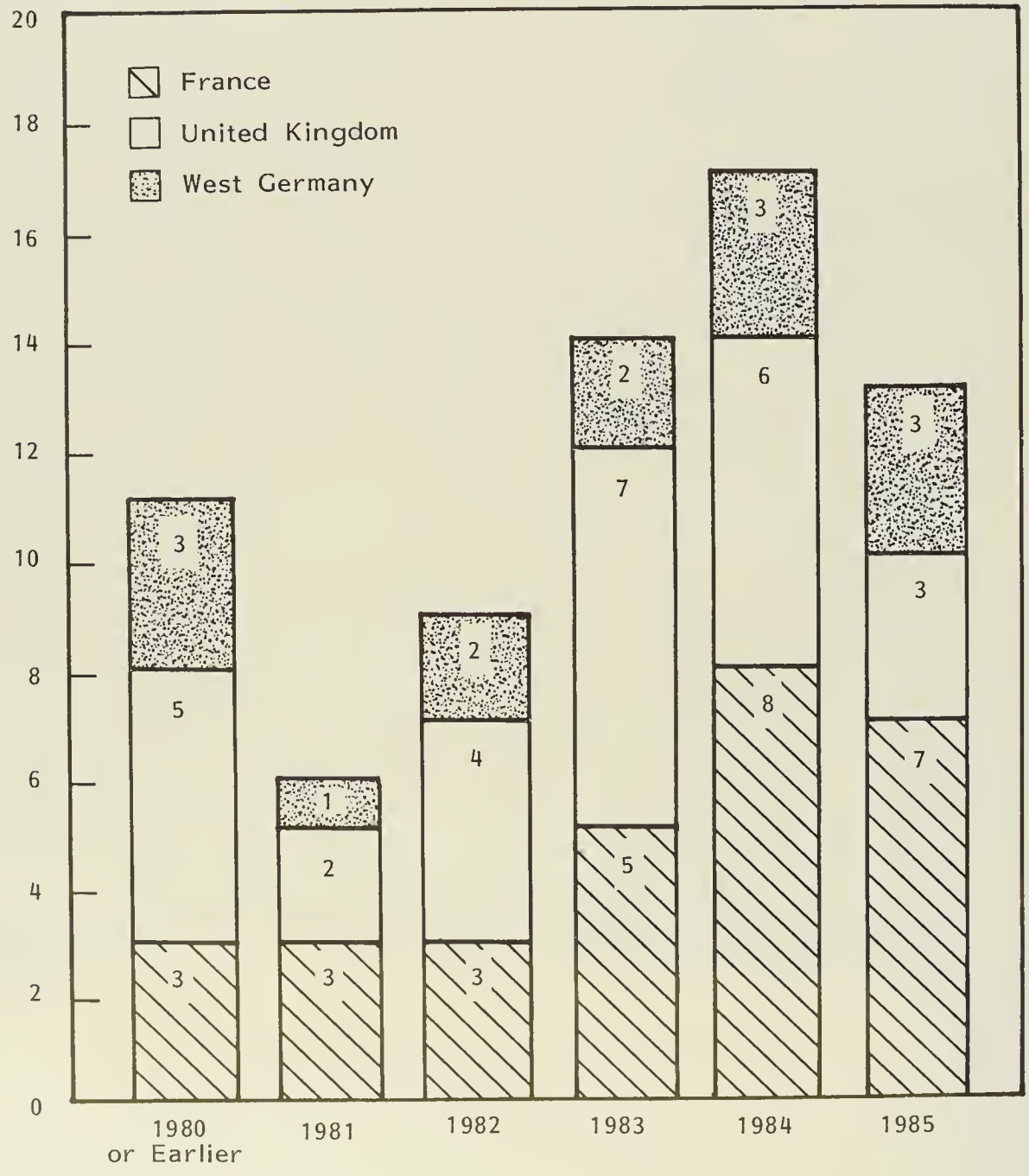
  - Three U.K. respondents had identified future needs, and two of them were able to answer the questionnaire with reference to their plans for future projects.

  - Two major public organisations in France could see videotex being applied internally in the next two years, but could not respond on that basis.

  - Two important West German companies had accepted the Bundespost's invitation to take part during the 1984 trial period, but had as a result found no relevant application and would not be continuing as an information provider; they were excluded from the analysis.

EXHIBIT VII-1

NUMBER OF USERS IN THE SURVEY
ENTERING VIDEOTEX FIELD EACH YEAR



- Exhibit VII-2 compares and contrasts the reasons preceived by users in 1985 for the implementation decisions they had previously made. The three leading decision criteria in order of importance are:

  - Low cost of the videotex terminal.

  - Convenience of use of the telephone network.

  - Videotex system simplicity and ease of use.

- The first and third of these are the key reasons in France and the U.K. respectively, while the second ranks highly in all three major markets. West German users exceeded in their mention of 'other' reasons, the two most often quoted being:

  - 'We have to offer service and Btx is now an acknowledged means of delivering service.'

  - 'There are reasons specific to our industry.'

- Other reasons given in France were:

  - The large base of installed Minitels to communicate with.

  - The policy of the DGT to expand this base and to keep up with technology by updating the Minitel range.

  - Various cost reasons were cited, but only once in terms of an enhanced ability to control company costs by the use of videotex.

EXHIBIT VII-2

PERCEIVED USER REASONS FOR CHOOSING VIDEOTEX SOLUTIONS

SELECTION CRITERIA	AVERAGE IMPORTANCE RATING*			
	FRANCE	UNITED KINGDOM	WEST GERMANY	ALL
Simplicity/Ease of Use of Videotex	2.2	[3.2]	2.0	2.5
Familiarity of TV-Style Terminal	0.6	2.3	1.2	1.4
Convenience of Telephone Network	2.5	2.5	3.1	2.6
Cost-Effectiveness of the Terminals	[4.0]	2.7	0.7	[2.8]
Cost-Effectiveness of Videotex Network	2.0	2.3	2.6	2.2
Recommendation from Trade Association	0.4	1.0	0.1	0.6
Standing of the Supplier	0.5	1.4	0.1	0.8
Support Provided by the Supplier	0.6	1.5	0.2	1.0
Uniquely Suitable Solution	0.9	2.7	0.7	1.5
Other	1.1	2.1	[5.0]	2.3

*Rating: 1 = Poor; 5 = Excellent

- In the U.K. 'other' reasons tended to be specific to individual firms:
  - 'We have a strategic need for the business to grow without building a national network of branches.'
  - 'It's the only practical way of getting to a large population of users.'
  - 'The potential of later expansion to our dealers.'
- Interesting sidelights of certain of the traditional reasons for choosing videotex were also forthcoming:
  - 'The choice of supplier is more important than the type of solution.'
  - 'Some of the cost benefits of videotex can only be realised if a system is designed properly and in particular if network costs are controlled.'
  - 'The standing of many videotex suppliers is inevitably low, since so often they are new and young companies.'
  - 'The uniqueness of videotex was at one time associated with its colour facilities before that feature became more generally available on standard DP terminals.'
- The other solutions with which videotex is in competition can be ranked according to their frequency of occurrence in users' system evaluations:
  - The most considered alternative is traditional or classical teleprocessing--totaling almost 30% of mentions.
  - Portable devices, whether computers or hand-held terminals, came next with 15%.

