RELAUNCHING VIDEOTEX

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CHAPTER 1

INTRODUCTION. VIDEOTEX: IS THERE A LIFE AFTER DEATH?

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In this book an overview is given of the introduction of videotex in different European countries and the United States. Not much has been published so far about organizational and socio-political perspectives on videotex. We therefore approach this field with caution. Still, we hope to raise interest in enlarged circles about the characteristics of this important new type of communication.
In the history of technology during the 20th century we often find adoption patterns that resemble each other, although quite different types of technology are concerned. For television, for video, for facsimile, certain comparable time slots seem to have been needed for obtaining "market acceptance". Consumers need time to adopt a new technology - a time span often longer than expected. This indicates that there is a clear difference between **social** and **technological maturity** - a distinction very rarely made by innovators and engineers who are optimistic and eager to implement their new "gadgets".

Such time slots of multiple decades have been noted, the telephone took about 90 years to gain general coverage in the households. Looking at videotex, and discussing its "life after death", it seems reasonable to ask if time slots for adoption tend to decrease with the higher pace of technological innovation. Videotex is based on computer communication on existing networks, relying on humanly and friendly programmed forms for interaction between users, and users and databases. One of the most typical characteristics of computers is their flexibility, their possibility (at least in theory) to be easily programmed for different types of usage. Because of this flexibility - the possibility to be adopted to changing needs - the technological aspects of videotex may be accepted by users faster than other (and less computerized) types of technology. Still, the social factors surely need their time. Whether this sums up to a faster adoption of videotex compared to other "innovations" from a historical view-point, remains to be seen.

The aim of the book is to offer an analysis of the role major actors played in the telecommunications policy field regarding certain Value Added Services and of the manner in which telecommunication companies, national governments, information and service providers, hard and software industry tried to achieve their particular goals.
Fundamentally, we conceive of videotex as an **interlocked innovation**. This means that videotex is a combination of innovations on at least three levels:

- innovation in the telecommunication infrastructure;
- innovation in the supply of new services;
- social innovation in the way users fulfil their specific communication and information needs.

In order to be able to introduce a videotex system with success, three conditions have to be fulfilled: there must be an appropriate infrastructure, a kind of cooperation between system

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provider, service providers and soft- and hardware industry has to be established and thirdly an articulated user demand has to be expressed.
The introduction of this 'new' type of telecommunication service is policy and technology driven. As such this introduction is interesting because at the starting time, there is no clear demand as such from the user side, neither from professional nor from residential users.
From the early days the idea existed that videotex was **the** consumer oriented technology of the coming information society (Toffler, Naisbitt, Mosco). In almost every European country the public discourse was articulated that acceptance of services from an easy-to-use terminal would be general. The world would be at the fingertips of every citizen, using this new device which was a combination of two old technologies: telephone and television.
But reality turned out to be more robust than anticipated. Videotex of the 1970s and 1980s showed to be a failure. Only in France the forecasts were met and the ambitious expectations were fulfilled. It is clear that when videotex was introduced, a lot of unforeseen problems had to be solved. Although the problems in general were different for each country, certain problems were common to all.
It is important to keep in mind that when the first ideas regarding videotex were presented the situation in the field of telecommunication, computer hardware and software differed considerably from the present situation. Personal computers and modems were not yet available. The hardware industry was attempting hard to develop cheap decoders for television sets to 'receive' videotex. The telecommunication networks were being gradually upgraded. Packet switched networks were not yet available. The first was introduced in Spain at the start of the eighties. They became part of the general telecommunication infrastructure in that decade. Electronic publishing was still in its infancy. Users, both professional and non-professional, had little if any experience with computers, information retrieval or datacommunication. The possibilities of telematics were still unclear both to the suppliers, the users as well as to the vendors of telecommunication and information technology.

We will look both at the regularities and the differences. Some countries were innovators while others lagged behind. The first experiments with Prestel in the UK took place in 1973, Télétel was introduced in France in 1982, Ireland will start with the introduction of a Télétel-like system in 1991. The regularities are due to the collective learning process. But the possibility exists that some countries did learn from the experiences of other countries.

1. The regularities

Two dominant scenarios for the introduction of videotex can be distinguished. Prestel and Télétel can lend their names to these scenarios. The scenarios differ on the following points:
- terminal design and strategy of terminal provision
- system architecture
- administrative system (including billing)
- marketing strategy
- regulatory constraints and political support.

Before dealing with these scenarios in more detail, it must be stressed that both Prestel and Télétel or any system like them could only develop within a specific policy and media environment (Schneider, Charon, Miles, Thomas and Vedel, 1991).

1.1 The policy environment

The motives of the main actors involved were often quite similar. The PTTs wanted to generate

more traffic (and thus revenue) on their existing telecommunication networks and develop new services. They had to prepare for competition with the main computer and time-sharing companies, who were involved in developments of more or less digitalized networks. The governments saw a possibility to support the domestic telecommunication and/or consumer electronic industry. The interest of hard- and software companies speaks for itself. In some countries the (newspaper and magazine) publishers participated partly for defensive purposes: videotex was for a long time considered a threat to traditional publishing. In other countries publishers saw videotex as a possibility for conquering new markets. The last category was formed by other potential service providers, who saw possibilities to expand their interests: For instance publishers of the Yellow Pages, mail-order-companies, banks, insurance companies and so on. In other countries the broadcasting organizations or their representatives initially played a role as well. But with the crystallization of the difference between broadcast videotex (teletex) and interactive videotex, their role diminished.

