Extended Enterprise and Electronic Commerce

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This paper[1] presents and analyzes the use of information and communication technologies (ICT) by the so-called extended enterprises. We adopted a 3-by-3 matrix framework with two dimensions. The first dimension is the 3 actors which enterprises deal with: (a) their business partners, (b) their customers, and (c) the States or public administrations. The second introduces a 3-step maturity model for enterprises facing electronic commerce and using ICTs to improve (a) the use of information at their boundaries, (b) relations and cooperation with their partners, and (c) competition on their markets.

1 Introduction

This report describes and analyzes how advances in information and communication technologies (ICT) will affect the future of companies which are seeking new and more productive ways of organizing their functions and activities while facing increasing competition from abroad.

This introduction briefly presents the environmental issues (global, information-based and customer-driven economy), the internal issues (strategic, organizational and technological aspects) faced by companies, and the analysis framework adopted to present this study.

1.1 Environmental issues

Companies, especially small and medium-sized enterprises (SME) are confronted with a number of changes that require innovative answers. Among these are (a) the emergence of a competitive global economy, (b) the trend towards an information-based economy, and (c) the shift from mass production to a customer-driven economy.

To compete in today's global information-based and customer-driven economy, companies must be efficient, innovative and competitive; able to respond just-in-time, focus on quality, and implement a so-called mass-customization. But in order to do this today, they must also be able to leverage the new information and communication technologies (ICTs) to fit better in their environment, establish more cooperative inter-organizational relationships and compete on the international markets.

1. This paper is a revised extract of “Electronic Commerce in Switzerland - Technology Assessment” written for the Swiss Science Council by S. Klein, Y. Pigneur and B. Schmid (february 1996)

1.2 Internal issues for SME

Facing the general challenges described above, companies try to adapt (a) their strategy, (b) their organizational structure, and (c) their use of information and communication technologies (ICT) in order to remain competitive, survive or grow.

SMEs mainly adopt three kinds of strategy - in this priority order - : (a) reducing their costs, (b) diversifying their distribution channels and targeting new markets, and (c) improving the service to their clients and the quality of their offering.

They are also in the - too slow ? - process of reviewing their organizational structures and processes. We distinguish three worldwide-adopted paradigm shifts that some SMEs try to adopt in order to (a) flatten some of their old-fashioned hierarchies by adopting teamwork and revising their decision processes, (b) improve the integration among their departments and reengineer their business processes, and (c) build an extended enterprise by adopting new patterns in collaboration with their business partners.

Last, SMEs know that information and communication technologies (ICT) can be a lever to implement their strategies and their reengineered organization. But very often they cannot take advantage of these ICTs because the required investments are too high and their competencies are inadequate. Among these ICTs, we observe the three trends towards the adoption of (a) groupware and computer-supported cooperative work (CSCW), (b) middleware, workflow and reporting or executive information system (EIS), and (c) inter-organizational systems (IOS) and electronic data interchange (EDI). In this report, we focus mainly on the last of these which forms the basis for electronic commerce (EC), trade (ET) and markets (EM) [Kalakota, 1996].

General proposition - Information and communication technologies used to implement so-called electronic commerce or trade can help (small and medium-sized) companies compete in a highly competitive, information-based and customer-driven global economy. They should be encouraged to do so in order to maintain their competitive position in an increasingly competitive world.

ICTs like IOS, EDI and EC are both driving and facilitating the adaptation of companies and SMEs to the changes in the economy presented in our introduction. For example, ICTs allow SMEs, which are often sub-contractors, [OTA, 1994]

- to enter niche markets on a worldwide basis and get quicker trade opportunities
- to link up with transregional or transnational corporations as suppliers, value-added providers or other market intermediaries
- to operate with groups of small business as if they were much larger entities, enabling them to compete with large businesses on a more equal footing
- to shorten product development cycles and adopt marketing strategies that are highly responsive to customer needs.

1.3 Our analysis framework

In order to analyze more deeply the role of ICTs in helping companies confronted with these changes in the economy to react, we adopted a framework, illustrated in figure 1, to structure our field study and to present this report.