- Other methods of telecommunications, meaning the telephone, fax, or telex, followed with 10%.

- Evaluation of rival videotex offerings--bureau, different software packages and designs--was next with 6%.

- Communication via the printed word in conjunction with the post gathered 5% of the responses.

- Lastly came computer to computer links from mainframe to distributed data processors, with a lowly 4%.

- Interestingly, 22% of users only considered videotex for their system.

- The alternatives favoured in each country are contrasted in the table in Exhibit VII-3. The profiles in each country in this analysis are very similar, indicating a uniformity of opinion about videotex across Europe, an opinion which should be noted for the construction of sales training programmes and marketing promotions.

B. SATISFACTION LEVELS

- In general users reported that they were well satisfied with their chosen suppliers. Rarely was satisfaction expressed in extravagant terms, but in the main the ratings were moderately good with the exception of certain problems which tended to occur in the areas of:

  - After-sales service.

  - Training and technical documentation.

  - Network quality.

EXHIBIT VII-3

SOLUTIONS EVALUATED AS ALTERNATIVES TO VIDEOTEX
(by Number of Mentions)

ALTERNATIVE SOLUTION	COUNTRY (Percent)			ALL (Percent)
	FRANCE	UNITED KINGDOM	WEST GERMANY	
In-House Teleprocessing	32%	21%	27%	27%
Portables, Micros, PCs, or Terminals	14	15	20	15
Mainframe-to-DDP Links	3	3	7	4
Other Videotex - Bureau, Packages	7	9	-	6
Other Telecomms - Fax, Telex, Telephone	14	12	-	10
Printed Paper Via the Mail	3	6	7	5
Face-to-Face Selling	3	-	-	1
Others	7	9	20	10
No Alternative Considered	17	25	19	22
All	100%	100%	100%	100%

- Exhibit VII-4 illustrates the rating levels for five major categories of product or service, broken down by country, as well as giving the overall ratings for all of Europe and for all services. The rating scale corresponds to that used in the questionnaire, with a scale with 3 representing 'well above average,' and 2 'good,' and 1 'unsatisfactory.'

- Among the product groups, hardware rates most highly, except in West Germany where it is ranked second to the network. Software comes next after hardware again everywhere except in Germany where it lies last since no users commented on the services aspect of their system--an indication of that country's emphasis on the in-house approach.

- In France, the ratings overall were lowered by the poor showing of the Transpac network:

  - Quite apart from the overload crisis which occurred in mid-1985, a major complaint was directed at the number of Teletel calls which fail to be answered. This is due to the lack of ports on the host machines, a problem which is acknowledged and expected to improve.

  - French software was rated as highly as the hardware, whereas in the other countries it was rated lowest.

- It is essential for long-term expansion of the French videotex industry that the DGT addresses the need for network planning and maintenance to be of the same high quality as the original system design and implementation.

- Individual companies were not often mentioned more than once:

  - The PTT, sometimes referred to under the service titles of Teletel or Transpac, was rated specifically in 13 cases.

EXHIBIT VII-4

USER SATISFACTION LEVELS

PRODUCT OR SERVICE	COUNTRY RATINGS*			OVERALL WEIGHTED RATING*
	FRANCE	UNITED KINGDOM	WEST GERMANY	
Hardware	2.5	2.7	2.4	2.6
Software	2.5	2.4	2.0	2.5
Services	1.8	1.8	2.7	1.9
Networking	2.3	2.3	N/A	2.3
Others, e.g., Documentation and Training	1.3	2.3	N/A	1.8
Overall	2.3	2.4	2.4	2.3

*Rating: 3 = Excellent, 1 = Poor

- Hardware companies mentioned covered terminals as well as host-end mainframe, minicomputer, and communications equipment.

  . Telic-Alcatel (three mentions) and Matra (one), both for Minitels.

  . IBM, CIT, and IRT for other terminals.

  . Matra for printers.

  . IBM (two), Bull Mini 6, Sitintel, and Telepac.

- Software provided a number of well known names:

  . Cap Gemini Sogeti's Multitel (twice), IBM's Teletem, Steria, GFI, SPI, Bull, and Prime.

- Service companies included:

  . Telesystemes, GFI, and GSI (the last two for their electronic mail systems).

- In the U.K. hardware suppliers gain the highest satisfaction levels and, as in France, the network (which included mentions of private VANs providers as well as British Telecom) rated below average at 1.8. The quality of BT lines and its after-sales service are the main contributors to this figure.

  - Other suppliers mentioned were Datec, Istel, and Travinet, all of whom offer X.25 networks with Prestel-compatible mode as a sub-network option.

- Terminal suppliers mentioned were:

  . Tandata (six times).

  . Bishopsgate (four times).

  . Sony (twice).

  . Ferguson, Phillips, and Radio Rentals.

- Microcomputers and PCs mentioned were from IBM and ICL.

- Hardware mentions were for Data General, Microscope, Modcomp, and Plessey.

- Software included mentions for five suppliers:

  . Langton with its PIII product (four times).

  . Aregon, Data General, ITT, and Viewtex Ltd.

- There were more service company mentions than in France.

  . Topic (three mentions) was singled out for praise of its offering, but rated poorly on after-sales support and maintenance.

  . Reuters (twice mentioned) had it service quality contrasted with that of Topic.

  . Aircall, Bank of Scotland, Datastream, Telerate, Thomas Cook, and tour operators in general were all cited once.

- In West Germany, Loewe Opta's lead in the Btx hardware marketplace was confirmed with 10 mentions against 2 each for Blaupunkt, IBM, and Siemens. Dornier, Kiwi, and Rafi were also mentioned once each.

  - Loewe's quality rating inevitably dominates the overall country figure.

  - Software mentions were limited to the IBM VCSIP package, developed with the aid of software companies like CGS Deutschland. This product is in use on over 75 of the 130 external computers hooked up to the Btx network. The general market opinion of the product is that it is somewhat too slow to make services based on it easily cost-effective. It will need a continuous upgrade and support programme.

  - The quality of the Bundespost's Btx network was acknowledged but software and performance problems were mentioned. Service providers relying on external computers tied into a network are conscious of the performance and capacity problems which lie ahead and which will be part of the price to pay for eventual sucess of the Btx concept.