The central players in the policy arena were the PTTs and the governments. They sometimes cooperated with other actors while at other times for reasons of interest priority they chose to block actively or passively the developments in the field of videotex. Other actors, often service providers such as the press, had a hard time conquering a position in this arena. Still others were hardly involved, most notably representatives of both the professional users and consumer organizations.

With the trend of deregulation in the 1980s the position of most PTTs did change considerably. Originally the PTTs were a branch of the central governments, but with the changing political climate their position became more market-oriented and they were forced to cooperate with various actors. These actors were sometimes dependent on the PTTs, but were also their competitors in other areas of the telecommunication market. The developments in the field of value-added services as for example in the UK and the Netherlands, are notable examples.
It is clear that the deregulation of the position of the PTTs differs in detail from country to country and is highly dependent on the policy climate of each country. The most liberal and deregulated situation can be found in the United Kingdom and The Netherlands. The most regulated position can be found in Germany, France, Italy and Belgium. The role of the EEC could also be considered in this context. The message of liberalization in the Green book of the Commission influenced the policy in the different countries in different ways.

1.2. The Media environment

Not only the policy environment and the legislation differ from one country to the other. The media environment in which videotex must position itself also has to be seriously considered. The success of Télétel and the failure of videotex in other countries can to a large extent be explained by looking at the media environment at the moment of introduction in the different countries. Information provision in France was low key at the moment of introduction of Télétel. Train schedules and phone numbers for example were hardly available by telephone. Voice-based information services were limited. Broadcast viewdata is not available in France, while this is heavily used in Britain, Germany and other countries. The penetration of home computers and modems on the other hand is lagging in France compared with the situation in other countries. These are some indications that should be taken in to account when comparing the two dominant scenarios regarding the introduction of videotex.

1.3 The Prestel scenario

Initially this was the scenario that was copied by most countries for example Germany, Denmark, Italy, Austria and Switzerland. The Prestel concept was based on a presumed adoption of

videotex by the residential market. The consumer had to buy a television-set with a special videotex decoder (or a separate decoder) in order to acquire access via the telephone network to a central database in which information pages were stored. The hardware for the consumer was expensive and not easily available at the moment that Prestel or for example the Danish or Austrian (the Prestel-standard mupid-terminal) videotex system became operational. The user had to subscribe to Prestel and prestel-like systems. The billing system was complicated and largely unclear to the user.
The system architecture was very complex and made it difficult for the information providers to update their information. Although the PTTs which introduced the Prestel-like systems occupied a very central position in the introduction of videotex, they hardly paid attention to the quality and reliability of the information offered or the market which they wanted to serve. At the moment that the experimental phases ended and videotex was introduced on the market, marketing efforts declined further. It became increasingly clear in those different countries which followed the Prestel concept that the adoption of videotex services would go very slowly and the number of subscribers wouldn't meet the initial expectations.
Since videotex successively appeared to be more acceptable in the business community, British Telecom began to shift their marketing efforts accordingly to the needs of specific business segments. The same switch in marketing activities following initial trials with videotex occurred in Denmark and the Netherlands. In Austria the PTT opted for closed users group and in-house use of BTX. In Sweden the business market was from the beginning regarded as the chief videotex user area, based on practical and financial arguments, but also because of fears for competition from new general purpose mass media. The failure of Prestel also played a role in the choice for a niche-oriented marketing strategy. However this strategy wasn't successful either. Consequently the break-even point was not reached in the countries which followed the Prestel-concept. Videotex was becoming a failure.

By the mid 1980s the original enthusiasm in many countries had crumbled away. The optimistic predictions on the number of subscribers were replaced by down-to-earth ascertainment of the reservations of service providers and users. Videotex was more and more considered a "much-ado-about-nothing" matter (Godefroy Dang Nguyen and Erik Arnold, 1985 and Noll, 1985). Many observers did put it bluntly: Videotex was dead!

The above scenario, which is described in more detail in chapter 2, was almost entirely copied by all European countries, except France and Sweden. Almost identical decisions and subsequently almost identical errors were made as if nothing was to be learned from previous experiences.

1.4 The Télétel scenario

The French experience was radically different. The introduction of videotex was considered to be a part of industrial policy. The first step was the modernization of the telephone system. During the second phase videotex was proposed as an attempt to generate traffic on the Transpac packet-switched network and at the same time to help create an information service community. Because the dedicated Minitel-terminals were provided for free the number of users could be "planned" in advance. The kiosk-structure made the billing system transparent: the user knows beforehand what he or she has to pay.
The system architecture is very simple: the Minitel terminal is connected to the telephone network, which is connected to Transpac. This is like other systems. However, in France, databases of the information providers are directly connected to the packet switched network. This simple architecture, in which no central host-computer is necessary, turned out to be efficient for the most important applications, and made it possible to reach a critical mass of services on the supplier side in a short period of time. Marketing of the services was not solely

by France Télécom but mainly by the information suppliers themselves. Because suppliers competed for the same market many promotional activities were developed.
This contrasted to activities developed by those PTTs which introduced Prestel and Prestel-like systems.

