INTERNATIONAL BUSINESS NETWORKING
WITH VIDEOTEX

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ABSTRACT

Business applications represent one of the fastest growing areas for videotex. Because of efforts to link national videotex systems, we analyze the potential uses and effects of videotex for international business applications. Using case studies of international videotex use by eight firms, we outline the key strategies firms use to exploit videotex internationally, as well as the major impacts of this use. Main strategies include 1) adding value to basic transactions through the incremental addition of new services, 3) using the basic service as a product leader that draws customers into a relationship, 4) using the information byproducts of transactions to better manage relationships with system users, and 5) linking videotex systems with other networks and information systems as a means of broadening reach. Impacts centered primarily on the ways firms related to their constituents, including a shifting of costs of transactions away from the service provider, a more easily expanded base of constituents, and more standardized interactions with constituents. International connections via videotex helped to alleviate the high costs of international telecommunications, and in some cases, permitted companies to access foreign markets previously too expensive to reach. Key obstacles to international videotex mostly involve the lack of common standards, its poor image outside France, and the lack of a real mass market in other countries. Theoretically, the case studies illustrate the use of telematic systems to enable strategies that have characteristics of both market and hierarchy approaches as noted by Williamson, and both cost/volume and product differentiation strategies pointed out by Porter. Regarding international strategy, the cases studies further illustrate that such telematic applications can help firms achieve the benefits of both global and multidomestic approaches discussed by Porter.
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Videotex systems, nearly given up for dead a few short years ago, are experiencing renewed interest from the business community, governments, and academics alike (Bouwman and Christoffersen, 1992). The reasons for this rekindling of interest are manifold, ranging from the continued publicity surrounding the proliferation of terminals and services in France, to the highly publicized debates regarding telephone company entry into information services provision in the United States. Although to date most attention has focused primarily on mass market information and entertainment services, recent research has focused on the growing use of videotex by businesses as a company networking strategy (Brousseau, 1991; Steinfield & Caby, 1990; Minitel News International, 1991a). In addition, although most research has also concentrated on usage within national contexts, national videotex systems, particularly in Europe, are increasingly being interconnected (Minitel News International, 1991b). As businesses seek to expand into international markets, many forms of international telecommunications services, including videotex, can play a role. Our purpose in this paper is to analyze the potential uses and effects of videotex for international business applications. We begin with a basic introduction to business use of videotex, and then briefly highlight the key developments concerning the growth of international videotex. We next outline our case study approach, followed by a description of international videotex use by eight firms. Our discussion of the cases outlines key strategies employed by firms to exploit videotex internationally, as well as the major impacts that appear to have resulted. We follow with a brief analysis of some of the key obstacles still facing the development and use of international videotex. Finally, we close with a brief discussion of theoretical implications of our research related to the role of telematics and organizational structure and strategy.

Business Use of Videotex

Although still struggling for market acceptance in most countries, new estimates suggest that there are approximately 3 million subscribers to mass market electronic information services in the United States (Arlen, 1992), and nearly 6 million Minitel terminals distributed in France (Teletel Newsletter, 1992). Moreover, videotex systems in Italy and Spain, which have recently interconnected with Minitelnet, the France Telecom subsidiary responsible for forging international links to the Teletel system, have experienced dramatic growth in users (Lorente, 1992; Mazzoleni, 1992). Accompanying this growth in the penetration of videotex is a rapid rise in its use by businesses as a form of computer networking, both for internal applications and to external constituents (Brousseau, 1991). In fact, these applications are widely viewed now as among the fastest growing in terms of traffic on the French Teletel system (Teletel Newsletter, 1990). One attempt to define business use is provided in a study by the Tersud group (reported in Minitel News International, 1991a, pg 26). By their definition business use (which they refer to as an “in house” application - we avoid the term since it connotes that all communication or transactions only involve internal constituents, while much of the activity, such as order taking, involves external parties) is when “the main activity ... is not sale of videotex information,” but rather when the application has been “designed as a complementary production, management or sales tool as part of the main business of the company.”

Using this definition, the Tersud study counts 7,500 business applications in France, involving 5,300 organizations (Minitel News International, 1991a). Applications were grouped into those that involved messaging, sales support, management support, financial management, and data base access. In other recent research, business use of videotex has been grouped into applications that mainly are directed at improving internal communications, product differentiation, or market innovation (Steinfield & Caby, 1990). Using this perspective, business applications can be directed at employees, suppliers, distributors, other organizational constituents, or even to home consumers.

International Videotex

Videotex network operators have in recent years pursued a policy of interconnection, enabling users in one country to access services provided in another (Minitel News International, 1991b). In March, 1990, representatives from 17 countries signed a declaration of intent to
accelerate the interconnection of their national videotex services. Most active in this area has been France Telecom, through its Inelmatique subsidiary, which markets Teletel (the French videotex system) abroad through a service called Minitelnet. In late 1991, Minitelnet provided a gateway service linking over 20 countries, including most of the major European systems. However, using a variety of access methods, foreign access to Teletel is possible from virtually anywhere. International access to Teletel, although still negligible compared to the more than 8 million hours per month within France (Teletel Newsletter, 1992), has increased rapidly, growing from 10,000 hours in 1988, to 30,000 hours in 1989, and 146,000 hours in 1991 (Minitel News International (1991b).

Key methods of foreign access outlined by France Telecom (1990) include:

- Placing a direct international call into the Teletel network in France. The relative costs of such access make this a viable strategy only for those border areas where calls do not have to pass through the international nodes of an operators network.

- Access through a foreign videotex network supporting the Teletel standard. This permits use of Minitel terminals, simplifying the extension of existing domestic services which rely on certain function keys to international markets. European countries beside France that have systems supporting the Teletel standard include: Belgium, Italy, Ireland, Netherlands, Denmark, Portugal, and Luxembourg (Minitel News International, 1991a).

- Access through national videotex systems that do not support the Teletel protocol. This requires a protocol translation that typically results in service and quality degradation, and may make certain key functions inoperable. Minitel terminals cannot be used.

- Connection through Infonet, an international X.25 network. Infonet is jointly owned by more than a dozen public and private telecommunications operators around the world, including France Telecom. It supports the Teletel standard, improving the access to Teletel from those areas served by Infonet nodes. Nodes are widely distributed throughout the U.S. and Canada, enabling users in these countries to connect only with a local call in most cases. In addition, Infonet maintains nodes in major European cities (France Telecom, 1990). Minitel terminals or personal computers with Minitel emulation capability can be used.