Figure 1 - The analysis framework

	Information at **boundaries**	Cooperation with **relations**	Competing on **markets**
Business (trade)	**1** (see § 2.1)	**2** (see § 2.2)	**3** (see § 2.3)
Consumer (retail)	**4** (see § 3.1)	**5** (see § 3.2)	**6** (see § 3.3)
State (procurement)	**7** (see § 4.1)	**8** (see § 4.2)	**9** (see § 4.3)

The first dimension of this framework is the type of actors or partners an enterprise deals with. We distinguish the following actors:

- [business] the other businesses or enterprises making transactions with the companies. This issue deals with business-to-business trade
- [consumer] the final customer or consumer buying the products or the services of the company. This point mainly addresses retail commerce
- [state] the public authorities which are often partners in the trade or commerce processes. This aspect mainly refers to the role of public authorities.

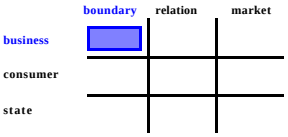
We cross this dimension with a second one which is a 3-step maturity model [Konsynski, 1993]. This model suggests three kinds of generic activities in trade and commerce which can be supported and improved by ICTs:

- [boundary] a company can use ICTs to improve its information gathering capability and better interact with its environment by getting and sending information outside its boundaries (in order to target some new trade opportunities more quickly, for example)
- [relation] a company can use ICTs to support and improve its cooperative relations when making transactions with its partners (i.e. supplier, customer, consumer, value-added provider, third-parties)
- [market] a group of companies (competitors, buyers and sellers) can use technologies to improve their global efficiency or competitiveness when reaching their markets.

2 Business-to-business trade

The traditional view of the firm with clear boundaries, limited relations with partners and stable markets is evolving. Today, information and communication technologies can leverage a redesign of the interorganizational relations allowing the companies to (a) get better at gathering information about their out-of-boundary environment, (b) establish EDI-based partnerships with their clients and suppliers,

and (c) share electronic platforms and markets with their competitors.



2.1 Business information at boundaries

Boundaries of firms are transformed by the various forms of information and communication technologies (ICT).

> *Hypothesis 1 - The new information and communication technologies (ICT), like the Internet and on-line services, allow companies to know better their commercial and technological environment. They can discover business opportunities at a very fast pace. These firms can also build a marketing "presence" on these networks, thereby being more accessible to the general public, their customers, suppliers and various partners.*

Business information (trade contacts and opportunities, market intelligence, statistics) plays a key role in marketing and staying competitive. Not having access to the relevant information at the right time can be a serious obstacle to do business.

Here is, for illustrative purposes, a taxonomy of business information proposed by a recent United Nations report [UNCTAD, 1994] which gives a comprehensive overview of the role of business information for increasing international trade efficiency:

- general economy and business information: the eye opener
- product and market studies: the overall picture
- statistical data: getting the hard facts
- price information: the bottom line
- trade regulations and standards: looking over the hurdles
- business contact: knowing your partners
- business opportunities: the chance is now

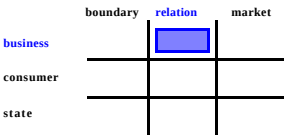
Information and communication technologies increasingly enable companies to scan, monitor and pay attention to information (events, trends, and patterns) that take place in their environment. They also allow a better diffusion of (marketing) information from the firm to its external environment.

Environmental scanning is the activity of perceiving and interpreting the environment for the purpose of taking the appropriate decisions. Recently, environmental scanning has become a more systematic activity in companies and its appeal has grown with the increasing amount of electronically and often publicly available information about the competitive environment. From the on-line databases and networks such as the Internet, managers can scan, analyse and interpret information that may signal threats and opportunities.

The sources of business information are numerous and varied: commercial suppliers, the business press, banks, trade fairs, trading companies, trade and industry associations, national public sector institutions and intergovernmental organizations provide business information and most of them do so through networks or on-

line databases.

In the United States, electronic networks and on-line databases are now the first media for supporting this environmental scanning, far ahead of the more traditional sources of information such as printed material, personal contacts or professional fairs. It also means that more and more information only exists or at least appears first on electronic networks. Therefore enterprises without a good practice of accessing such electronic business information will be disadvantaged.



2.2 Business partnerships and relations

Relations with partners outside the enterprise (suppliers, customers and even competitors) that are facilitated by information and communication technologies (ICT) are of major concern to the enterprises and their managers.