It is clear that the French scenario, mainly based on the decentralized structure and the free hand out of terminals, is more successful than the Prestel scenario when one considers the amount of users reached and the traffic generated within the telecommunication network. In this context it is interesting to note that for example in Switzerland, but also in Belgium and Italy, French Télétel has been and is a strong competitor to the local videotex system in the French speaking parts of these countries. Télétel spills over from France to neighboring regions and countries. But more important is the trend to copy the Télétel approach with regards to terminal distribution and kiosque-billing, and to relaunch videotex in those countries in which the Prestel approach wasn't that successful as for example is the case in Italy, Sweden and the Netherlands.
The prominence of the 'French model' has, however, not been totally unaffected by the numerous arguments about its high costs. The price for winning the position as the world leader within the videotex field may very well be payed for with substantial economic losses and deficits for France Télécom for a considerable amount of time.

2 The differences

Although there are two dominant scenarios, the adoption of videotex in each country also has its own specific characteristics. Sometimes this has to do with the specific policy climate, sometimes with regulatory, cultural or geographical factors.

Concerning the United Kingdom (see chapter 2) it is clear that developments in other countries have bypassed Prestel. Nevertheless England is an interesting example of the consequences of deregulation for the development of a market for certain Value Added Services. The concept of videotex in England however is blurred. At the one hand one can see that Prestel is some kind of a curse, at the other hand private videotex systems did emerge aiming at professional users communities.

The case of France makes it clear that the initial technological advantage of the United Kingdom certainly is not the only factor that is important for a successful introduction of a new technology. More important and perhaps decisive was the public discourse concerning a new technology. The French Nora-Minc report had a tremendous impact on the public opinion in France. Although in every country the technology push dominated, only in France this push was successfully supported by handing out free terminals. Demand was stimulated by strong service marketing and positive public climate but also by the interventions of the DGT (France Télécom), which had an unquestioned leadership in the field of innovation policy. The idea of an information society has become somewhat of a reality in France.

In Germany the public debate played an important, but less stimulating role. The discussions in the parliaments both of the Länder and the Federation made the introduction of BTX a political issue. The main issue was if videotex had to be considered as a form of mass media or a telecommunication service. The question was raised what the (negative) social and economic consequences were. In other countries (perhaps except Switzerland and Sweden) public discussions were not that strong. In most countries the dominant discourse of the information society was used one way or another to legitimize the introduction of videotex.

Another problem is illustrated if we compare the Italian (see Chapter 3) and Dutch (see Chapter 4) case. In Italy, but also in the Netherlands, initially the Prestel scenario was followed.

However, in Italy the development of videotex was stopped, when it became clear that the Prestel approach wasn't successful. In the Netherlands different actors, who fulfilled different roles, launched new projects, which were mainly blocked by competitors or the PTT. All the different initiatives from network operators, service and information suppliers 'had to be integrated' considering the small size of the market. This made a specific role, that of **system integrator**, necessary. This integration of the different initiatives is also reflected in the system configuration. In Italy there was only one dominating actor who after a long period of relative inactivity relaunched videotex, based on the Télétel concept. No bargaining or blocking of initiatives was involved, PTT being the most dominant actor.

Some of the smaller countries were heavily influenced by the developments in neighboring countries with comparable cultural backgrounds. For instance Austria (see Chapter 5) and Switzerland (see Chapter 6) followed the BTX-approach. The problem of Belgium (see Chapter 7) is complicated by the fact that it is a bi-cultural country. Belgium had the example of the Dutch hybrid system and the French Télétel-system. On the other hand Switzerland is faced with comparable multi-cultural problems but seems to profit from it: users are happy to retrieve information from databases with different lingual and cultural backgrounds.

Switzerland followed an introduction strategy by decreasing the price of terminals and the communication tariffs. This policy is possible through cross-subsidization within the PTT. In Switzerland the Information Providers, especially through the combined efforts of the banks, play an important role in the introduction of services. This contrasts very strongly to the lack of interest from information providers in Denmark (see Chapter 8). In Switzerland the PTT performs the roll of system integrator, this is not the case in Denmark where the regional telephone companies have concentrated their effort on the building of the technical infrastructure while not paying attention to the usability of services. The lack of interest of the information providers in Denmark is thus mainly due to the dominating technical approach that accompanied the introduction of videotex.

The strategy of a decreasing price for hardware is also followed by the Spanish videotex service (see Chapter 9). However the decrease in price there is made possible partly because EEC-subsidies from the STAR-program are reallocated to the service operator, Telefonica. In Spain the information providers are not only the central actors, but the user community is also actively participating on the policy arena.