Although still at a nascent stage, international videotex can potentially be an important complement to a firm's global presence. As with professional services on domestic networks, international videotex as a networking approach offers distinct advantages and disadvantages to business users. Potentially ubiquitous access via low cost terminals, ease of use of services, use of public switched facilities rather than private leased lines, and common standards all imply that the potential set of intraorganizational, business-to-business, and business to customer links is much broader than via other techniques such as private company networks and industry specific EDI networks. Theoretically, the establishment of services via international videotex should also be possible at a much lower cost than if private leased facilities are used, at least in connecting those users who will not generate large amounts of traffic. Thus, smaller and medium sized firms may stand to benefit as well from this type of networking approach.

On the other hand, the use of leased facilities or other specialized networking strategies can of course include such advantages as higher bandwidth (resulting in higher speed transmissions), greater customization of services to specific user groups, and more control over the network. Moreover, limited access can mean a more secure network. The decision to use international videotex requires, then, a careful analysis of its strengths and weaknesses for the desired application, including an awareness of the potential evolution of the application, the specific
country context (e.g. videotex penetration, terminal availabilities, access methods, availability of alternative network services, etc.), and the target population.

Methodology: Case Studies of International Business Videotex Users

A handful of organizations have now begun to extend their professional uses of videotex internationally, and an examination of these applications offers many insights into possible ways in which firms will exploit this new capability. To this end, case studies were completed in eight French organizations which now use videotex to provide professional applications to users based in other countries. Given the newness of the service, and the small number of firms now involved, we made no attempt to select firms on any criterion other than the fact that they had an international business videotex application. Interviews were held with the individuals responsible for developing and/or maintaining the international videotex applications. Questions not only focused upon the various uses of videotex by the firm, but also the general business context in which the firm operated as well. Key research questions guiding the case studies include:

- What are the general characteristics of international videotex applications?
- What key factors encourage successful development and implementation of international business videotex applications?
- What effects might the use of international business videotex have on the firm, its relationships with its constituents, or on the industry?
- What obstacles stand in the way of international business videotex growth?

<table>
<thead>
<tr>
<th>Name</th>
<th>Type of Business</th>
<th>Number of Users</th>
<th>Key Characteristics of Business Addressed by Videotex</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMW France</td>
<td>National rail company</td>
<td>15 000</td>
<td>Fluctuations in demand and capacity</td>
</tr>
<tr>
<td>SNCF France</td>
<td>National rail company</td>
<td>15 000</td>
<td>Fluctuations in demand and capacity</td>
</tr>
<tr>
<td>LAMY</td>
<td>National rail company</td>
<td>15 000</td>
<td>Fluctuations in demand and capacity</td>
</tr>
<tr>
<td>VESTRA</td>
<td>National rail company</td>
<td>15 000</td>
<td>Fluctuations in demand and capacity</td>
</tr>
<tr>
<td>DEVMICO*</td>
<td>National rail company</td>
<td>15 000</td>
<td>Fluctuations in demand and capacity</td>
</tr>
<tr>
<td>RESINTER*</td>
<td>National rail company</td>
<td>15 000</td>
<td>Fluctuations in demand and capacity</td>
</tr>
<tr>
<td>TRAITEL</td>
<td>National rail company</td>
<td>15 000</td>
<td>Fluctuations in demand and capacity</td>
</tr>
<tr>
<td>VERAIR</td>
<td>National rail company</td>
<td>15 000</td>
<td>Fluctuations in demand and capacity</td>
</tr>
</tbody>
</table>

*Foreign companies*
### Table 1: Comparison of Case Study Firms

<table>
<thead>
<tr>
<th>Name</th>
<th>User Charge for the Service</th>
<th>Main Applications Internationally</th>
<th>Main Applications Domestically</th>
<th>Strategic Issues</th>
<th>Remaining Strategic Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOUS TRAIET</td>
<td>no for the service provider</td>
<td>Increased business for the service provider</td>
<td>Increased technology and cost</td>
<td>Improved image</td>
<td>Improved image</td>
</tr>
<tr>
<td>LAMY</td>
<td>subscription for the kiosk</td>
<td>Improved speed and accuracy in order taking</td>
<td>Improved access to hotels and public</td>
<td>Improved image</td>
<td>Improved image</td>
</tr>
<tr>
<td>VESTRA</td>
<td>no (excluding communication cost)</td>
<td>Improved stock management for parts, better service to hotels, and accuracy in rapid delivery</td>
<td>Improved stock management for parts, better service to hotels, and accuracy in rapid delivery</td>
<td>Improved image</td>
<td>Improved image</td>
</tr>
<tr>
<td>BMW FRANCE</td>
<td>no (including foreign communication cost)</td>
<td>Better service and lower prices from suppliers to hotels</td>
<td>Better service and lower prices from suppliers to hotels</td>
<td>Improved image</td>
<td>Improved image</td>
</tr>
<tr>
<td>DEVIMCO*</td>
<td>yes</td>
<td>Improved speed and accuracy in order taking</td>
<td>Improved speed and accuracy in order taking</td>
<td>Improved image</td>
<td>Improved image</td>
</tr>
<tr>
<td>RESINTER*</td>
<td>yes</td>
<td>Improved speed and accuracy in order taking</td>
<td>Improved speed and accuracy in order taking</td>
<td>Improved image</td>
<td>Improved image</td>
</tr>
<tr>
<td>SNCF</td>
<td>yes</td>
<td>Improved speed and accuracy in order taking</td>
<td>Improved speed and accuracy in order taking</td>
<td>Improved image</td>
<td>Improved image</td>
</tr>
<tr>
<td>AIR FRANCE</td>
<td>yes (for special public, no for professional communication cost)</td>
<td>Improved speed and accuracy in order taking</td>
<td>Improved speed and accuracy in order taking</td>
<td>Improved image</td>
<td>Improved image</td>
</tr>
</tbody>
</table>

* subsidiaries of Group ACCOR, which altogether has 8,260 employees.

### Case Study Results

The eight organizations can be effectively grouped into three categories, based upon the primary focus of their videotex applications. Three companies - Air France, SNCF, and Resinter - are all in travel-related industries and use videotex in support of their reservation systems. Another three - BMW France, Devimco, and Vestra - have systems that are primarily oriented towards order processing. Finally, two organizations - LAMY and Soustraitel - operate systems that can best be described as electronic trading networks (ETNs), where buyers and sellers are brought together over the system (see Mansell & Jenkins, 1991, for a discussion of ETNs). At the close of the presentation of the cases, Table 1 highlights the key aspects of the studied firms and their use of videotex.

### Reservation Systems

#### Air France

Air France, the state-owned French national airline, recently merged with the two other French carriers, UTA, and Air Inter, and acquired a part of Sabena, the Belgian national airline. These moves are part of a strategy of preparing for airline deregulation in Europe, and have made the Air France Group the largest airline in continental Europe. Domestically, competition from other airlines is currently restricted (until 1993), although SNCF’s TGV trains do compete on some key routes (e.g., Paris-Lyon). Internationally, competitors are numerous.