Hypothesis 2 - Some ICTs, typically known as electronic data interchange (EDI), allow enterprises to perform transactions with their partners more effectively, notably by reducing the amount of paperwork needed at each step of transactions (orders, invoices and payments). These ICTs can also be used as levers for stronger partnerships, alliances or inter-organizational systems (IOS).

There is an accelerating trend towards computer-supported links between independent firms to achieve and sustain efficiencies in their interactions. ICTs leverage new partnerships, associations, and bilateral business processes that reshape organizations and industries. More recently, standardization to support such information-based linkages is emerging.

EDI helps Sears Canada reduce costs and streamline processes

In one year, Sears, Canada's largest retailer with C$4 billion in sales each year, increased its number of EDI-enabled suppliers to 600 from 11; Sears will soon succeed in reaching 100 percent of its domestic and international purchases using EDI.

In the same period, Sears has seen a 50 percent reduction in out-of-stock and late deliveries, and has reduced the cost of inventory by C$150 million. The supply chain reorganization has eliminated 40 jobs from the 38,000-person company. To make the change to EDI, Sears narrowed its 37 product procurement processes and 31 payment methods to 4 operational modes and 1 standard payment term.

Scaling down its procurement system means Sears had to enforce strong guidelines in regard to its suppliers, with eventual penalties, to become fully EDI-compliant and 100 percent accurate. Some small suppliers initially complained but most of them complied with the EDI-program in order to remain Sears' suppliers, despite the cost to upgrade their supply systems.

(Phillips Publ, 1995)

Benefits of IOS and EDI [Howard, 1995] include cost savings and service-level improvements. Direct cost savings are due to a decrease in data entry effort, a reduced error rate, and speedier information flows, especially if the EDI system is directly interfaced with the data processing systems of the partners. Indirect cost

savings like reduced inventory levels occur when IOSs are used as levers for a closer relationship between the trading partners. Service-level improvements have also been observed when using IOSs, for instance faster response times, just-in-time production, more responsive service to customers, easier tracking and better control of goods during shipping, and faster reconciliation of shipping notices and invoices.

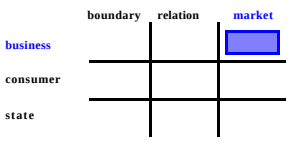
In some cases, IOSs and EDI were used by companies to get a competitive advantage on their competitors or suppliers, as *Wal-Mart* and *Sears* demonstrated in the retail sector, *Baxter* in healthcare-procurement, or *Brun-Passot* in office supply procurement. In other cases, IOS and EDI were adopted by an entire sector as a competitive necessity and a stimulant for the industry, such as the *Quick-Response* in the apparel sector.

Another effect of such electronic integration, interesting for the SME-based context, is that small companies can look, feel and act as larger companies since the rules of time, distance and complexity are changed. For example, a small company could get a global worldwide presence if it chooses to distribute its products over largely used electronic networks. As such, it competes with larger companies with subsidiaries in many countries.

Table 1 : Users of EDI standards in Europe (Howard, 1995)

	1994
Austria	1’270
Belgium & Luxembourg	350
Denmark	400
Finland	500
France	2’300
Germany	990
Netherlands	1’225
Norway	2’350
Spain	504
Sweden	500
Switzerland	150
United Kingdom	13’200

Finally, many observers think that a network like Internet will be used more intensively for computer-supported partnerships and electronic data interchange (EDI on Internet) as soon as some issues like security, reliability and electronic money are improved. The first experiences in this matter are very positive.



2.3 Business platforms and markets

Market transformations are profound as market search and coordination mechanisms are transformed by information and communication technologies.

Hypothesis 3 - Enterprises are collaborating with competitors in their efforts to build electronic platforms. These larger projects, sometimes coordinated

by an industry association or embedded in a consortium structure, function with communal principles where ideas, technologies and sometimes advantages are openly shared between the members.

ICT can play a major role in the rationalization of many fragmented markets involving many buyers and sellers, by reducing the transaction costs due to the identification of trading partners and the coordination of transaction execution and settlement. We adopt a three-class typology for classifying inter-organization systems, as suggested by [Konsynski, 1993] who distinguishes (a) virtual systems, (b) industrial platforms, and (c) electronic market access forum:

Virtual systems arise when international or sectorial standards are selected by a community of market participants, such as the *Quick Response* initiative in the textile sector. The intention is often to prevent the dominance of proprietary standards. Once the standards are selected, each participant agrees to implement these standards in its own systems.