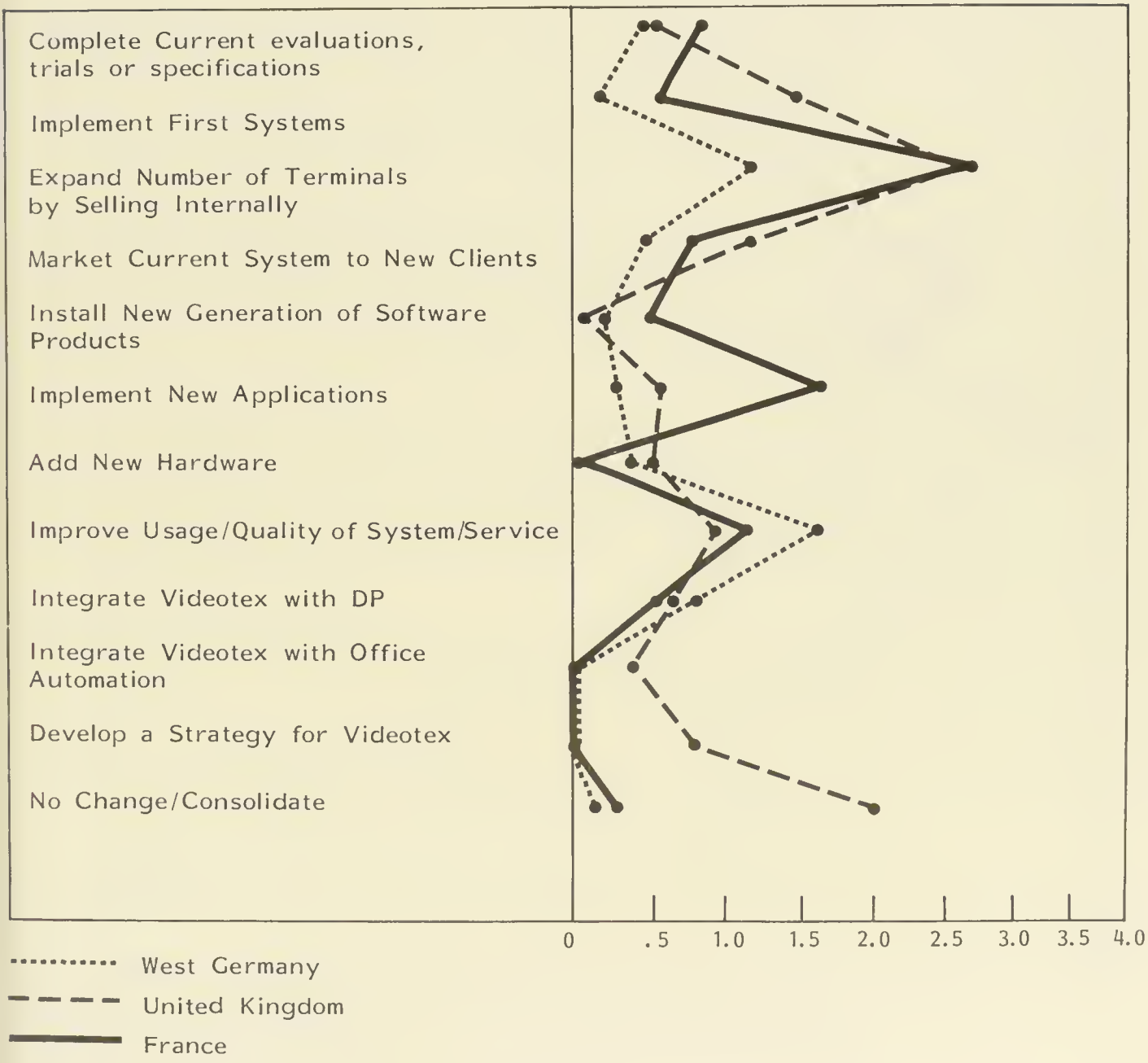
C. OBJECTIVES AND PRIORITIES - IN THE SHORT AND MEDIUM TERMS

- Exhibit VII-5 illustrates the current priority activities for users in 1985, comparing profiles for the three countries researched. The features have been arranged in a product life cycle order with typically early activities first and later activities further along the graphs.

- The countries show remarkably similar profiles in their current preoccupations with videotex:

EXHIBIT VII-5

CURRENT OBJECTIVES/PRIORITIES OF USERS
(Rated by Weighted Number of Mentions)



- All three countries have major peaks on:

  . Expansion of the number of terminals.

  . Improving system usage and system quality (including elements such as system performance, software tuning, and user training).

- France has a third major peak on implementation of new applications, indicating that many users have proved their first generation systems and are moving into the second and later applications, whereas the U.K. has a high rating for consolidation of existing systems, indicating a desire to obtain benefits before proceeding with more development.

- Exhibit VII-6 illustrates the future priorities envisaged by the respondents for the medium-term period through to the end of 1988. The profiles for the three countries have now moved forward somewhat while retaining a similar tendency to a tri-modal shape.

  - Emphasis has passed from the pure addition of terminals toward the extension of existing services to new classes of users (who may be expected often to have terminals already); this movement is least true of the U.K.

  - There is a uniform concentration on the building of new applications; in 1985, only France is strong in this area.

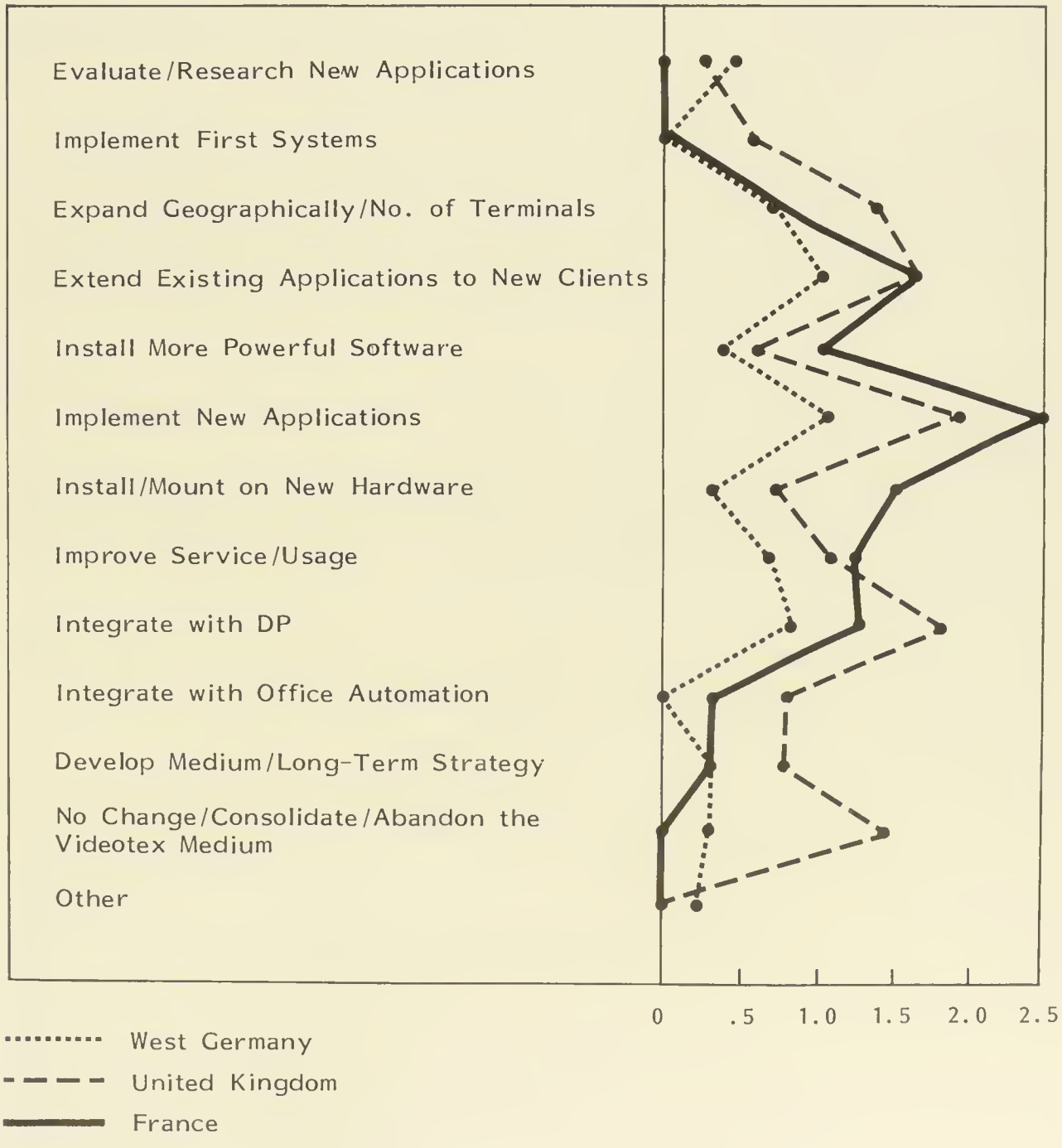
  - There is strong evidence of the integration of videotex with traditional DP getting properly under way in this period.