Tickets for Air France flights can be obtained at either Air France sales outlets located in airports and selected offices, or from any travel agency. They also make use of sales representatives, especially in the U.S., who provide information about Air France services to travel agents. Finally, Air France offers a freight service for shipping cargo between destination cities.

Videotex is used at Air France in a variety of ways, both for professional and consumer applications. These applications were primarily developed for the French market, capitalizing...
on the widespread diffusion of Minitel terminals and the coverage of the Transpac network. We describe these first, and then indicate the international extensions that are underway.

On the professional side, one set of internal applications involves the use of videotex as a front end means of accessing a range of company databases. Employees without personal computers and direct connections to Air France host computers can thus have access to personnel, financial, passenger and flight management information using a Minitel and dial-up lines. A videotex server merely enables conversion to Teletel format of these existing databases. Access is restricted by the use of passwords.

More related to the core business of filling capacity of flights, a second set of professional uses is directed at small travel agencies who are not yet directly connected to a reservation system. Approximately 500 agencies in France make their reservations and check flight information on Air France via Minitel. The Minitel server is again a front end to the Air France host computer (Alpha3) where the reservation system now resides. The service is on 3614, the set of Teletel services where there is a small communications charge to the user, but no fees to the information provider. Air France representatives acknowledge that the use of this service is steadily decreasing, as more agencies are equipped with special terminals (called Esterel) and direct connections to their reservation system. Moreover, Air France is in the process of changing over to a new reservation system (Amadeus), which will provide access to other airlines and travel services, hastening the switch to Esterel terminals for most agencies. They will, however, continue to provide the Teletel conversion for the Amadeus system, primarily in support of their public services.

A limited number of businesses maintained their own travel offices which were equipped with Minitels and a special printer (called a Diademe) enabling on-site ticket provision. Only 30 companies are now using this printer, and there appears to be some reluctance to aggressively pursue this as a business strategy in the near future, possibly to avoid conflicts with travel agencies. Company officials also note that they have experienced some difficulties with the connection of this printer to Amadeus.

Air France also provides a 3614 service in support of their freight business. Once again, small shipping companies who do not have direct connections from a terminal or personal computer use the service to make shipping arrangements for clients. The service is not password protected, however, and if they provide a shipping number to their clients, the clients can use the service to directly check on the status of their cargo.

Access to flight information and reservations is also made available to the general public in France through a Teletel service (in fact, separate services are available for Air France, UTA and Air Inter). This service is on 3615, the Teletel kiosk level in which there is both a communications charge and a charge payable to the information provider. Air France thus receives income from each access to this service, in addition to the added sales it may generate on flights. Company officials estimated revenues from this service to be approximately 250,000 - 300,000 francs per month, based on 3,000 - 5,000 calls per day. Much of the usage is simply to check flight information, but company officials note that usage for reservations is on the rise, particularly after 8 p.m. for next day flights when other outlets and phone-in services are closed. It remains a relatively small proportion of total reservations, however, with Minitel reservations accounting for under 2% by company estimates. New types of public services include allowing customers to access frequent flyer programs when available, permitting users to enroll, check mileage, and request awards.

International extensions for videotex are occurring primarily in two areas. First, they are currently testing the use of small portable computers equipped with Teletel emulation for their sales support representatives in the U.S. These representatives visit major travel agencies in order to promote the use of Air France for flights between the U.S. and France. Using the Infonet network, they are able to link to the Air France information services, in order to consult
flight and seat availabilities, but the agencies must use their local reservation system to actually book seats. They plan to extend this approach to all countries served by the Infonet network.

A second type of extension is that the public services are now accessible outside of France (since December, 1991, via Infonet or the local videotex system). The service is available in Italian for Italy, but only French is used in other countries. An English language version is under development. Due to the complexity of the international tariffing process, however, the service only provides flight information. Prices of seats are dependent upon the place where the ticket is purchased.

Company officials also noted that there may be a possible market for videotex access by travel agencies in some countries, although their agreement with Amadeus (which is a separate entity owned by a consortium of airlines), prohibits them from attempting to provide terminals and direct reservations services to agencies. They noted, for example, that fewer than 50% of agencies in Italy currently have computers, and their small size suggests that videotex solutions might be appropriate.

SNCF
SNCF is the national rail company of France, and currently has a monopoly on domestic rail service. Domestic competition is through other forms of travel. Internationally, SNCF works in cooperation with other national rail carriers in Europe, with revenues from international tickets split between the carriers based upon the proportion of mileage covered in each country. SNCF enjoys a strong reputation for efficiency and innovation, with their high speed train, the TGV, known around the world. With European economic integration, there is a strong likelihood that rail companies will be allowed to compete in other countries, suggesting that an international marketing presence may soon be necessary.

Ticketing and reservations on SNCF trains are possible via several methods within France: 1) at ticketing and reservation windows at all SNCF train stations, 2) from travel agencies, 3) at an automated teller machine (called an APV, for Automatic Point Vente) currently located at major stations, and 4) through Minitel. In the first two cases, professional terminal devices are directly connected to the SNCF reservation system. The latter two provide an easy-to-use interface to customers, but function as front end processors that are linked to the SNCF reservation system. SNCF, like Air France, is also in the process of upgrading to a new reservation system permitting connections to other travel-related services like hotel and car reservations.

SNCF has provided a videotex service on 3615 since 1981. It is one of the most popular videotex services in France, generating as much as 50 million francs per year based upon 800,000 hours of connection. The service provides easy to use train schedules, and links to the main reservation system for intercity routes. It also provides information on related services, such as bike and car rentals, suburban timetables, and new products. Tickets must be picked up at an SNCF station, but users can go to special lines for Minitel reservations at major stations. SNCF officials believe that the Minitel service has significantly reduced waiting times in stations, and has cut by a factor of 10 the cost of reservations compared to traditional methods. It is used for about 5% of all SNCF reservations.