Industry platforms represent the initiative of one or more players (trade participants, professional organizations, or industry associations) in a market to provide a common electronic platform for the industry. The intention is to offer transaction savings, bring economies of scale, and improve the efficiency of trade for the entire participating community. Such platforms are popular in transport (*SABRE*-like airlines reservation systems and *Cargo Community Systems*), insurance (*RINET* and *IVANS*) and healthcare industries. One of the well-advertised national platforms is Singapore's *TradeNet* connecting all the partners of the nation's seaport and airport. Another initiative in Finland, *(FinnPap/Finnboard)* was no less significant:

A trading environment for Finland in international paper and wood products

Most of the paper companies in Finland, whose sales amount to $4 billion annually, jointly developed an EDI-based industrial platform to link themselves with their key customers and international sales offices. These companies decided that to compete effectively they had to provide an on-line data interchange with their customers and they provided them with a virtual and instantaneous means of placing status inquiries and new orders, in contrast with the 12-day norm of this industry. Moreover, considering their individual small sizes, they were unable to join one of the proprietary information networks of their big competitors.

The system cost $50 million to develop. The speed and quality of response provided by this common platform would have been technically and financially unattainable by any of the individual participants. Therefore, many SMEs acting together and leveraging technology were able to appear to the outside world as a big competitor, creating a so-called virtual or networked company.

(Konsynski, 1993)

Electronic market access forums (EMAFs) refer to computer-supported environments or places where an intermediary or facilitator performs many essential market functions like seller and buyer identification, matching, negotiation, settlement, insurance and trust brokering, product and service valuation. The intent is often the promotion of fair and competitive markets. Such EMAFs exist in many industrial sectors: finance (*Reuter's Instinet*), textiles (*Telcot*), gemstones (*GEM*), spare parts (*ILS*), used cars (*Aucnet* & *AutoInfo*), etc.

The United States especially but also the European Union and other countries like Singapore have launched many initiatives in virtual systems, industrial platforms and electronic market access forums. There are some big - mainly US - companies which are highly interested in providing infrastructure, services and applications for supporting these electronic commerce activities. Some other companies operating networks (e.g. *Compuserve* or *Microsoft*) originally dedicated to the consumer market are going to host some business-to-business applications and intend to be more active in this segment.

Another phenomenon has to be mentioned: the Internet, in which many business-to-business experiments are emerging to implement virtual systems (EDI on Internet), industrial platforms and electronic market access forums. New improved security, encryption and electronic money systems are a high priority and improvements are quickly coming to the market. Many observers think that the Internet will host many inter-organizational systems while allowing great cost savings over some existing platforms or EMAFs, thereby increasing the number of new projects in electronic markets.

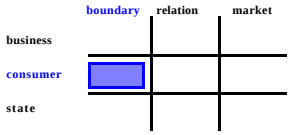
Meanwhile, another globally promising experience is emerging. After having set the EDIFACT standard, the United Nations [UNCTAD, 1995] is launching its Global Trade Point Network (GTPN) to stimulate the trade competitiveness and trade efficiency of national economies. This network is going to connect electronically all the Trade Points at which public and private sectors cooperate to improve trade efficiency in six areas: customs, banking and insurance, transport, business information, business practices, and telecommunications. The central on-line document of each trade point is the Electronic Trade Opportunities (ETO) and many applications are designed to allow firms to manage, maintain, and query these documents on a worldwide basis. Until now the main focus was on improving the availability of business information but the next step (1995-98) will deal with the execution of transactions over the network. This infrastructure is being developed using international standards (EDIFact, Internet, X.400) and will be one of the largest trade platforms in the world; the United Nations expects to save a portion of the transaction costs (10%) out of the yearly 4,000 billion dollars of global trade.

The World Trade Centers and Chambers of Commerce have the same kind of projects to allow their members to engage in international trade. Some big players (*AT&T, Dun & Bradstreet, Chase Manhattan, Microsoft, ...*) recently unveiled an on-line service “to let business use on-line traffic to line up suppliers, negotiate contracts, make and receive bids, and arrange the delivery of goods and services around the world”.