The Swedish approach (see Chapter 10) chose the business market for the marketing of videotex. In Sweden, like elsewhere, one is now confronted with the problem of how to attract sufficiently large groups of consumers. Ireland (see Chapter 11) seems to copy this Swedish strategy by directing the marketing directly towards the business sector. Although in the United States (see Chapter 12) videotex as it is known in Europe hardly exists, information services directed at the business market are highly successful. It has a spin-off to the consumer market in Prodigy, GEnie and other consumer oriented value-added services.

On the first hand it seems that innovation of value-added services in the United States contradicts the concept of interlocked innovation. However, the Prodigy case can be interpreted in the same way. IBM is at the same time service operator, system provider, hard- and software provider. But more importantly, it illustrates very clearly that in each country all of these elements have to be available at the same time and even then success will not be certain. Specially, the point of system integration is of interest. A powerful actor, as for instance the DGT (France Télécom), the PTT in Italy, Videotex Netherland, or a group of cooperating actors such as the Banks and the Swiss PTT in Switzerland, the system provider and the Users Association in Spain, or the

[illegible]rate behind Teleguide in Sweden, has to take the lead.

What all these examples show is that even if there are a lot of regularities with regard to the introduction of videotex in Europe, there also are a lot of differences between the countries.

In the mid 1980s videotex was declared dead: it was a technical mis-perception not matching the needs of the users. The development in many European countries seems to support this view. But as mentioned earlier: new technologies have their, often considerable, adoption time. A series of new projects in countries as Spain, Ireland, Sweden make us ask the question if videotex in the 1990s is revitalised due to a shortening of the acceptance period - and not to its prematurely announced death.
The contents of this book may be seen in this perspective. Whether the acceptance time for future, and still more computerized types of technology will decrease further, is a matter for coming history to show.

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CHAPTER 13

VIDEOTEX IN A BROADER PERSPECTIVE: FROM FAILURE TO FUTURE MEDIUM?

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Many different observations can stimulate the national analyses made in this book. But considering the rich variety of specific national conditions and contingencies influencing the outcome of videotex development in each of the 13 countries, one must be extremely cautious about hasty generalizations.
However, we shall put forward several propositions on the nature of videotex as an example of a new service based on the telecommunication network, on videotex as an interlocked innovation, on marketing strategies for videotex, on the positioning of videotex in the media mix and on the policies related to introducing and further developing videotex within the European Community. These propositions are intended as a basis for further research and discussion within media, telecommunications, policy-making and market and innovation research settings.

1. The concept of videotex

First, the present experiences with videotex should be interpreted within a **historical context**. This view implies that this new communication tool must be understood as a dynamic and changing entity - not as a fixed innovation with characteristics defined once for all, but as an **innovation in process**. This development is reflected in the changes in the concept of 'videotex' itself, causing much confusion about the actual meaning of the term.
Videotex was originally a new telematic service (combining television, telephone and computer power) that was supposed to surmount the shortcomings of professional databases, which are still too specialized, too expensive and too complicated for the average consumer. Videotex was intended to be quite the opposite:

* generally accessible,
* simple to use and
* inexpensive to acquire and use.

Hence the simplistic idea of merging the two ubiquitous tools of modern communication: the telephone and the television.
The attempts to realize these aims led the constructors of the first generation of videotex to design systems with two general characteristics: graphic- and page-oriented presentation standards with 40 characters on each line and simple, standardized user interfaces. Because of national industrial policies and international competition, five different standards or protocols emerged worldwide; three, Prestel, Télétel and Bildschirmtext (BXT), were adopted in different countries in Europe. Until the mid 1980s, the question of the standards almost caused holy war between the ardent advocates. As the different standards were often supported by dedicated terminals, videotex in Europe seemed to be split up into segregated areas unable to communicate with each other.

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But in recent years the issue of standards has been gradually defused, as many of the national systems have adopted different multi-standard strategies and gateways have been established to connect the systems of the 1980s.
On the terminal side, the rapid dissemination of personal computers (PCs) into private households in Europe and especially in the United States has profoundly changed the conditions for disseminating videotex services. PCs are much more flexible than dedicated terminals, and software developments are facilitating the shifts from one standard to an other. Another important trend seems to be the steady development of ASCII-based services that are targeting the private consumer market. In the United States, such pioneer services as CompuServe, GEnie and the tens of thousands of electronic bulletin board services (BBS) offer innumerable services, from software download to electronic mail and teleshopping, targeting private consumers. In the US these services are also considered to be videotex just as much as the graphic-oriented services, such as Prodigy (see Chapter 12).

The overall trend seems to be that the conception of videotex as a specific presentation standard is shifting towards a more loosely defined understanding of the medium characterized by general availability of such interactive services that put only low constraints on technology (terminals and transmission) and by the high degree of user-friendliness.

From a historical perspective videotex could be interpreted as a new medium in a **specific developmental phase** characterized by the current state of technology, politics and culture. However, this changes over time. The development of new generations of videotex systems allows more refined and flexible architectures: the advances in and declining prices of transmission technologies enable quicker build up of pages and shorter waiting times; and the advance of terminal equipment (PCs) makes it possible to establish a much more intelligent user interface.