International extensions are just beginning. SNCF maintains offices in seven European cities in other countries, including Barcelona, Bern, Brussels, Frankfurt, Madrid, Milan, and Vienna. Representatives in these offices do not sell tickets directly, but provide sales support to local travel agencies and train stations. The current procedure for international train travel is that local agencies or stations use paper-based books to consult schedules, and issue tickets without the need to access any centralized system. When reservations are desired, an international cooperative system called Hermes sends reservation messages to national reservation systems, but little additional information is available from this system. In view of the possible opening of national markets for rail services, SNCF has developed a "push" strategy, to provide access to their information services to foreign travel agencies.
SNCF is currently engaged in a trial whereby about 100 travel agents in other countries connect to the French videotex service via their national videotex system. The advantage for these agents would be to avoid having to use the paper-based timetables, and to have access to other SNCF provided information to aid travellers. The trial is investigating the technical viability of such an international offering, as well as the costs of using the service for agencies. They are studying the need for foreign language versions, agency willingness to pay the charges, and ease of use. Difficulties faced so far in the trials include poor quality connections, particularly from countries using a different videotex standard such as Germany and Spain. Additionally, the lack of a terminal distribution policy in other countries has hindered the trial, as agencies are unwilling to buy terminals until convinced of the service's usefulness. Interestingly, they find that potential access to non-SNCF videotex services, such as weather or metropolitan transit information, helps to sell the concept to foreign travel agents.

Resinter

Resinter is a subsidiary of the Accor Group, one of the largest hotel and restaurant groups in the world. Resinter, created in 1982 and now employing approximately 120 persons, provides reservation services to 1100 hotels out of the 1500 belonging to the group. The major hotel chains served by Resinter include Arcade, Lucien Barriere, Ibis Urbis, Mercure Altea, Novotel, PLM, and Pullman Sofitel. Their company mission statement includes the following objectives: 1) to diffuse hotel prices, promotions, and services to the distribution networks to support sales activities, 2) to register room reservations and transmit them to hotels, and 3) to optimise the use of hotel capacity in each locality and provide substitute solutions.

A centralized reservation system is the heart of Resinter. They maintain 12 Central Reservation Offices around the world linked to a central host in Paris via the SITA network, and 21 telephone access points. More than 85% of all reservations are still made by telephone. Additionally, they have interconnected their system with other major reservation systems, including all major airline systems such as Sabre, Apollo, and Amadeus. A public videotex service has also enabled customers in France to reserve rooms since 1990. Resinter currently accounts for approximately 8-10% of the room reservations in Accor Group hotels, with the rest made directly by the hotels. Finally, statistics collected from their reservation systems (e.g. a listing of the key travel agencies which book a hotel's rooms) are marketed to hotels in the group to help them in marketing efforts.

Resinter has both professional and public videotex service offerings. Traditionally, when a reservation is made through Resinter, it is communicated to the hotel via telex, fax, or over the SITA network, each of which suffers from cost and efficiency disadvantages. Videotex is now used with the 170 largest hotels (accounting for some 45% of all rooms) for this function. Each hotel has a terminal with a "black box" that automatically connects to a 3614 service by whatever means possible (direct dial or Infonet) every four hours to obtain the booking information.

A second professional service available to hotels is on the 3615 kiosk. It allows hotels in France to update their room availabilities for booking by Resinter agents. Traditionally this also was done via telex or fax.

The public service, also on 3615, enables customers in France to make their own reservations, and is the only way besides calling a hotel directly to book rooms on weekends when Resinter centers are closed. It has pricing and room availabilities, connection to a service that suggests recommended routes to take, and suggested hotels based upon customer preferences. Additionally, a small band of advertising space on this service is sold to group hotels. It accounts for only a small proportion of room reservations - 40,000 connections, resulting in 6000 room nights (about 2% of Resinter reservations) in 1991. Revenues from the 3615 service cover the cost of its operation.

Internationally, videotex is used professionally to send booking information to hotels, as noted above. They also plan to extend the service permitting hotels to update their room availabilities to Belgium, which accounts for most of the international traffic to Teletel. Some international
access to the public service does occur, but only accounts for about 2% of videotex reservations.

In the future, Resinter hopes to integrate service offerings to hotels onto a common personal computer-based terminal connected via leased lines or ISDN. This service would replace the current mix of telex, fax, SITA, and videotex for message flows between hotels and Resinter. They are also examining the potential use of audiotex for public applications, given the large proportion of telephone-based reservations.

Order Processing Systems
Devimco
Devimco is another subsidiary of the Accor group described above. It functions as a central purchasing authority for hotels and restaurants in the group for kitchen equipment, furniture, and other types of supplies, such as linen and towels. It organizes the outfitting of new hotels and restaurants built by the group, and coordinates the restocking of supplies by existing ones.

Hotels and restaurants owned by Accor use Devimco as a central purchasing authority, while franchised hotels and restaurants are free to buy anywhere as long as they respect brand constraints. Economies of scale are achieved by Accor by standardizing on some products (e.g., furniture, towels, linen) in order to obtain price advantages. Devimco negotiates with suppliers on behalf of the group in order to obtain the best prices. In return, it guarantees to the suppliers that included hotels and restaurants do not represent payment risks and will pay their bills. By playing the intermediary between suppliers and hotels, the Devimco system shares many of the characteristics of the electronic trading systems noted below. We have included it here because of the closed user group nature of the system, serving only Accor hotels and restaurants.

The videotex service developed in the past two years by Devimco permits group owned and franchised hotels and restaurants to enter orders for supplies and to follow up on previous orders. It is a private system that is paid for by charging suppliers 3% on all orders made. The system also includes a training application for new users, deemed necessary due to the high turnover rate in hotels and restaurants. Although designed as an international service, the Teletel system was used due to the widespread availability of Minitels. Where possible, they use a special security key that plugs into the Minitel terminal containing the user ID and password. By not issuing such information directly to employees, unauthorized purchases are prevented (e.g., by those who formerly worked for a hotel or restaurant).

The order placing function includes detailed item descriptions, price in local currency, supplier information, anticipated delivery times, minimal required order, and so forth. The follow-up function allows users to see if the supplier has confirmed the order and the actual delivery schedule. It also permits users to file a claim in the event of an incorrect or faulty product. Upon receiving an order, the system automatically issues a telex to the designated supplier. Suppliers then use a 3615 service to enter their confirmation of receipt of the order. Users directly pay suppliers for each order, rather than pass bills through Devimco. When a claim is received by the system, a letter is sent to the supplier. In addition, the system calculates a "satisfaction index" for each supplier, based upon the total number of claims received, and helps Devimco eliminate poor quality suppliers.

The videotex service used by suppliers maintains complete accounting information, so that suppliers can check on total orders, orders by customer per period, and their satisfaction index. Managers of hotels and restaurants can also obtain information about all orders issued from their location. Finally, a messaging capability is built into the system, enabling hotel/restaurant users to exchange messages with Devimco.

The system is still in the development phase, and at present only provides services to two of the large Accor hotel chains, representing about 250 hotels and several restaurant chains. The database contains information from 170 suppliers and 7000 items. Currently most of the users and suppliers are in France, but the service has now been extended via national videotex.
interconnections to Belgium, Switzerland, Portugal, and Spain, and will soon include the U.K. and Germany.