3 Reaching the consumers

Firms communicate with their customers through various media. For several years, the ICTs have been deeply altering the traditional view of marketing, shopping and retailing media. The computer-mediated environments such as the Minitel, Compuserve, and the Internet allow another way to reach consumers and online marketers plan to increase their online spending in order to be (a) better at commu-

nicating with their customers, (b) more efficient in their selling relations with their customers, and (c) more attractive on their consumer markets.



3.1 Communicating with consumers

Whoever controls information in many cases controls the business. Today, information is more valuable than ever in the relation with the customers and sentences like "the customer is king" are suddenly all the rage.

Pharmaceutical distribution, information and margins

Not long ago the most valuable information in the pharmaceutical industry was the drugs preparation know-how that was accumulated in the companies' labs. Then pharmaceutical distributors began collecting information about what drugs individual patients were using. Armed with this information and under governmental pressure, distributors pressed the doctors to prescribe cheaper drugs. As distributors got better at gathering information about their customers, they won a bigger share of the consumer's dollar (33% in 1972 and 40% in 1992); manufacturers a smaller one.

Moreover, pharmaceutical distributors that are part of managed-care networks, like MedCo Containment Services in the United States, exploited customer data better than their traditional counterparts did. As a result, they got bigger supplier discounts (11% in 1987 and 27% in 1992) and gained market share (25% in 1987 and 55% in 1992).

When Merck & Co, a drugmaker, bought MedCo in 1993, it wasn't vertically integrating but it was actually buying its database, an intangible asset that now allows it to recoup the margin it was losing in manufacturing. At the same time, it is signalled to the industry that the availability of digital detailed information would become key in competing.
(Stewart, 1995)

Therefore, every interaction with customers and consumers is considered as an opportunity to learn and be more effective in marketing. ICTs can help companies to gather more and better data about their customers and provide them with improved information.

Hypothesis 4 - Realizing the growing importance for consumers of offering services in addition to the products they market, companies are actively using ICTs to get information about their customers, customize their products and provide customers with up-to-date accurate information about their products and services.

More and more companies consider that each interaction with a customer is a chance to learn how they view their products or services. Some of them invest a lot in computerized systems that capture data about customers' ongoing interactions with them. Today, gathering and storing data from customers is getting easier, not only since the ICTs prices are decreasing but also since many customers interact with companies via fax, smart cards, Internet or Minitel access, and other digital means. Moreover, these new ICT-enabled media have entailed a redesign of marketing strategies of the companies.

Among the media used by firms to gather or distribute electronic information,

two are especially remarkable: the French Minitel and the international Internet with its World Wide Web extension. Among the others are Compuserve, America Online, Prodigy, and, more recently, the Microsoft Network.

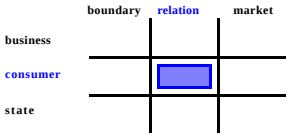
The French *Minitel* [Théry, 1994] was the first interactive service ever available to an entire country. The experiment was initiated in 1983 with 120,000 terminals and reached 6,272,000 terminals for 20'112 services in 1992. The terminals were first distributed free of charge to the users, but as the product evolved they finally got charged on a monthly basis. The demand was boosted by the free on-line telephone directory and the yellow pages that still represented 43% of the calls in 1992. The business applications rank second with 19% of the calls but are first for their share in the connection time with 23% against 21% for the electronic telephone directory. Ranking third in the time connection % are the chat services with 15%. Minitel is still very active in France and gateways with the Internet have recently been developed allowing the entire world to use the Minitel services. But as the Minitel is using slow transmission rates and does not integrate multimedia, it is facing the competition of the Internet.

The *Internet* [Enslow, 1995] emerged from the connection of numerous private networks that have finally created a web of networks all over the world. First used by the military and universities, it now includes millions of users, commercial firms, non-profit organizations, discussion groups and other activities. It is currently facing the fastest growth of its history with a more than 50% increase per month in some countries. Parallel to this boom of users, firms are more and more developing servers to get and provide services and information about their products.

The World Wide Web, sometimes referred to as WWW or the "Web", is an Internet-based hypermedia environment. It includes a standard set of software, protocols and conventions that make it possible for people to search, retrieve, browse, and add information to the environment at will. It is the add-on which allowed and facilitated the growing commercial use of the Internet one year ago.