  - France has its third largest rating in the installation of new hardware.

  - The U.K. retains its propensity to consolidate and keep systems static (there was even one user who intended to abandon videotex by this stage).

EXHIBIT VII-6

USER OBJECTIVES/PRIORITIES FOR 1986-1988
(Rated by Weighted Number of Mentions)



D. USER EXPENDITURES

- Budget figures were not easy to obtain since many users could not separate out the figure relating to videotex from general DP expenditure budgets or in some cases did not know the amounts in user department budgets for terminals and other end-user equipment.

- The survey revealed a wide spread among users in the relative proportions of money allocated to different budget categories.

- The following extracts from respondents' comments shed light on this aspect of the market. Decision making for the purchase of these systems is often at a top level where financial decisions can be made and enforced on what may be very separate departments or divisions within a geographically dispersed group.

- Five French respondents had budget breakdowns which they estimated to be:

  - 'Out of a total of approximately $630,000 for 1985, 26% is for hardware, 35% for software products, 35% goes on internal staff costs, and only 4% on maintenance.'

  - 'As an information and service provider, we spend 50% on hardware, 20% on software, and 30% on marketing and management.'

  - 'We will only spend about $25,000 this year; 45% will go on terminal hire, the remaining 55% is split evenly (27% each) between software and maintenance.'

  - 'Hardware 25%; software and personnel, etc., 75%.'

- 'Hardware, including terminals and front-end processor, 60%; software, etc., 40%.'

- One French company measured its videotex budget in terms of an in-house team of six persons. Another estimated it was just over 2% of its overall DP budget. A third spent 95% of its videotex budget with external suppliers.

- In France and the U.K. there were information providers who admitted they were not yet profitable organisations.

- In the U.K. the smallest firm in the sample with a turnover of approximately $2 million rated its videotex costs (for a single terminal used in a purchasing application) as insignificant, but thought that smaller companies with less than $150,000 revenue would have difficulty justifying the time involved as well as the money.

- On the investment side:

  - A U.K. comment was to the effect that 'We had saved our reserves having failed to invest in the last generation of terminals for our industry; therefore we felt it was worthwhile to invest in this current round, especially since viewdata allows us to increase our geographical penetration without branch office costs.'

  - A typical West German situation was reflected in a bank which has implemented a large home banking service but is reluctant to do much more investment next year until Btx proves itself.

- In West Germany:

  - One user spent 50% of budget on hardware.

- Another was planning to cut down on the purchase of editing stations, and to concentrate on software development and managing and marketing the system among the general public.

- A fourth user intends one day to bring his videotex software development in-house, as today he is having it all done by external contract staff.

- One U.K. user's budget had risen by 100% and he was quite confident that similar rises could occur also in the next few years.

- The total videotex budget for the user sample is estimated at $29.1 million for 1985, and this is growing at an annual rate of 17%. Continuation of the current growth rates of this group of users would lead to expenditures of $65 million in 1990 at an average annual rate of growth of 17%.

	Budget ($ millions)	AGR (%) 1985-1986	Forecast 1990 Budget ($ millions)
- France	6.2	26%	20
- U.K.	20.0	14%	38
- West Germany	2.9	19%	7
- All countries	29.1	17%	65

VIII OPPORTUNITY MARKETS

VIII OPPORTUNITY MARKETS

- Opportunities for suppliers operating in the videotex field have now to be assessed in the light of the increasing convergence of videotex, data processing, and office automation.

- The local area network (LAN) is the physical focus at which the technologies from different backgrounds can converge within an organisation. The announcement by IBM of more detail on its token ring network s therefore to be welcomed by those vendors offering videotex systems in the business field. For too long the uncertainty of IBM's stance in this field has meant that users have delayed purchases of systems.

- Videotex and office communications technology will now benefit jointly from IBM's full presence in both sectors.

- Exhibit VIII-1 summarises the market forecasts for the whole of Western Europe, broken down between business/professional and consumer applications. The total market is set to grow between 1985 and 1990 from just over $300 million to nearly $1.5 billion at an average annual growth of 36%. However, France will take over 60% of this total, and by 1990 will take over 70% of the consumer applications market.

EXHIBIT VIII-1

GROWTH OF THE VIDEOTEX MARKET IN WESTERN EUROPE

TYPE OF APPLICATION	MARKET SECTOR		MARKET SIZE					
			Actual 1984 ($ Millions)	Forecast 1985 ($ Millions)	1985/84 AAGR (Percent)	Forecast 1988 ($ Millions)	Forecast 1990 ($ Millions)	1990/85 AAGR (Percent)
Business and Professional	Terminals	Units (Thousands)	$183	$369	101%	$1,000	$1,655	35%
		Value	46	88	91	240	428	37
	Systems		17	29	70	56	76	21
	Software Products		6	11	83	21	33	25
	Processing Services		30	45	50	85	114	20
	Professional Services		27	43	59	96	145	28
	Total		$126	$216	71%	$498	$796	30%
Consumer	Terminals	Units (Thousands)	$251	$521	108%	$1,176	$1,829	29%
		Value	8	18	125	150	394	85
	Systems		17	29	70	55	75	21
	Software Products		4	8	100	23	38	37
	Processing Services		11	18	64	40	64	29
	Professional Services		21	35	67	77	118	28
	Total		$ 61	$108	77%	$345	$689	45%

A. OPPORTUNITIES IN NEW TERMINAL DEVELOPMENTS

- Terminal markets are forecast to grow from almost 900,000 units in 1985 to 3.5 million units in 1990, an annual growth rate of 31%. These figures include all units with videotex capability newly installed during the period, whether videotex is their main or only a secondary communication mode. It therefore covers:

  - Decoder units sold free-standing.

  - Full videotex terminal sets.

  - Microcomputers with videotex capability.

  - Add-on videotex compatibility boards for fitting to standard PCs and multi-function terminals.

  - Printers and other output peripherals (e.g., plotters, slide makers) for use with the terminals.

- The value of the 'if sold value' dollar market increases even faster, at the very high rate of 51%, due in part to the phasing in of more paid-for products in the French market as the DGT's 'free' terminal policy is replaced by a requirement for more advanced units, which are only available on a chargeable basis.

- Exhibit VIII-2 compares the user requirement for upgraded terminal features with the vendor offerings, current or proposed, in the four major makets:

  - Local intelligence is the most sought-after enhancement, except in the U.K. where it is second to picture graphics.