Company officials report that the system pays for itself, and excess revenues are redistributed back to the participating hotels and restaurants. Their chief complaints about international videotex are the requirement for subscriptions rather than kiosk access in most other countries, and the inability to use their security key on other systems.

BMW France
BMW is a German family owned automobile manufacturer. BMW maintains independent subsidiaries in countries with relatively large markets, including France, while working through exporters in smaller countries. BMW France is responsible for all aspects of the business in France, including maintaining a network of dealers, sales support, and after-sales support activities. Dealers, although independent businesses, are BMW franchises and only work. There are approximately 1000 BMW dealers in France and the French overseas departments.

National videotex systems are used in each BMW country subsidiary, primarily for logistical applications like parts distribution, although professional services are most advanced in France. Additionally, in most countries, a public service providing information about BMW cars is available. The case study centered primarily on professional services in France, which are further described below.

The videotex applications in BMW France began in 1984, when IBM helped the company to integrate all their existing information system with the new videotex applications. Most of the applications focus on the support of order processing by BMW France's dealers. Thus, dealers who do not generate enough traffic to justify a leased line connection back to the host computer use Minitels to enter orders for new vehicles, check on the availability of models, and find out delivery schedules and status.

Order processing also is the principal function of the videotex application that supports the distribution of replacement parts in France. All parts destined for French dealers are warehoused in Strasbourg, which in turn receives its stock from the BMW central parts store in Munich. Each country subsidiary develops its own approach to parts distribution, with the videotex application developed in France geared not only to the efficient distribution of parts, but also to promoting improved parts inventory management practices among dealers. To do this, company personnel have studied the frequencies with which certain parts are normally required. Essentially, they encourage dealers to maintain an adequate supply of the most frequently used parts on hand, while requesting the rapid shipment of other parts only when necessary. In this way, shipping costs are reduced, and delays in car repairs are minimized. The way in which the system is used to promote these practices is through a combination of pricing incentives and feedback. Costs for express shipping of frequently used parts are higher than if ordered for standard delivery. Additionally, if dealers keep their total annual percentage of express delivery requests under a specified level, they receive a bonus. The system continuously informs them of how they stand in this regard, allowing them to adjust their ordering behavior accordingly.

This application is made available on the 3613 Teletel level, which means it is completely free for dealers. BMW France absorbs the cost of the videotex use because it is still less expensive than the old method of taking orders by telephone. The system receives some 13,000 lines of orders each day, which would be difficult to handle manually. With the system, they have fewer personnel, make fewer mistakes on deliveries, and inventory practices have been significantly improved.

Other videotex applications have been added, including a scheduling program that enables dealers to view the calendars of BMW field representatives to request a meeting. A training application allows dealers to enroll in courses offered by the company. Finally, the system includes a broadcast messaging function, which sends updates on prices and new promotions to all dealers twice per day.
International extension of the BMW France videotex system began in September, 1989. Because of Strasbourg's location on the border with Germany, the company decided to reassign the German dealers in the neighboring region to BMW France for the parts distribution function. Initially 26 German dealers were provided with dual standard terminals (necessary because they used BTX, the German videotex system for other commercial applications) so that they could use the Teletel system for parts ordering. A German language version of the application was developed, and connections were made using local border calls where possible, or connecting through the German public packet network (known as Datex-P). Because of the complexity of the connection procedure, and the high communications cost, a "black box" approach was used. A device connected to the terminal automated the logon and connection, allowing batch ordering. There was some resistance from the German dealers to the incentive-based system developed by BMW France, as they opposed any form of "commercial policy" from another subsidiary. They were also accustomed to ordering virtually all parts on an express basis. However, the BMW headquarters, seeking to obtain the same benefits as witnessed in France, required the French subsidiary to use the system to improve inventory practices. They are attempting to do this by significant price differentiation between express and standard orders.

Although not yet underway, the company believes that a similar approach could be taken with dealers in Belgium. Essentially, with European economic integration removing barriers to cross border distribution, they hope to centralize more of their activities in the areas where costs of operation are lowest. International videotex and other forms of telecommunications services will thus play an ever increasing role.

Vestra

Vestra, based in Strasbourg, is the second largest men's garment manufacturer in France, numbering some 2800 employees. They produce two forms of men's suits: 1) stock suits of a standard size, either under license from a designer or under their own label, and 2) made-to-measure suits. The latter category accounts for approximately 10% of their business (although not 10% of volume due to the higher cost of a made-to-measure suit). In either case, Vestra never deals directly with final customers, but rather provides their product to several thousand boutiques and large department stores. Most of these retail outlets are in France but increasingly Vestra is selling to other markets as well. Vestra has long had a reputation for technological innovation, and was one of the earliest users of computer integrated manufacturing in their industry in order to counter the higher costs of labor in France.

Their use of videotex began in 1984, primarily in support of the made-to-measure business. Essentially, trained salespeople in their retail network take the appropriate measures from customers, and send these to Vestra via videotex. Depending upon the season, Vestra receives between 200 and 1000 orders per day, which are then directly fed into their computer controlled cutting machines. Custom-made suits can then be produced within five days, as opposed to the three to four weeks a traditional tailor might take.

The videotex application allows stores to save measurements from a particular customer, so that the electronic forms can be reused with just changes in style or fabric. When an order is made, the system informs the store of the delivery date, and users can check on the status of previous orders. It also permits users to investigate fabric options, and reserve particular materials if desired. Importantly, through the system, the made-to-measure suit functions much like a leader product, as the full set of stock products is available for ordering as well. Vestra officials believe that the opportunity to get custom-made suits attracts stores initially, and once a relationship is established stock products are proposed. Advertisements for specials on stock products are often included at the bottom of screens. Accounting statistics compiled by the system permit Vestra to see whether or not orders have decreased from a particular store, enabling them to inquire if a problem exists. The service is run on the 3614 Teletel level, where only local communications charges are born by the customer.
International extensions of the videotex application began as soon as was feasible, and orders now come from stores in the U.K., Ireland, Germany, Belgium, Sweden, Norway, Finland, and most recently, the U.S. Approximately 15-20% of the made-to-measure business comes from international orders. As a result of extension to the U.S., they are implementing a second server which will permit 24 hour per day operation.

International connections are accomplished via Minitels if possible, or personal computers with Teletel emulation otherwise. Infonet is used in the U.S., where they estimate that each order costs about 30 francs to take. Company officials note that the international made-to-measure business did not exist prior to their use of videotex, because the delays and inaccuracies involved in normal paper ordering favored local tailors. To help exploit their expertise in the large U.S. market, they have formed a joint venture with a chain of retailers that did not offer a made-to-measure product in the past. The new subsidiary is equipping all stores in the chain with Minitels, and training sales people in the use of the system.