These ICT-enabled environments modify the nature of consumer interaction. They can be used not only to gather information about consumers but also to adopt new communication strategies with consumers for presenting products and services. But these environments will require new and yet unknown approaches for marketing activities compared to traditional media and other interactive multimedia (pay-per-view, video-on-demand and interactive TV). Most online marketers are adopting a trial-and-error method to find the best approach to integrate these new media in their marketing strategy in order to [Bloch, 1996]:

- adopt new sales channels and make additional sales
- make product promotion and increase the number of different visits
- build a brand or corporate image
- improve customer service and increase the number of queries answered
- learn about customers and get their feedback
- save money and reduce distribution costs
- minimize strategic disadvantages and decrease competitive pressure
- create an organizational laboratory and improve process innovation
- learn technology



3.2 Interacting with consumers

It is not enough to get better in gathering information about consumers and in communicating with them, companies also have to sell their products or services and make transactions with their customers. For this also, ICTs can change the rules of the game.

Hypothesis 5 - New distribution channels have been created in order to satisfy the needs of a growing, wealthy- and technically-skilled population. These channels are based on technologies such as on-line services, but also CD-ROMs and interactive TV. More than other technologies, these channels require a critical mass of customers and sellers to become effective.

In order to decide to sell through a computer-mediated environment, a critical mass of customers is necessary. This critical mass existed in the French Minitel network and it is emerging in the Internet.

A recent study [ActivMedia, 1995] mentions that purchases of goods and services on the Internet amounted to $118 million for the year ending in August 1995. This amount is low in the retail industry but it is growing very fast ($1 million in September 1994 and $23m. in August 1995). The study also shows that several Web businesses are already profitable now (22% now and 40% more in 12-24 months) even if they have been active on the Web for less than seven months. This study reveals that the leading online marketers sold books, music, software, hardware, financial services, and travel services online. It also appears that, unlike the mass-market world of retail distribution, company size has little or no bearing on success on the Internet.

Virtual Vineyards

How many new shops pull in $1 million in sale during their first year in existence? Very few, no matter if you're online or not, but the online enterprise Virtual Vineyards did it.

Starting from scratch six months ago, Virtual Vineyards is a successful shop which sells California wines only through the Internet, at retail prices between $6 and $100. Its marketing and sales strengths relie on the reputation of California wineries and an exclusive offering of products.

The company did have a reasonable amount of investment capital ($600'000) to start with, to buy equipment and to build its online marketing, distribution, and customer service structures. Moreover, Robert Olson, its president, understood not only the attractive value of the new ICTs but also the special needs of an online marketing strategy building an interesting and ever-changing Web site, containing a lot of information and user interaction.

Virtual Vineyards is just one of the many companies that defy the common wisdom, "No one is making money online, except the greedy purveyors of the medium."

A computer-mediated environment such as the Internet will eventually become

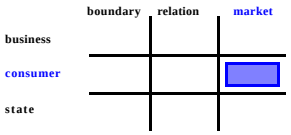
a major place to reach customers for more companies. But several problems must be overcome first:

- too much browsing and not enough buying
- not enough value added compared to traditional shopping
- the impersonal nature of online shopping
- the need to educate customers.

These problems explain why retailers worldwide are hesitating and still learning how to integrate online shopping in their marketing strategy; it is also a reason why some report that online or virtual shopping is still a non-event in the retail industry.

Another important issue which has slowed acceptance of online shopping is the fear of security risks in online financial transactions. Many solutions are emerging but accepted standards are not yet commonplace. However big actors such as Visa, Mastercard, Bank of America and Microsoft are already exploring innovative solutions for electronic payment on the networks. Some other smaller companies such as DigiCash, First Virtual and CyberCash are proposing more unusual solutions for digital or electronic money. When the latter encryption-based technologies are mature and largely adopted, they could revolutionize the business processes and even the economy mechanisms (introducing an unsuspected complexity to manage and regulate these unofficial moneys).

The situation is completely different in the current banking and credit card businesses where automatic teller machines (called ATM in the banking sector), electronic fund transfer at point-of-sale terminals (EFT-POS), and home banking (video- and audio-) are already accepted worldwide and continually increasing.



3.3 Information malls

A long time ago, people realized that creating a centrally-located “hub” for exchanging goods and services was the most efficient way to organize commerce. After the bazaar (near water-based transportation) and the shopping malls (related to road transportation), the information malls (linked to information transportation) is the last step of this evolution [Sheth, 1993].