EXHIBIT VIII-2

UPGRADED TERMINAL REQUIREMENTS AS PERCEIVED BY USERS AND VENDORS

TERMINAL FEATURE	PERCENT OF POSITIVE RESPONDENTS				
	France	United Kingdom	West Germany	Italy	All
User Requirements					
Line Graphics	14%	37%	36%	-	27%
Picture Graphics	10	48	29	-	29
Multi-Standard Working	48	15	29	-	31
Local Intelligence	62	41	71	-	56
Other*	41	33	36	-	37
Vendor Offerings					
Line Graphics	22%	17%	0%	-	12%
Picture Graphics	11	33	-	-	15
Multi-Standard Working	22	25	-	-	15
Local Intelligence	56	25	50	100	47
Other*	100	75	40	33	68

* Includes: printers, micros with videotex software, portable terminals, enhanced keyboards, etc.

- Local intelligence is also the only area where the vendors are matching user requirements to within the confidence limits of the survey. Line graphics and multi-standard working suffer most in these respects.

- The key characteristics of the market for videotex terminals are:

  - Price sensitivity.

  - Highly optimistic volume forecasts.

  - Requirement for a combination of text and limited (character) graphics with colour basically an optional frill, but a good selling point.

  - Information provider requirements well known.

  - Information retrieval giving way gradually to transactional and calculation work as the number one application.

- So far a true volume market has been created only in France where numbers have been ordered in the hundreds of thousands from three manufacturers, all in the national state-owned electronics sector.

- TV set manufacturers have had limited success in this market but are well positioned to take advantage of the next round of growth in the sector (with names, such as Philips, Siemens, Thorn EMI, Sony, etc.).

- These vendors must learn to combine the volume approach that they are familiar with in the field of consumer sets with the more flexible short-run product life cycle which is the order of the day in current information systems markets.

- The third type of company to profit from the terminal sector is the often new, small company serving a particular niche market. Examples of this type are:

- Tandata.

- Bishopsgate.

- Loewe Opta.

- They have all come to the fore principally on the strength of their achievements in the videotex field, but now face stiff competition from:

  - The larger companies with financial resources to back up the R&D investments required.

  - Exposure to the general terminal market as the boundaries between videotex and DP crumble.

- A number of other 'players' are now in contention:

  - Terminal manufacturers with a range of multi-function, intelligent devices.

  - PC and microcomputer suppliers.

  - Home computer vendors.

- Survival will depend upon:

  - A clear product strategy.

  - A marketing plan.

  - Strong selling.

B. INTEGRATED SYSTEMS AND PROFESSIONAL SERVICES

- These two products are being considered together becouse in the videotex sector the two are provided principally by the some type of vendor--the systems house, who may in practice be:

  - A division of o large electronics company or computer monufocturer, for exomple, GEC, IBM, or Italtel.

  - A compony speciolising in the videotex systems field, such os Microscope.

  - Well-known softwore ond systems componies like Cap Gemini Sogeti, Danet, and Systems Designers.

- The type of systems required ore:

  - Public network systems in which hardwore, softwore consultoncy, ond commissioning may oll be required by o PTT or o network corrier, in o project volued ot $500,000 upword ond spread over six months to two yeors. There is o market for this type of system in Europe over the next five years omounting to between 15 ond 25 units, including odd-on projects to enhance systems olready in the field.

  - Videotex systems for orgonisotions wishing to run in-house viewdota or to use the public system for internol communications or to supply informotion ond services to the public or to o closed user group using the videotex network either of the PTT or of o privote VAN.

- This is the medium-size systems morket for componies in the over $100 million soles revenue class. There is o market for systems in this category worth $50,000-100,000 ond upword meosured in severol hundreds over the next five years. It will include:

. Communications equipment at the host end and, for private systems increasingly, at the branch controller level.

. Software kernels and tailored systems implementation worth at least 40% on average of the contract price.

. Consultancy, implementation, and training.

- The micro-based segment of the market will become increasingly important as convergence with DP and office automation starts to take off. Systems in the price range $20,000 to $50,000 will exist in two classes:

  . In-house and private systems using a central micro host and desktop or portable PCs as the end-user terminals.

  . Larger systems incorporating multi-user micros and/or local area networking of terminal and printing devices.

- At this level, numbers of systems sold in Europe over the next five years will be in the order of the low thousands.

- In some cases, whole systems will be sold on an integrated basis with parts of the supply subcontracted to software and hardware contractors. In others, professional services ranging from a first phase of consultancy to tailored software and training will be a separate contract from the supply of equipment.

  - Integrated systems markets, defined to include systems with hardware supply included, are forecast to grow from $57 million in 1985 to $151 million in 1990 at an average growth rate of 22%.

- Professional services on their own will grow even faster at 27% per annum over the forward period, driven by the expansion of consultancy, system design, and contract programming. From $81 million in 1985, the market will rise to $263 million in 1990, split fairly evenly between business and consumer applications.

- Exhibit VIII-3 shows what the vendors think about the need for upgrading and enhancing products and services. In the systems field the key characteristic is the mix of skills needed to support projects in this area.

  - Design.

  - Engineering (hardware and software).

  - Development teams.

  - Sales and installation support functions.

C. SOFTWARE PRODUCTS

- The free-standing software products market for videotex systems will grow at a faster rate than for any other of the service categories, namely at 33% per annum. Starting from a small base of $17 million in 1985 it will grow to $71 million by 1990.

- This relatively small size is accounted for by the fact that many of the mainframe and minicomputer videotex products sold in Europe will be 'kernel-type' systems which require implementation with professional services and/or communications equipment or other hardware. They are thus included in the forecast under systems or professional services. For this reason, INPUT's forecast consists principally of:

EXHIBIT VIII-3

VENDOR COMMENTS ON THE LIFE CYCLE OF VIDEOTEX PRODUCTS

SYSTEMS AND PROFESSIONAL SERVICES

- Our product development is principally market-driven, the R&D centre works on more advanced projects, not on project upgrading.
- One of our strengths in that we retain a one-off design and engineering capacity, which is tied in with a consulting function.
- A users' club provides a good forum for airing views on product enhancement.
- We have both types of system engineer (back-room and front-room boys)
- We can design more quickly than the large firms. A 50-60% initial match on requirements is good for "kernel-based" system products.
- Users buy on the basis on ongoing enhancements. Constant refreshment is necessary - 14-15 months between radical changes.

SOFTWARE PRODUCTS

- Development of Unix will enable software to be used for 10-20 years. Unix gives extensiblility and portability over hardware and into new generations of system.
- The new generation of products will go beyond tree-searching techniques.
- Expert systems will be added into videotex within three years.
- No different than any other software product.
- We're driven to new issues to keep up with Prestel. Photovideotex will need a new round of investment.
- Our PC-based system uses parameters to allow customisation.

PROCESSING SERVICES

- Current life is five years. New specification will be established once ISDN is introduced.
- High volume usage requires product lifetimes of, say, five years.
- Cycle appears quite long (10 years) and introduction can take 2-3 years.

- Products for the micro market.

- IBM mainframe products sold for installation by in-house staff.

- Current products are mainly targetted at:

  - Information providers.

  - Giving PCs and micros a videotex capability.