Electronic Trading Systems
Lamy
Lamy has been a legal and technical publisher since 1892, and is the market leader in France in such areas as social and transportation laws, while second in the market for tax law publications. It had revenues of approximately 220 million francs in 1990, and now employs 250 people. Revenues have been growing at 15-20% per year in recent years, much of which is a direct result of their videotex developments. The company has pursued a policy of broadening access to their many information bases, using such new media as CD-ROM and videotex.

Their first videotex application began in 1985. At that time, Lamy offered a paper-based manual used by the trucking industry to calculate tariffs for freight transport in France. France regulated tariffs, and used a complex system that included 642 zones to calculate the required tariff. Truckers and freight forwarders had difficulty using the paper manual, and the first videotex application performed automatic calculations given the weight, originating, and destination location. The popularity of the system was evident, as the sales of paper manuals declined by 40%, but revenues were two to three times pre-system levels. Although France deregulated freight transport tariffs in 1989, the system is still used by the industry to calculate reference tariffs before setting prices. About 800 forwarders used the service, which was offered on a subscription basis.

Perhaps the most important effect of the service was that it illustrated to Lamy and the trucking industry actors the utility of videotex, sensitized them to Minitel use, and opened the door for further applications. In 1986, in response to requests from users of their transport application, Lamy developed a freight exchange service geared to the "spot" market. Previously, truckers would work through public freight agencies, which functioned as a source of information about available offers for freight in need of transport. These agencies could not really support the needs of a spot market, whereby, special and non-recurring shipments are requested, typically for next day delivery at a minimum (as opposed to the regular market, involving long term contracts to deliver recurring freight). Paper-based systems are too slow for the spot market, and a videotex database, updated almost in real time was developed by Lamy. The systems functions by having freight forwarders subscribe to the system, and they are invoiced annually. They use a 3614 number to enter their offers, listing type of goods, weight, originating and destination location, and delivery due date. Truckers then use a kiosk number (3615 or 3616) to call and search for available freight. Typically it is used to fill up some excess capacity in their trucks or find a load for a return trip. Users can search for all offers matching their existing route and free space requirements. Upon finding a matching offer, they immediately call the forwarder to make a bid.

The success of this new service was immediate and significant. The system generates more than 250,000 hours in connect time, and more than 70% of all French truckers, over 20,000 in number, use it. More than 25,000 offers are posted each day, and during peak hours, 2500 connections at a time are made by truckers. Revenues related to their videotex applications...
amounted to 100 million francs in 1991, a third of 1991 income. Offers typically only stay on the system for no more than 15 minutes, and are removed by the forwarder, who otherwise would be inundated with calls.

Lamy has added many other applications to enhance their freight exchange system, including: a database of warehouses, training and employment listings, information flashes about travel conditions, truck rental information, an insurance service guaranteeing payment for truckers, a way of ordering the legal documents that must accompany all shipments, a currency conversion service, and a messaging service. More expensive databases were developed for access at the 3617 level, including a service with information about the transport of dangerous materials, and a currency conversion service that includes rates from other dates. Additionally, their main services offer access to two other videotex applications developed by other companies: a route guide service, and a fuel ordering service. They also advertise other Lamy transport-related products via their service.

International extension of the service was accomplished by establishing an international database for transborder shipping offers. Forwarders were sought in each country, who then put in offers in their domestic language. They established links with Belgium in 1987, and in subsequent years, added Germany, Switzerland, the Netherlands, Italy, and the UK. Spain and Portugal are just now being connected. In each country, offerers and truckers use their local videotex system to connect to the database, which is stored on a central computer in Lille. Where Minitel terminals are available, they are used, but in Germany, most users have either BTX terminals or personal computers with emulators. They also have licensed their service to local publishers in each country to create an intracountry service more targeted to the structure of the transport sector.

The international service generates about 8000 calls per day, with about 25% of the accesses coming from outside France. The longer distances and other delays involved in international transport generally imply a smaller spot market than would be found in an intracountry basis. Nevertheless, European economic integration is likely to increase demands for such a system.

Company officials believe that their system has, in fact, created a market that did not really exist before. Moreover, their own research with system users convinces them that it has resulted in an increased efficiency of operations by French truckers, who now have a much higher proportion of full trucks than foreign counterparts. The price of transport has decreased in France, and foreign truckers find it difficult to compete with French truckers.

**Soustraitel**

Soustraitel is a non-profit association of small to medium sub-contractor firms possessing industrial and engineering expertise in a variety of medium to high tech fields ranging from metals to plastics to electronics. The association was initially formed through the efforts of the Strasbourg Chamber of Commerce, which was hoping to assist the smaller firms in their region in the marketing of their services. To accomplish this, the Chamber of Commerce created a Minitel database ten years ago, including information about the sub-contractor firms that wanted to join. The database noted the name and address of each firm, as well as their areas of technical know-how. After demonstrating the database at a sub-contracting conference, other chambers of commerce expressed an interest in participating, and the association became inter-regional in 1984.

The videotex application is essentially the Minitel database, to which sub-contracting firms pay a fee of 4800 francs per year to join. Additionally, Soustraitel seeks out firms in need of subcontracting work, and encourages them to submit requests for bids. These requests are then input into the system at no cost to the offering firm. Subscribers can then examine the offers, and if they feel qualified, contact offering firms on their own to submit a bid. The success of the service thus depends on attracting offering firms, which in turn make the system of value to the subscribers. The Strasbourg Chamber of Commerce continues to maintains the database, but they have given over commercialization of the service to another firm.
Internationalization of the Soustraitel service occurred several years ago when it was presented
to a European Commission group exploring the area of pan European subcontracting. Through
the DG 23, the directorate now in charge of sub-contracting issues, some base funding was
provided to make the service pan European. First, a local German chamber of commerce
joined, but now the database contains subscribers and offerers from Germany, Belgium, Spain,
the Netherlands, and Luxembourg. It is translated into five languages, including German,
Dutch, Spanish, and English. Each country has the same organization as France, with an
association of chambers of commerce overseeing the management of the database, and a
separate firm licensed to commercialize it. Contacts have been initiated also with Italy,
Portugal, Switzerland, Austria, Ireland, Scandinavian countries, Czechoslovakia, and countries
in the Magreb.