Hypothesis 6 - Electronic markets or information malls, open to the public at large, federate individual businesses and allow consumers to cost-effectively access, compare and discuss more data about the products they are willing to buy. These new institutions are strongly changing the consuming habits.

An **information mall** could be considered as a place or a “hub” where a large number of online buyers and sellers can easily congregate and where commerce can be centered. The key activities in an information mall include information (yellow pages), transactions (shopping and making transactions), entertainment (games), education (distance learning, museums, encyclopedias) and social interaction (and communication). Such an exchange hub has five aspects:

- physical: look-and-feel, security and privacy
- economic: capability to do transactions such as matching buyers and sellers, negotiation, billing, payment, electronic fund transfers
- technical: modes of navigating and browsing, interoperability, multimode access (via phone, interactive TV and computer networks such as the Internet, the Minitel or Compuserve)
- social: human dimension with chat lines, common interest groups, games
- support: shared facilities and conveniences such as training for new users, dispute resolution, common advertising and housekeeping services.

Many experiences are in progress; most of them on the Internet (Home Shopping Network and Barclays Square, for example). Innovative solutions are tested in order to support some of the shopping activities (localizing buyers or sellers, finding products, and bargaining). New intermediaries are appearing in order to help customers to shop.

How Peapod is customizing the virtual supermarket

Peapod, a grocery-shopping and delivery service based in Chicago and San Francisco, is a company that is exploiting an electronic mall in retailing services. It allows its customers to use an online system for accessing the databases of the supermarkets at which Peapod shops for its customers.

Moreover Peapod lets each customer create his or her own virtual supermarket. Using a personal computer, customers can shop in the way they prefer (list of items by category, by brand, by package size, by unit price, by nutritional value, by special shopping lists).

Despite the company's rate ($5 per month and a per-order charge of 5% of order amount), the customers save money because they do better comparison shopping, buy fewer impulse items, use more discount actions. In addition, they save time because they can shop at anytime and from anywhere.

After four years, this online service has 7,500 customers, revenues of about $15 million, and a customer-retention rate of more than 80%. Peapod accounts for 15% of the sales volumes of the 12 stores where it shops for its customers.

(SR, 1995)

The negative social consequences of the bazaars were significant: they usually destroyed the local native culture surrounding them in the countries. The shopping malls had the same kind of side effects; they destroyed smaller businesses and caused significant economic and social displacement downtown. Because an information mall is far more versatile (neither time nor space constrained) than any previous exchange hubs, its side effects could be even more damaging.

4 The public sector

In most countries, governments clearly play a significant role in electronic commerce and electronic markets as they did for previous infrastructure developments (such as railroads, aviation and highways).

In its various roles as regulator, educator and promoter, government and public administrations can use ICTs to establish the rules and the incentive structure that will help determine private sector choices.

The United States, the European Union, Singapore, Denmark and many other countries took many initiatives to support their national companies in the field of electronic commerce.

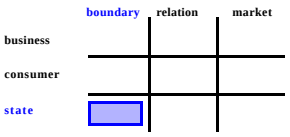
From vision to action in Denmark

Keypoints from the *"Information Society 2000"* strategy report of Denmark are:

- A number of laws must be rewritten, such as those regulating legal aspects of handling and storage of electronic documents, and public access to official documents
- The public sector will be in the front line of introducing electronic commerce, starting with the healthcare sector
- Public administrations will be interconnected through a network and obliged to be able to communicate electronically with any citizen and company that wishes to do so
- All public institutions must have an e-mail address
- The public sector will move to the electronic storage of documents
- All Danish companies should get a unique registration number to be used in electronic communication with the public sector
- A network should be created for the exchange of electronic documents in business, open to all Danish companies

(Electronic Trader, 1995)

The public sector has many incentives to promote and sustain electronic market solutions for its own rationalization but also to help the SMEs leverage the best of these new technologies in the global information-based society.



4.1 State and public information

To assist SMEs in the global information-based economy, the public administration within central and local government might also promote the electronic dissemination of business-related information.

Hypothesis 7 - Many public administrations, at the country, state or city level, use ICTs to widely dispatch census information collected and structured to help their local businesses reach foreign markets.