- Features of future products for this market are also mentioned in Exhibit VIII-3.

  - UNIX capability.

  - Database searching techniques.

  - Expert systems.

D. PROCESSING SERVICES

- Exhibit VIII-4 classifies the types of applications service which can be provided and are now being provided on videotex networks in the following ways:

  - By scope of end user.

    . Internal; i.e., in-house.

EXHIBIT VIII-4

CLASSIFICATION OF VIDEOTEX PROCESSING APPLICATIONS

TYPE OF APPLICATION		TYPE OF PROCESSING		
		1-WAY FLOW	2-WAY FLOW OF INFORMATION	
		Information Only	Transactional	Calculation
Business and Professional	Industry-Specific	E.g., Data Base Services	Tour Bookings	Insurance Quotations
		• Internal • C.U.G. • Usually Chargeable • Open • Sometimes Bundled	• Internal • C.U.G. • Chargeable	• Internal • C.U.G. • Chargeable
	Cross-Industry	E.g., Company News	Order Processing	Cash Management
		• Internal • C.U.G. • Chargeable • Open • Free	• Internal • C.U.G. • Chargeable	• C.U.G. • Chargeable • Open
Consumer		E.g., Train Timetables	Teleshopping, Home Banking	Telebroking, Education
		• C.U.G. • Chargeable • Open • Free	• C.U.G. • Chargeable • Open • Free or Bundled	• C.U.G. • Chargeable • Open

. C.U.G., closed user groups of subscribing companies, professional or private individuals (e.g., a club).

. Open, meaning that the service can be used by any company or private customer who applies or connects.

- By whether charges will be made.

- All services, whether in-house or not, can be mounted on public networks.

- Early public videotex services started providing information only and these have a greater chance of being free of charge. Early private videotex services were industry-specific since chargeable added value was easier to identify and could therefore be more easily justified to sponsors.

- One trend, as videotex has matured, is for newcomers to be offering services with more calculation facilities and cross-industry appeal.

- Another trend is for consumer applications to become free of charge and to be provided by a general or financial service company as an extra mode of delivery to existing services, such as in home banking.

- Traditional processing services companies must position their offering through the videotex medium to take account of these changes.

- Where services are offered by 'within industry' suppliers, e.g., home banking by banks, telebroking by brokers, education by training companies, processing service company strategy must be to:

  - Act as the intermediate carrier by providing host or network facilities.

  - Provide a remote facilities management (FM) option for services already installed on in-house machines.

- The remote FM concept involves providing a dedicated host machine on the processing services vendor's site to relieve the customer of the operational side of his processing, thus allowing him more resource and management time to develop and enhance the systems being run.

- The advances made in the flexibility and reliability of networking in the last five years make this attractive concept, hitherto regarded as non-viable, into the most logical long-term option for many medium-sized and fast-growing services organisations where:

  - General management effort must be concentrated on the problems of growth.

  - DP management needs more time to track the system implications of company strategy in order to be able to provide systems on a sufficiently short time scale; usually in a business environment where plans are made and implemented very rapidly.

- Processing services in the videotex area are forecast to grow from $64 million in 1985 to reach $178 million by 1990 with an annual growth rate of 23%. France will take in excess of 70% of this market throughout this period.

APPENDIX A: DEFINITIONS

APPENDIX A: DEFINITIONS

A. DATABASE

- DATABASE - An organised collection of information. The database may contain a collection of time series and numeric data, a collection of indexed or full-textual data, or a combination of both. Some databases are beginning to contain textual and image data. Databases contain principally historical information, but they may also contain realtime (or near-realtime) data and, in some circumstances, forecasted data. Databases may be either in printed form or, increasingly, automated and machine-processible form.

- DATABASE VENDOR - Databases are produced and maintained by vendors who frequently produce the database as a by-product of electronic publishing. In addition to offering the data in the form of printed publications, the vendor offers the computer-readable database either directly (often on-line) or, more frequently, through information services vendors. For using databases on-line, database vendors charge subscription fees, collect use royalties, or do both. Charges may either be direct to the end user or through licensing arrangements with information services vendors.

- DATEX-P - Is the abbreviation for the German PTT's data (exchange 'P') packet-switching network.

- GREY LITERATURE - A term used to describe the 'nonconventional' or unpublished documents that are produced in nearly every field. Typical of this kind of document are research reports, dissertations, conference proceedings, technical instructions, and official bulletins. Generally they are produced in relarively small numbers of copies and are neither published nor distributed commercially.

- INFORMATION SERVICES VENDORS - Information services vendors offer databases that they build and maintain themselves or license from database vendors, or both.

- ISDN - Integrated Services Digital Network.

- ON-LINE DATA BASE - Databases are available for on-line access by users through information services where access is by computer terminal, personal computer, or micro-controlled word processing system.

- SDI SERVICES - SDI or Selective Disseminiation of Information are off-line services in which a user nominates topics or questions that are automatically searched on the occasion of each update of the database.

- TELETEX - The designation for the upgraded telex which has been recently introduced in Europe.

- TELETEXT - The international designation for what is known in West Germany as videotext. It is also called broadcast videotex.

- VIDEOTEX - The general name given to the concept of distribution of information contained in databases over the telephone system using television as the display medium. Information is presented in page format and operation is interactive.

- The various national videotex systems go under different names in each country:

  . Prestel in the U.K.

  . Teletel in France.

  . Bildschirmtext (Btx) in West Germany.

  . Videotel in Italy.*

  *This system is currently based on Prestel.

- VIDEOTEXT - The West German designation for disseminated information, also known as TV text. No dialog is possible with videotext.

B. INFORMATION SERVICES

- INFORMATION SERVICES - The provision of:

  - Data processing functions using vendor computers (processing services).

  - Database access where computers perform an essential role in the processing or conveyance of data.

  - Service that assist users to perform functions on their own computers (software products and/or professional services).

  - A combination of hardware and software, integrated into a total system (integrated systems).

1. REVENUE

- All revenue and user expenditures reported are available (i.e., noncaptive) revenue, as defined below:

- CAPTIVE INFORMATION SERVICES REVENUE - Revenue received from users who are part of the same parent corporation as the vendors.

- NONCAPTIVE INFORMATION SERVICES REVENUE - Revenue received for information services provided within the U.S. from users who are not part of the same parent corporation as the vendor.

- OTHER REVENUE - Revenue derived from lines of business other than those defined above.

2. SERVICE MODES

- PROCESSING SERVICES which include the following:

  - REMOTE COMPUTING SERVICES

    . DATA BASE - Characterised by the retrieval and processing of information from a vendor-provided database. The database may be owned by the vendor or a third party.

    . INTERACTIVE (timesharing) - Characterised by the interaction of the user with the system, primarily for problem-solving timesharing but also for data entry and transaction processing; the user is on-line to the program/files.

    . REMOTE BATCH - Where the user hands over control of a job to the vendor's computer, which schedules job execution according to priorities and resource requirements.

. USER SITE HARDWARE SERVICES (USHS) - These offerings provided by RCS vendors place programmable hardware on the user's site (rather than in the EDP center). USHS offers:

  - Access to a communications network.

  - Access through the network to the RCS vendor's larger computers.

  - Significant software as part of the service.