There are currently about 400 contractors from France on the system, and about 900 offering
firms have used it. In 1991, the system had 15,000 connections, but there was no means of
measuring how many resulted in actual bids being made and accepted. The Soustraitel
representative noted that many offering firms simply scan the database of subscribers and then
call a particular firm without actually placing a request for bid on the system or mentioning how
they found the firm. Without demonstrated evidence of the efficacy of the system, many
subscribers are reluctant to continue their membership, and only about 50% resubscribe. In an
attempt to stimulate demand, Soustraitel has added other services for subscribers, such as
enabling remote registration for a major sub-contractors conference. They also created a
miniature exchange during the conference, by placing Minitels throughout the building, and
arranging meetings between offering firms and subcontractors who wish to make bids.

Ease of access from international users remains a problem, with personal computers and
emulators used most often as the terminal. Cost of connections is an impediment, and they are
contemplating the use of a "black box" approach to automate the connection and operate in a
batch mode.

Discussion
Collectively, the case studies suggest a number of important lessons and issues for further
research. We first attempt to identify the reasons why business videotex was chosen as a
networking strategy, particularly for international needs. Our discussion then turns to the
potential effects from, and the main obstacles to, international business videotex use. We close
with a brief examination of broader theoretical issues suggested by the case studies.

Reasons for Using International Videotex
Three broad sets of reasons for choosing international appear throughout the case studies.
First, many of the same communication requirements that justify a domestic business videotex
application are important parameters for international videotex. Thus, in virtually all cases, the
system users (although clearly not the parent organization) were often small, individually had
low traffic volumes, were geographically dispersed, and had limited computer expertise. This
limited the applicability of other networking approaches.

Second, every firm had initially capitalized on the widespread availability of Minitels in France,
beginning with a domestic application. The advantage of this experience was that much of the
knowledge gained domestically could be applied to the international market. The disadvantage
was that it locked in the firm to a particular standard that was not so well developed abroad.

Third, the flexibility afforded by the potential reach to the mass market enabled firms to tailor
applications around their international strategy. For Resinter, Devimco, and BMW, and it
followed the internationalization of the firm, and was a means of providing organizational
constituents outside of France with an equivalent set of services to those provided to French
clients. With SNCF and Air France, the expected internationalization of their business (in
terms of the opening of markets necessitating a full marketing presence in other countries) was
also the stimulus for videotex use. However, it is important to note that international videotex
served to lead the remaining three cases (Lamy, Vestra, and Soustraitel) into international
markets. In each case, the international nature of the business simply did not exist prior to the development of the videotex application.

Strategies in the Development of International Videotex Applications

The development strategies used by firms can be divided into two groups: those that are quite the same as with any domestic business videotex application, and those that are unique to international videotex. In the former group, throughout the cases we can see evidence of five basic strategies.

- Applications that began with the simple provision of information (such as Lamy's tariff database) soon moved to provide more value-added communication and transaction support services.

- Firms often began with a basic core service, but continued to enhance their relationship with users through the incremental addition of new applications. Virtually all of the cases followed this strategy.

- Videotex was often used as a way to establish a relationship with a user, or as a means of providing a "product leader". Vestra's use of their service to hook stores with a made-to-measure product, but then attract them to their more profitable stock products is a good example.

- Service providers often used the information "byproducts" of their applications, either to pinpoint potential needs of users, or to feed back to users to help them manage their own activities. Devimco's satisfaction ratio and BMW's inventory incentive system are prime examples of how this can be achieved.

- Videotex applications are often linked to other information systems and networks, and often are used merely as a means of reaching certain segments of the market that would not otherwise have access to services. SNCF's and Air France's use of videotex servers as "front-ends" into their reservation systems illustrate this approach.

Extending videotex internationally suggests that other strategies will be necessary as well. Cultural, commercial, and technical issues must be addressed. On a cultural level, firms often had to adapt their applications to fit the local context, most obviously in terms of language. Vestra, for example, converted all measures from the U.S. and U.K. to inches, and for the U.S. used a delivery date that put the month before the day, rather than the reverse as used in Europe. On a commercial level, some firms used more of a market push strategy because of the lack of a mass market in other countries. Thus, SNCF did not envision directly accessing the general public, but would first work through travel agencies to increase awareness of their company. Finally, internationalization requires special technical strategies to overcome higher costs for communication, standards problems, and complexity of networking arrangements. The "black box" strategy of BMW and Resinter was in response to these needs.

Impacts of International Business Videotex

The case studies illustrated some important potential impacts of international business videotex use, which are worthy of further study. As with the section on strategies above, it is useful to distinguish between those impacts that are more the result of business videotex and could occur even with a purely domestic application, and those that take on added significance as a result of international usage.

In the former group, we have identified six types of impacts that generally involve some form of change in the nature of the relationship between the firm and its constituents, especially those that are external. These are briefly highlighted below.

- As has been noted for other forms of corporate networking business videotex appears to shift the costs of transactions to users, either in the form of substituting user labor for internal firm labor, or user payments that underwrite the cost of the network (e.g. Rockart &
An extreme case is where mass market use of a kiosk level service generates significant income in and of itself, in addition to increased sales of a firm’s products (e.g. SNCF’s service).

- Business videotex not only reduces costs of transactions, but improves their reliability and efficiency. Order entry systems are especially relevant in this regard.

- Business videotex may alter the basis of the relationship between an external client and the firm, making them seem more like partners than customers. The provision of information to help users manage their activities more efficiently, the provision of terminals and black boxes, and the addition of service enhancements in response to user demand all contribute to this effect. Additionally, they increase the cost of switching to new providers, thereby enhancing loyalty.

- Use of videotex makes it easier to expand the base of constituents, because of the reduced transaction costs, and can allow a firm to reduce dependence of a few large customers by adding many smaller ones.

- Substituting videotex for more traditional methods of exchange results in a more standardized means of interacting with constituents.

- Videotex may permit firms to bypass traditional intermediaries, if, for example, SNCF and Air France pursued an approach that permitted the direct issuing of tickets to customers to avoid travel agency commissions. Our cases, however, suggest that in most cases systems are designed to incorporate existing actors, perhaps to avoid conflicts that might hurt important business relationships.

Like other telecommunications approaches, videotex also has the potential for altering the basic competitive structure of an industry, and in creating entirely new markets (see Keen, 1988).

The Lamy and Vestra cases both illustrate new industry structures made possible only through their videotex applications.

Some effects are more significant when viewed in the context of internationalization of the application. Clearly, for example, videotex applications are especially useful in holding down the excessive costs of international telecommunications. As such they can permit access to foreign markets that previously were too expensive to reach, or the provision of services to existing foreign customers where not previously possible. Indeed, videotex appears to be adaptable to companies following either a global or a multidomestic strategy (Porter, 1986). For those pursuing a global strategy, international videotex interconnection allows firms greater flexibility in centralizing certain aspects of supply or production while maintaining a marketing presence in each country (e.g. Devmico). For those following a more multidomestic strategy, use of national videotex systems and local information providers (e.g. Lamy and Soustraitel), help to achieve the benefits of customization for each country context, while still centralizing key information resources. Indeed, elements of both approaches can be seen in some case study firms (e.g. BMW’s global approach to parts and multidomestic approach to sales policy, and Lamy’s mixture of domestic and international databases).