2. Videotex as an interlocked innovation

A second point is that we believe that videotex must be understood as an **interlocked innovation**. As such, the specific innovation processes initiated imply a set of interdependent innovations in infrastructure, system provision, information and service provision and user demand. If only one of these four elements is insufficiently provided, it is very likely that the entire innovation chain will brake down and the introduction process will stop. This observation seems pertinent in trying to determine why videotex was not successful in the various countries in the 1980s.

A new service based on a familiar technology or infrastructure has a lower threshold of adoption and is often more attractive economically than a totally new technology. In this sense, videotex is a complex and complicated innovation because it is an innovation in both services and technology. We can explain this by comparing various new media and technologies and their specific combinations of service and technology.

Table 1. Adoption of an innovation

		TECHNOLOGY	
		OLD	NEW
SERVICE	OLD	Adoption/substitution + Regulation + (Colour-TV)	Adoption + Regulation + (HDTV)
	NEW	Adoption + Regulation - (Teletext)	Adoption - Regulation - (Videotex)

(Regulation: +: regulation is available; -: regulation is required.
Adoption: +: a positive attitude; -: adoption problematic).

The smoothest innovation process occurs when there is no need for major changes in the habits of the information users nor for the organization and regulation of the different production components. An example is the introduction of colour TV in the 1970s and 1980s: users' practice and media production were not essentially influenced by the innovation.
On the other hand, the introduction of teletext in the 1980s did presuppose a change in the habits and information application of the users and required some regulation. High-definition television (HDTV) will not produce substantially new user patterns, as the basic product, television, remains the same, but the production and transmission processes will be profoundly modified by this new type of television, which will tend to merge television, film and video production.

Videotex seems to represent the most complicated case in which an innovation implies both a whole new set of production procedures and a fundamental restructuring of the users' information, communication and transaction habits. Videotex thus tends to be a type of innovation that entails the most complex innovations and the most difficult adoption processes, requiring a complex of conditions to succeed. In most European countries these conditions have not been sufficiently established to produce the necessary and sufficient conditions that make videotex a success in terms of economics and user satisfaction.
The concept of interlocked innovation shows that market forces have difficulty in creating an appropriate balance between supply and demand. This book provides empirical evidence in the form of numerous national accounts of 'failure', 'mismanagement', 'user deception' and missing 'take-off' of service provision.
France, as well known, constitutes a notable exception. A crucial element in this success-story[80] is the central role of France Télécom (DGT) as the active coordinating agent. A similar position as the 'system integrator' (Quelch & Yip, 1985) seems to be attributed to Videotex Nederland in the Netherlands and to such consumer-oriented systems in the US as Prodigy. The emergence of this new type of agent can significantly influence the future marketing of videotex services.

[80] We shall not discuss further the precise character of the success of the Télétel system. It seems undeniable that the system will not break even before 1996-1998 (CommunicationsWeek, 2 September 1991) but the rate of return on such infrastrutural investment as a telecommunications network depends on political and economic assumptions. There are no eternal truths in this field.

3. Marketing strategies

In videotex introduction strategies, the usual approach is to target the adoption of videotex by the consumer. Even though there are exceptions, such as Sweden, the general focus has been on services for the mass market, that is the consumer. Failure to accomplish this in countries following the Prestel scenario (see Introduction) has been interpreted as inappropriate targeting of the services and the remedy has been to reorient services towards the business sector. This strategy did not prove very successful in such countries as the UK, Germany, the Netherlands, Austria and Denmark, and the negative experiences thus gained have led to a new reorientation of services for consumers in the light of the success in France.

Because of these historical conditions, very little attention has been given to the advantages of communication and transaction services for business organizations themselves. This neglect is regrettable, because videotex offers many efficient opportunities for the business market.

3.1 Strategic opportunities offered by videotex

The US Office of Technology Assessment's (OTA) report **Critical Connections** (1990) sheds some light on the question of the possible impact of computer-based communication. This can eventually affect the speed of economic transactions, the distance over which information is transported and the relationships and interdependencies among economic actors.
These three mechanisms can be combined with different goals that are strived towards within business organizations: efficiency, effectiveness and innovation. These goals are affected by every business activity, including operations, services, technology development, human resources management, firm infrastructure, logistics, procurement, marketing and sales.

Efficiency is improved by new or modified means of accomplishing existing tasks. Business processes can be accelerated, distances can be overcome and intermediaries in the business chain can be bypassed by using telecommunication. Such communication technology as videotex, yields more efficient business operations by reducing interaction time in the exchange of information. Videotex communication services makes it possible to improve communication between geographically remote offices of an organization or between an organization and employees in field offices. Videotex can improve services, for instance, by providing instructions on repairs and services, information on the availability of spare parts and so on.
The use of communication technology also results in greater **effectiveness** by improving data entry and rapid information transfer, which makes global management control possible and enables tailor-made responses to consumer demand. Another implication concerns the capability of providing information to different actors at the same time. One can imagine a videotex service for car owners of a specific type that offers information on the nearest garage and its opening times and services. An example in the field of human resource management might be training programmes offered as a videotex service both within an organization and for the consumer market.
Videotex and other communication technologies also lead to **innovation** in the form of better and new services, such as on-line databases with medical and financial information. Communication facilities also influence the relationships between actors in a production chain. One can imagine that, after the repair of a device, information could be directly stored in a database that immediately becomes available to engineers and designers, who can analyze recurring problems that might require action. An application in marketing and sales is the storage of marketing data by companies for their own purposes. But these data are also of interest to others and might even be sold to third parties.
There are three general ways of achieving competitive advantages by introducing videotex servi-

ces within an organization:

* The costs of existing services can be reduced. Information and communication services can accelerate and improve the efficiency of business operations, both within an organization and between organizations as well as between organizations and consumers.
* Markets can be expanded. By offering existing services through a videotex network or enhancing existing services with new applications, an organization can enter a new market segment and thus enlarge its market.
* New services can be added to new or already existing market segments.

Steinfield & Caby (1990) create a topology of the strategies used in introducing videotex that is similar to the one mentioned in the OTA report. Essentially, this includes:
1) applications directed towards improving internal coordination and thereby lowering costs;
2) applications that help to differentiate otherwise standard products through some form of information or network service; and
3) applications that represent new products or services that can only be provided through a telecommunication infrastructure.
Based on a case-study approach, Steinfield & Caby (1990) found that the type of videotex application depends on the scope (internal, interorganizational or external) of the videotex services. A company without any interorganizational linkage pursued applications directed towards improving internal coordination. A second organization used the videotex network for product differentiation. The implementation of videotex positively affected productivity and users' orientation on information technology.
Videotex can be important developing new applications within and between organizations and in integrating new information technologies. The positive consequences of videotex for organizations and service providers is sorely neglected in adoption strategies. Organizations can meet strategic objectives through videotex-based services.

3.2. Developing new markets: the critical mass of services

The benefits for the organization itself might be sufficient to ensure the successful introduction of videotex on the business and consumer markets but this is a gradual process. The starting point is no longer a **'critical mass of users'** but a **'critical mass of services'**. In this approach, the positive consequences of introducing videotex in an organization must be communicated to other organizations. The 'critical mass of services' can only be realized if enough organizations are convinced of the competitive advantages they will gain. Videotex will eventually spread from the business market to the consumer market.
An example is the introduction of a videotex service for flower shops offered by the Fleurop services in the Netherlands. Communication between flower shops has been based on telephone and fax. Introducing a videotex service is expected to improve both the efficiency and the effectiveness of the ordering process. Nevertheless, when consumers become aware of this service, they might bypass the local florist and order directly.

Another marketing strategy is aimed at progressively gaining a critical mass of users (Schneider et al. 1990). In the initial phase of such a **'sequencing'** (step-by-step) approach, one first tries to describe the potential added value of videotex for a specific market segment (consumer or business). It must be made clear that the service offered should satisfy clearly identifiable needs for information, communication or transaction services. An existing relationship between the service provider and user is necessary to achieve a suitable balance between the supply of services and the existing demand. After a critical mass is attained in a specific sector or target group (travel, insurance, agriculture or professionals) that recognize the utility of the service, one

can proceed to another sector or target group. The first group might comprise the critical mass for the second. If the second group also joins, then a critical mass for a third group is reached. and so on.

Central to this approach is a sophisticated marketing strategy that identifies specific economic target sectors and groups to mobilize a specific group at the right time. For example this approach was followed, with limited success, by the Bundespost in Germany and the PTT in the Netherlands after they reoriented their marketing strategy and shifted their focus from the consumer to the business market. However, the sequencing approach is still followed in various strategies to introduce videotex.

3.3 The demand side: the critical mass of consumers

The various countries have different patterns of consumer and business demand for videotex services. These are mainly caused by differences in the media situation, that is the amount and quality of information and communication channels available.
An indicator of the 'success' of videotex services is the percentage of households 'possessing' a terminal (table 2). Although such figures are often outdated and their value can be questioned. they still indicate the degree to which videotex has been adopted in the various European countries. In classical innovation theory, success is defined as the number of users that have adopted (subscribed to) the innovation. By this criterion France has had the greatest success[81] followed by Switzerland, Spain and the Netherlands. However, the strongest growth in installed terminals and subscriptions is in Portugal, Spain, Italy and Switzerland.

[81] The figures for France are over-estimated as 20-30% of the Minitel terminals distributed generate very little or no traffic at all.

Table 2. Adoption ratios of videotex for various European countries (mid-1991)

	Number of terminals	Number of households (millions)	% of households with a terminal
Austria	12,000	2.9	0.4
Belgium	8,500	3.6	0.2
Denmark	6,500	2.2	0.3
France	5,700,000	20.5	27.8
Germany	260,000	27.8	0.9
Italy	155,000	18.6	0.8
Ireland	350	1.1	0.03
Netherlands	125,000	6.1	2.1
Portugal	4,500	3.5	0.1
Spain	325,000	11.9	2.7
Sweden	30,000	3.5	0.8
Switzerland	75,000	2.3	3.3
United Kingdom	100,000	22.0	0.5

Sources: Videotex International (1991), no 138/139, Bruno et al. (1991), and contributors to this book.