- BATCH SERVICES - This includes data processing of user programs performed at vendors' sites and/or data that are physically transported (as opposed to electronically by telecommunication media) to and/or from those sites. Data entry and data output services, such as key punching and computer output microfilm processing, are also included. Batch services include expenditures by users who take their data to a vendor site that has a terminal connected to a remote computer for the actual processing.

- PROCESSING FACILITIES MANAGEMENT (PFM) (Also referred to as 'resource management' or 'systems management') - The management of all or a major part of a user's data processing functions under a long-term contract (more than one year). This would include both remote computing and batch services. To quality as PFM, the contractor must directly plan, control, operate, and own the facility provided to the user either on-site, through communications lines, or in a mixed mode.

- Processing services are further differentiated as follows:

  - Function-specific services are the processing of applications that are targetted to specific user departments (e.g., finance, personnel, sales)

but cut across industry lines. Most general ledger, accounts receivable, payroll, and personnel applications fall into this category. Function-specific database services where the vendor supplies the database and controls access to it (although it may be owned by a third party) are included in this category. General purpose tools such as financial planning systems, linear regression packages, and other statistical routines are also included. However, when the application, tool, or database is designed for specific industry use, then the service is industry-specific.

- Industry-specific services provide processing for particular functions or problems unique to an industry or industry group. The software is provided by the vendor either as a complete package or as an applications 'tool' that the user employs to produce a unique solution. Specialty applications can be either business or scientific in orientation. Industry-specific database services, where the vendor supplies the database and controls access to it (although it may be onwed by a third party), are also included under this category. Examples of industry-specific applications are seismic data processing, numerically controlled machine tool software development, and demand-deposit accounting.

- Utility services are those where the vendor provides access to a computer and/or communications network with basic software that enables users to develop their own problem solutions or processing systems. These basic tools include terminal-handling software, sorts, language compilers, database management systems, information retrieval software, scientific library routines, and other systems software.

• SOFTWARE PRODUCTS - This category includes users' purchases of applications and systems packages for use on in-house computer systems. Included are lease and purchase expenditures as well as fees for work performed by the

vendor to implement and maintain the package at the users' sites. Fees for work performed by organisations other than the package vendor are counted in professional services. There are several subcategories of software products:

- APPLICATIONS PRODUCTS - Software that performs processing that services user functions. They consist of:

  . CROSS-INDUSTRY PRODUCTS - Used in multiple-user industry sectors. Examples are payroll, inventory control, and financial planning.

  . INDUSTRY-SPECIFIC PRODUCTS - Used in a specific industry sector such as banking and finance, transportation, or discrete manufacturing. Examples are demand-deposit accounting and airline scheduling.

- SYSTEMS PRODUCTS - Software that enables the computer/communications system to perform basic functions. They consist of:

  . APPLICATION DEVELOPMENT PRODUCTS - Used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Examples include languages, sorts, productivity aids, data dictionaries, database management systems, report writers, project control systems, and retrieval systems.

  . DATA CENTER MANAGEMENT PRODUCTS - Used by operations personnel to manage the computer system resources and personnel more effectively. Examples include performance measurement, job accounting, computer operations scheduling, and utilities.

- SYSTEMS CONTROL PRODUCTS - Function during applications program execution to manage the computer system resource. Examples include operating systems, communication monitors, emulators, and spoolers.

- PROFESSIONAL SERVICES - Made up of services in the following categories:

  - CONSULTING SERVICES - EDP management consulting and feasibility studies, for example.

  - EDUCATION SERVICES - EDP products and/or services--related to corporations, not individuals.

  - PROFESSIONAL SERVICES FACILITIES MANAGEMENT (PSFM) - The counterpart to processing facilities management, except that in this case the computers are owned by the client, not the vendor; the vendor provides people to operate and manage the client facility.

  - SOFTWARE DEVELOPMENT - Including system design, contract programming, and 'body shopping.'

- INTEGRATED SYSTEMS (Also known as Turnkey Systems) - An integration of systems and applications software with hardware, packaged as a single entity. The value added by the vendor is primarily in the software. Most CAD/CAM systems and many small business systems are integrated systems. This does not include specialized hardware systems such as word processors, cash registers, and process control systems.

- Integrated systems revenue in this report is divided into two categories:

  - CROSS-INDUSTRY systems; i.e., systems that provide a specific function that is applicable to a wide range of industry sectors, such as financial planning systems, payroll systems, personnel management systems, etc.

- INDUSTRY-SPECIFIC systems; i.e., systems that serve a specific function for a given industry sector such as seismic processing systems, automobile dealer parts inventories, CAD/CAM systems, discrete manufacturing control systems, etc.

- Revenue includes hardware, software, and support functions.

APPENDIX B: TABLE OF U.S. DOLLAR CONVERSION RATE ASSUMPTIONS

APPENDIX B

TABLE OF U.S. DOLLAR CONVERSION RATE ASSUMPTIONS

CURRENCY	ASSUMED U.S. DOLLAR CONVERSION RATE						
	1984	1985	1986	1987	1988	1989	1990
French Francs	9.03	8.00	8.17	8.34	8.57	8.69	8.88
Italian Lira	1,826	1,770	1,867	1,970	2,078	2,193	2,313
Pounds Sterling	0.79	0.70	0.72	0.74	0.76	0.78	0.80
Deutsche Marks	2.94	2.62	2.59	2.57	2.54	2.52	2.49

Note: in no regard should these conversion rates be interpreted as a forecast of exchange rates. They are calculated on the basis of prevailing exchange rates and used simply as an index to eradicate distortions that would otherwise arise as a result of the use of different inflation assumptions for different countries.

APPENDIX C: VENDOR QUESTIONNAIRE

APPENDIX C

VENDOR QUESTIONNAIRE

Q.1 What is your role in the Videotex/Viewdata/VANs market? (eg. information provider, software house, service bureau, network bearer, etc.)

_____

_____

_____

Q.2 How do you describe/define the end-user markets you serve?

a. _____

b. _____

c. _____

_____

Q.3 What computer systems/networks are used?

a. Owned or operated by your organisation

_____

_____

b. Provided by other suppliers

_____

_____

Q.4 What is the breakdown of your annual revenues (1984) in this field?

	Tick if provided	100%	Growth (85/84)
Terminals			
Comms. equipment			
Other equipment			
Software			
Complete systems			
Processing services			
Transmission charges			
Other (professional svces, maintenance, etc.)			

Q.5 BACKGROUND AND HISTORY OF THE COMPANY'S OPERATIONS IN THE VIDEOTEX MARKET.

Please use this page to supply important information relating to the development of your Company's operation in Europe, (ONLY if you think some background is needed).

Q.6 What are your major products or services (in order of importance)?

NAME/DESCRIPTION OF PRODUCT OR SERVICE	1984 Units Installed (or Customers or Terminals	1984 Revenue Break-Down %	1985/84 Annual Growth (Estimated) %	COMMENTS
1.				

Q.7 Who are / will be your top 3 competitors now (1985) and in the future? Please rank in order of importance and estimate their market shares.

COMPETITOR	Estimated Market Share	
	1982	1987
1.		
2.		
3.		

Q.8 What geographic markets do you serve ? And how will your revenue split change in the next three years ?

W. Germany

France

U.K.