Obstacles to Internation Business Videotex

Five broad sets of obstacles appeared throughout the case studies. We highlight key issues below.

- Different national videotex approaches. Standards differences (in terminals, videotex and packet network protocols, electricity, telephone interfaces) posed a significant problem, and raised both the cost and the complexity of international videotex. In addition, country strategies that inhibited penetration levels (such as lack of a terminal distribution strategy and kiosk billing system) made it difficult to achieve the same degree of access as case firm’s enjoyed in France. These national asymmetries are perhaps the strongest inhibiting factor to the growth of international applications. Videotex also suffers from a poor image and/or lack of awareness in
many countries outside of France. Finally, competition among network operators was perceived by some case study firms as a reason for less than optimal cooperation in solving international connection problems.

- Cultural differences can be an obstacle to the international extension of a successful domestic service. Lamy officials noted, for example, that the trucking industry in Germany is dominated by companies rather than independent truckers, and they tend to work with each other on the basis of existing relationships. Thus, a market mechanism such as Lamy's freight exchange service is less relevant.

- High international telecommunications costs, even using videotex, are still a problem. Domestic services that are attractive because access costs are nearly negligible, lose their value when international tariffs come into play. This is especially the case when services are directed at the end consumer. Given that the European Community is supposed to become a common market, it is not clear how much longer intra-EC cross border tariffs can remain so high relative to the distances covered.

- Technical problems that are inherent to videotex as currently designed are an obstacle to some business applications (see Brousseau, 1991). The relatively slow speed, and need to dial to establish a connection each time, will eventually cause users to seek other solutions when traffic requirements increase.

- Within the firm developing the application, additional obstacles are present. Among information systems people, and other actors who may play role, there is still a relative lack of awareness of videotex as a potential networking approach. Moreover, users within a firm, but based in another country can display a loyalty to their own national videotex system to the detriment of the company system. Additionally, our interviews with users and with Intematique have convinced us that even if there is a true desire to exploit videotex internationally, firms must have an international policy and if necessary, an international distribution infrastructure in place to follow through with their service offerings.

Theoretical Implications
Collectively, the case studies suggest several theoretical issues related to information technologies and organizations. Most importantly, they begin to shed light on the implications of integrating traditional information networks within organizations with more mass-oriented telematic systems such as videotex. Traditional theories of organization forms focus on information networks that have more limited reach, interconnecting key units within a firm, and more recently through such technologies as EDI, a limited number of pre-existing constituents to the organization. For example, theorists such as Malone (1988), based upon Williamson's (1975) classic distinction between markets and hierarchies, note how information technology contributes to the efficiency of markets. Costs of transactions and other problems that normally favor the use of hierarchy (i.e. vertical integration) over markets (i.e. outsourcing) are reduced through information technology. Business use of mass telematic systems in many of our case studies appeared to result in an intermediate coordination form. That is, quasi-markets seemed to appear, where elements of both hierarchy and market were evident. For example, in the Devimco case, suppliers and hotels operated in a kind of marketplace structured by Devimco. The hotels were owned by the parent company of Devimco, and had to purchase supplies following a strict set of standards, but did not necessarily have to use the suppliers available on the videotex system. However, the features of the system that permitted, for example, an increased stabilization in terms of the suppliers that were available (e.g. through the evaluation of the satisfaction index, the price negotiations that initially were made prior to allowing a supplier to be listed, etc.) also gave the assembly of players more of the characteristics of a quasi-firm.

In terms of competition, theorists such as Porter (1980) have distinguished between two broad strategies in order to gain advantage: one where firms attempt to compete on the basis of lower costs, often with high volumes, and a second where firms compete on the basis of a
differentiation strategy, often focusing on niche markets with low volumes. Glazer (1991) notes that the former requires in-depth information about the product and the production process, while the latter requires better knowledge of customers' needs. He suggests that when firms possess both types of knowledge, they can exploit the benefits of a more flexible manufacturing and marketing strategy. Interestingly, many of our cases appeared to use videotex in such a way. It helped them to lower costs of production by reducing transaction costs, and deal with many more customers, hence increase volumes. However, at the same time, many of the firms used the information gained from the transactions to offer new products and support to their customers, which is more of a custom approach. The videotex system itself represented a means of product differentiation for these firms.

Regarding the international extensions of videotex, the global and multidomestic approaches developed by Porter (1986) also refer mainly to traditional organizational networking strategies. Once again, the kinds of interconnections permitted by mass telematic systems have appeared to permit a type of dual or intermediate approach, whereby firms apply elements of both organizational forms. Thus, as noted above in our discussion of impacts, in some of the cases firms used both a global strategy (involving the concentration of activities in those countries where costs were lower), while establishing separate entities customized in each country. Perhaps the best example of this was the Lamy case, where they maintained separate country systems, as well as an international system based in France.

In general, there appears to be a need for new theoretical development about organization structure and process that incorporates the potential for mass telematic systems. Some preliminary observations provided by our case studies are that such systems can permit hybrid forms of organization that are neither markets nor hierarchies, which compete on the basis of both cost/volume and product differentiation, and that internationally apply elements of both global and multidomestic approaches. The networked organization work by Rockart & Short (1991) is a step in this direction, but is not really focused on the implications of mass interconnection to organizational information systems. Although our case studies only focused on videotex, it is not the only means by which this phenomena is occurring. The growing use of voice processing technology (using 800/freephone numbers or audiotex services, for example) has perhaps even eclipsed videotex in terms of its ability to link the mass market to an organization’s information systems for data base retrieval and transactions. Clearly new theoretical development on organizational structure and process in such an information technology environment is needed.

Conclusion

Based upon the cases described above, our analysis indicates that there does indeed appear to be a niche for videotex as a form of domestic and international business computer network. Because of its ability to provide lower cost access to the general public, and small business customers, it broadens the reach of company telematic resources. Examples from above illustrate that such approaches can lead to a redefinition of who a firm’s constituents are, and how they relate to the firm. However, important obstacles, often a result of national asymmetries, remain, suggesting that the policy-making community may need to have a more aggressive approach to achieve unfettered provision of international value-added services like videotex. For the researcher community, the marriage of mass market telematic systems to traditional information networks within organizations presents new challenges to our understanding of organizational structure and process.
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