Another indicator of success is the number of connections per month and the connect time per terminal each month. Videotex is used most intensively in Germany. In Italy and Switzerland use is also high, while the Netherlands and Spain are lagging behind.

Prestel in the United Kingdom **initially** seemed to be a breakthrough in consumer telematics (1980-1984). This example was followed by Germany and many other countries, although without any success. The French Télétel system is the most used so far, and many countries consider the system as an example. The French example has led to several initiatives to (re)launch videotex in such countries as Sweden (Teleguide), the Netherlands (Videotex Nederland), Denmark (NetPlus/Info 24), Ireland and Belgium. It is interesting that Intelmatique, the international marketing branch of France Télécom, is involved in several of these initiatives.

Table 3: Number of connections and the connect time per terminal for various European countries (mid-1991)

	Number of connections by month	Connect time per terminal per month (minutes)
Austria	n.a.	30
Belgium	195,000	169
Denmark	55,000	54
France	75,000,000	100
Germany	6,248,000	455
Greece	n.a.	n.a.
Italy	1,150,000	285
Ireland	n.a.	35
Netherlands	453,000	24
Portugal	23,000	137
Spain	750,000	30
Sweden	31,000	132
Switzerland	1,104,000	205
United Kingdom	n.a.	n.a.

Sources: Videotex International (1991) no 138/139, Bruno et al. (1991) and contributors to this book.

However, we must still be very careful with this interpretation. Except for France, where videotex reaches households in general (although even this is sometimes questioned (Arnal & Jouët, 1989), videotex services in Europe are mainly business oriented. Videotex has so far failed to reach its potential market as a consumer commodity. The critical mass of users has yet to be attained in most European countries.

An important explanation for the limited adoption of videotex services can be sought in the lack of marketing research or the limited co-marketing efforts of the PTOs and the service suppliers. Underlying the videotex introduction strategies is the idea that the needs of consumers for information, communication and transactions can be satisfied by the types of services offered. However, the system operators and the service providers hardly understand the specific needs of most people and their ways of satisfying these needs. There is a fundamental lack of knowledge of the reasons why people use information technology. Information systems for the home need to be designed on the basis of a thorough understanding of the use of existing information and communication channels (Dervin, 1989).

The usefulness of videotex services for the consumer must be the central focus. User demand will be oriented towards applications. Communication and transaction services offer advantages because of their interactive nature. These types of services can be assumed to contribute to the success of videotex systems. One of the illuminating features of the French experience of the mid-1980s was the steep rise in the use of such communicative services as the famous 'messageries roses'. These services met a need for emotional and game-like behaviour, which was possible on the Télétel network because of its open architecture and the anonymous presence of users on the kiosque services. The enormous rise in the demand for playing and emotional behaviour took completely by surprise the French planners and technocrats, who had conceived the network for utilitarian purposes. (Marchand, 1987, Charon,1987).

Information services prove to be less important. Most of the information offered is also available through paper-based media outlets. The type of information for a consumer market does not really fulfil a fundamental need for information, contrary the situation in the professional market.

4. Positioning videotex in the media mix

The swift development of information and communication technologies has not made life simpler for the service and information providers, the telecom operators or for the users. One of the complicating factors is the abundance of different new solutions that have become available in recent years. If videotex is to survive in the long term, it must adapt to a 'media mix' of steadily growing complexity. It also must develop a profile of utility that differentiates it from the related technologies such as teletext, audiotex, compact disk read-only memory (CD-ROM), and E-mail. The challenge of these alternatives raises the following perspectives:

* Broadcast **teletext** has achieved a considerable position with the spreading of TV-sets equipped with decoders in recent years. But teletext as such has a rather narrow capacity as a telematic medium: It has limited information storage capacity and it cannot support communication and transaction services. Teletext is, however, quite efficient in disseminating up-to-date information, it has extensive coverage and is extremely competitive in user cost.

* **Audiotex** is a new medium that appears to be spreading quickly to exactly the user forum for which videotex was originally meant: the consumer (home user) or the small business user. Whereas videotex requires a visual display unit, audiotex is directly accessible by means of a simple (DTMF) phone. This makes audiotex services considerably easier to access for the inexperienced computer user that does not care about the terminal options. It is thus ironic that audiotex information provision (organized as premium rate services[82]) is growing quickly at present just as was forecasted for videotex ten years ago.

The advantages of audiotex in terms of ubiquity and user-friendliness, however, are balanced by its disadvantages compared with videotex. Many sophisticated services depend on more complex input than can be provided by the 12 buttons on the DTMF phone: they require an alpha-numeric keyboard. Another important factor is the limited flexibility of audiotex in searching for and retrieving information. As the information output is only voice, the user has to memorize the alternatives; most people cannot simultaneously keep more than three or four items in mind. Until audiotex has been developed further to master speech recognition as an efficient means of information reception, most voice- or sound-based systems will have limited capability for the more sophisticated transaction services. Even if audiotex occupies a prominent position in the private comsumer market, it will probably not completely 'cannibalize' videotex services. These will find their niche where the complexity of search procedures and of the information output exceeds the capabilities of the audiotex systems. Nevertheless, many 'low key' information systems can easily find an efficient user profile with voice-based systems, and this implies a reduction of the total telematic market open to videotex.