Italy

Rest Europe

U.S./N. America

Rest World

Q.9 What particular export opportunites do you foresee?

Prompts:

National

vs.

Europe

vs.

Global

vs.

?

Q.10 How will you market your products/services in new areas ?

	Now (1985)	Then (19...)
Direct sales		
Agents/Distributors		
Joint ventures		
Via Trade/Professional Associations		
Other		
(Vertical vs. X-Industry vs Departmental)		

Q.11 a) How many data processing centres are running your Videotex/Viewdata applications and what hardware is involved ?

Application	No. of Centres	Hardware	
		Suppliers Name :	Machine Models
1.			
2.			
3.			
4.			

b) Who does the billing ? _____

.12 a) What types of network form or will form a major part of the delivery mechanism ? Please tick appropriate earlist timeframe column.

Type of network linkage	NOW = 1985	FUTURE i.e. within	
		2 years	5 years
Public Videotex - Teletel, Prestel, BTX			
Public Data Networks - Transpac, PSS, IPSS, Datex-P			
Public Telephone/Telex - PSTN			
Private Leased line/ Network/PVS			
Broadcast Teletext - Ceefax, Antiope			
Satellite links/DBS			
Cable TV/Radio			
Cellular/Mobile Radio			
Other * 1.			
2.			

* e.g. Videodisk technology

Q.12 b) Space for network diagram/or your comments on the communications environment.

Q.13 What factors are forstering/impeding growth in your chosen sectors ? Please give a High/Medium/Low impact rating.

Prompts:

- Terminal base size
- Pricing
- Marketing
- User Awareness
- Regulations, environment
- Standards
- P.C.'s

Q.14 What terminal and man/machine interaction facilities would you like to be offering in future ?

Prompts:

- Line graphics
- Picture graphics
- Local intelligence
- H D T V

Q.15 What is the place of advertising and sponsorship in this field ? How will they affect your offerings ?

Prompt:

- ? Royalties

Q.16 What are your comments on the product life cycle in this business ?

Prompts:

° Length
° Profitability
° Pricing methods
° R & D

Q.17 a) What promotional methods are you using ?

Prompts:

° Advertising
° Seminars
° Exhibitions
° Newletters
° Direct Mail
° Telephone Sales
° Direct Sales Force *

* b) How many are in it ? ..... OR What %age of total staff ? .....

Q.18 What are the three most serious issues facing your organisation ?

1.

2.

3.

Q.19 Is there anything else I should have asked ?

APPENDIX D: USER QUESTIONNAIRE

USER QUESTIONNAIRE

(1)

Q.0. Does your organisation [use] supply [services/information] to a videotex/viewdata network ?

Yes _____ No _____ Maybe in ..... years

If No, please give reason(s).

GENERAL

Q.1. What is your personal/company's involvement with Videotex/Viewdata systems ? Please ring the appropriate alternative(s).

As:

End-User(s)	1	DP Manager	2
Trade Assn. Representative	3	Information/ Service Provider	4
Other	9	Please specify _____	

Q.2. How long has your organisation been active in the Videotex field ?

Since 19.....

Q.3. Is it a [PRIVATE] videotex system ? If Private, is it [IN-HOUSE]

OR It uses a [PUBLIC] system ? or [EXTERNAL]

e.g. from a Trade Association

OR It is a [COMBINED] system ?

e.g. part Private, part Public

Q.4. What applications are run on your videotex/viewdata systems ?

Application	Code * for INPUT use only
1. _____	☐
2. _____	☐
3. _____	☐
4. _____	☐

5. _____ ☐

_____

_____

_____

* CODE means:
Application is aimed at 1= Own management planners etc. 2= Own outworkers
3= Other organisations 4= Consumers/general public

Q.5. a) Why did you choose a Videotex system solution ? Please indicate in the boxes below how important each of the following criteria were/are to your decision; where 1= unimportant and 5= very important

		Comments
☐	Simplicity/ease of use of system	_____
☐	Familiarity of TV style terminal	_____
☐	Convenience of telephone network	_____
☐	Cost-effectiveness of the terminals	_____
☐	Cost-effectiveness of the network	_____
☐	Recommendation from trade asscn.	_____
☐	Standing of the supplier	_____
☐	Support of the supplier	_____
☐	Uniquely suitable solution	_____
☐	Others (please specify)	_____

1. _____

2. _____

Q.5. b) What other solutions were considered ?

1. _____

2. _____

3. _____

TERMINALS

Q.6. Approximately how many videotex terminals (including PC's used as):

_____ a. were in use as at 1/1/85 [ ]

_____ b. will be added during 1985 [ ]

c. What is the maximum number likely to be connected

and when will that peak be achieved ? 19.....

Prompts: _____

° Makes & models _____

° Prices _____

° Overall plans _____

Q.7. What developments would you like to see in the design of terminals, and why ?

Line graphics	1
Picture graphics Photovideotex	2
Multi standard working	3
More intelligence	4
Other (Please specify)	9

Q.8. Who uses the terminals ? Or will use them in future ?
Tick or give as %age of total use.

	Now ('85)	Then ('86-88)	Remarks
Director/Senior Exec.			
Middle Managers			
Clerical - Admin.			
Production			
Maintenance			
Sales			
Agents/Distributors			
Consumer/General Public			
Other (please specify)			
TOTAL	100%	100%	

OTHER FEATURES

Q.9. What is your overall satisfaction with your suppliers and their systems ? Please tick 1 grade for each important supplier and add any relevant comments about his product/services.

Major Supplier/Product	Excellent or Very Good	Good to Average	Poor or Inadequate
1.			
2.			
3.			

Q.10. a) What type(s) of network form (or will in future form) a part of the delivery mechanism ?
Please tick earliest timeframe column which applies.

Type of Network Link	NOW = 1985	FUTURE ie. within 2 years	FUTURE ie. within 5 years
Public Videotex - Teletel, Prestel, BTX			
Public DataNetworks - Transpac, PSS, IPSS, Datex-P			
Public Telephone/Telex - PSTN			
Private Leased line/ Network/PVS			
Broadcast Teletext - Ceefax, Antiope			
Satellite links/DBS			
Cable TV/Radio			
Cellular Radio/PMR/Paging systems			
Other * 1.			
2.			

* e.g. videodisk/CDROM, gateways

Q.10, b) Space for network diagram of your Videotex/Viewdata system or for your comments on the communications environment.

Q.11. How much will you spend per annum on Videotex/Viewdata ?

This year ('85/86).....

Next year ('86/87) + / - %

Prompt

° Budget categories

PRIORITIES, DEVELOPMENTS AND TRENDS

Q.12. What are your primary objectives * and priorities * for:

a. the current year (1985) _____

_____

_____

_____

_____

b. the next 2-3 years (1986-88 timeframe) _____

_____

_____

_____

_____

* Prompts:

° Expand no. of terminals
° Improve use of system
° Install new software
° Install new equipment
° Develop medium/long-term plans
° Integrate videotex with DP
° Integrate videotex with office automation
° Other

Q.13. What are the three most serious obstacles to your future progress with viewdata systems ?

1. _____

_____

_____

2. _____

_____

_____

3. _____

_____

_____

Q.14. Is there anything else I should have asked ?

Prompt: _____

_____

° Other possible respondents

_____

THANK YOU