* **CD-ROM**s (and other compact disks) are expected to be increasingly propagated because they have a vast capacity to store information in the form of text, data, graphics and sound. But CDs demand relatively costly equipment (PC, CD drive and special software) and their dissemination

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[82] 0898-services in the UK, 900-services in US and Denmark, 071-services in Sweden, and 06-services in the Netherlands.

so far has been limited to professional settings. The advantages of CD-ROM compared with videotex are that there is no transmission cost once the system is in operation and the information can be reused perpetually. Nevertheless, with the currently available CD-ROMs, the information can only be updated by distributing new disks.

* **E-mail** was expected to grow substantially in the 1980s but these optimistic hopes were dashed. Fax transmission has been booming, whereas electronic mail has only become popular in settings with a highly developed computer culture. Public subscription to advanced E-mail services in accordance with the X.400 standard has been marginal in most countries. In France the Télétel system has been augmented with an E-mail service (Minicom) but the traffic has been quite moderate[83].

Electronic mail may eventually be incorporated in future videotex systems in Europe: this is the case in the United States, where such services as CompuServe and Prodigy have mail systems that are used extensively. But these functionalities largely depend on the level of sophistication of the terminal, and it is difficult to imagine successful E-mail for private users and small businesses, that is not based on the 'intelligence' of the PC.

5. Videotex in the 1990s: policy aspects

The development of videotex in the 1970s and 1980s was driven by technology and policy. The early Prestel scenario was especially pushed by engineers from the PTTs in the various countries. whereas the dominant motivation for the Télétel operation seems to have been the anxiety of French Government and technocracy about lagging behind in the technological race with Japan and the United States. Both scenarios express policies deriving from the monopolistic regulatory framework with only few limitations for the PTTs. This situation enables a massive transfer of resources from one service area to another: cross-subsidization. Télétel is the most famous example of this, as the distribution of 'free' terminals for videotex was paid for by the income of France Télécom in other branches, especially traditional telephony.

The gradual introduction of competition within telecommunications has placed narrow constraints on the companies' possibilities of practicing cross-subsidization. The Commission of the European Communities with its General Directorate XIII as a driving force has played a dominant role in imposing these important reorganizations.
The deregulation process will significantly affect the development of videotex services in Europe. Videotex, like other services based on telecommunication network, will no longer benefit from subsidies from other sources, and the operation of networks will be open to competition - similar to the provision of services. These changes have already influenced the behaviour of the operating telecommunication companies. As they no longer (or only for a short period) have a monopoly on network operation, they are constrained to orient their behaviour towards the competitive market. It can be considered as adaptation to these conditions when PTTs such as those in the Netherlands and in Sweden engage in joint ventures with other partners to set up such specialised videotex companies as Videotex Nederland and Teleguide.
Another consequence is the more or less open reluctance of PTTs to invest in developing infrastructure for the service provision because they fear losing more money on an already unprofitable system: for example in Belgium and Denmark (see chapters 7 and 8).

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[83] The Minicom received around 300,000 calls per month in first four months of 1991 which represents 0.05 % of the amount of calls to the electronic directory (60 million per month)(La lettre Télétel, no 22. 1991).

The European Commission tried to play an active role in promoting videotex services in Europe. In 1990 the Commission persuaded representatives of videotex services in 17 countries in Europe to sign an agreement to connect the various videotex systems. This interconnection makes access according to the different standards (Prestel, BTX, Télétel and ASCII) possible. At the management level this interconnection is a fact; the technical implementation is progressing whereas there are substantial problems in setting up a flexible invoicing procedure. In most cases is it not possible to gain direct access to another national system without a separate subscription.

The future development of videotex in Europe depends largely on the ways in which market forces and public policy-making will react to the new and changing conditions. The scene is still open to new actors but the risks of participating are considerable. The Prestel scenario with its centralized architecture has been no success in the 1980s. The Télétel operation has been a relative success in France but it still has to prove that it is viable outside the very specific French conditions. The question is also if whether or not the lack of intelligence in the Minitel will block further development of advanced services such as E-mail, teleshopping and banking.
From the studies presented in this book we can learn that a multitude of variables are influencing the final outcome: life or death for videotex. One of these variables concerns 'system integration'. Videotex can only be successful if it is coordinated by some integrating organization: such as the PTTs in France and Italy, the banks in Switzerland or big corporations in the United Stated (Prodigy).
Another group of variables relates to marketing. In the case of videotex, which tends to be technology-driven, marketing requires fundamental research in the information and communication behaviour of consumers, professionals and business users. The knowledge of these mechanisms has been largely insufficient.
A third group of variables is related to the quickly changing media environment of the 1990s. Videotex will without doubt be exposed to competition from other telecommunications network-based services.
The developing of new services and new technologies is clearly a learning process including a multitude of actors, that influence the final result in complex ways. For those engaged in videotex the sentiments have varied from hope and optimism to desperation and tidings of death. Time will show if there is a life after death for videotex.

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