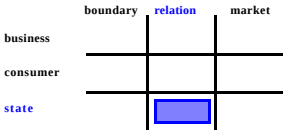
Because of the critical role that information plays in trade and commerce, the public sector in many countries tries to take advantage of the ICTs to ensure the widespread and equitable distribution of business information. These ICTs enable the public administration to provide more and better packaged information to meet SMEs' needs. Delivering this information electronically can promote electronic commerce to SMEs but also result in rationalization gains and more efficient service for the public administration.

Many US federal agencies and departments provide online information to American companies: economic and business indicators, foreign trade data, statistics (business, employment, energy, monetary, price and productivity, regional economy) and summaries of current economy conditions. In addition, many trade opportunities files are made available on a periodic basis. The same is becoming

true for the European Union.

The Internet is becoming one of the most systematic sources of this government-provided business information.

In most cases, this information is free or very low-cost but issues of financing and pricing are actively debated. Another debate raises equity concerns: if the on-line information gives distinct advantages (timeliness and searchability), those without electronic access will be disadvantaged. Nevertheless, facilitating cheap and ubiquitous access (through public access terminals for instance) could leverage the field.



4.2 Links with the public sector

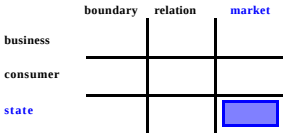
In many countries, government procurement is used as a leverage to deploy ICTs and support electronic commerce.

Hypothesis 8 - Public administrations are large transaction processors which can achieve very significant productivity gains when using the EDI type of ICTs. These administrations reduce their own operating costs and, more importantly, act as leaders or promoters towards their private partners (customers or suppliers).

Some governments stimulate the market by leveraging the government procurement power. In the United States, the impact of government procurement on the development of ICTs has been and remains tremendously important. One such initiative is the *Continuous Acquisition and Life-Cycle Support (CALS)* for linking governmental agencies and their suppliers. The Singapore EDI-based initiatives, such as *TradeNet*, demonstrate the role that government sponsorship of ICTs can play in the competitive position of a nation. The European Union and most of its members have launched many initiatives to deal with similar concerns.

Recently Denmark adopted its *IT Political Action Plan* where the development of electronic communication, such as EDI-based systems, between public administrations and private companies is one of the major options. In this idea, the second biggest city (Arrhus) already exchanges more than 50,000 EDIFACT messages a month with its partners, much more than the biggest food supplier in Switzerland. In this plan towards a paper-less administration, citizens and companies wishing to communicate electronically with public authorities will have this possibility. Another important part of this Danish report is on the healthcare program (*MedCom'95*) aiming to handle the 32 million prescriptions, 23 million laboratory reports and 6 million medical reports on patients leaving hospitals by EDI within five years. During the pilot phase the EDI software is free of charge.

Such a trend towards the use of electronic communication between public administrations and private companies aims at achieving rationalization for the public sector but also at stimulating private sector activity.



4.3 Public platforms and markets

The public sector can take the lead in order to advance the development of electronic platforms and markets in a timely manner for rationalization or demonstrative purposes.

Hypothesis 9 - Governments and public administrations use ICTs in order to create and sustain electronic platforms and markets for public needs (national infrastructure, procurement, public calls for bid, public regulated markets).

It is observed that worldwide, governments sometimes take an active and leading role in the creation of trade-related EDI networks, platforms and markets. The involvement of public administrations such as customs authorities makes this a certainty. Another major reason is the importance of government procurement business which justifies the use of ICTs for improving public rationalization in the interplay with private suppliers.

The public sector takes the initiative when the competitive posture of the nation or a region is threatened, when key elements of an electronic platform require the major actions of a government administration or one of its associated service agencies (such as the PTT), and when standardization has to be enforced.

For these reasons, an inter-industry partnership may be actively led by the government, such as the TradeNet in Singapore.

TradeNet in Singapore

The TradeNet electronic platform is one of the most comprehensive trade-related EDI systems in the world. This system demonstrates the role that government sponsorship of ICT can play in improving the competitive position of the nation. The Singapore government has spent a significant effort to facilitate trade documentation processing and link all the trade partners (port authorities, customs, freight forwarders, shipping companies, banks and insurance companies) of one of the world's largest ports.

This effort was successful for the competitive posture of the Singapore transportation and trade industries: approval for declarations, which used to take a couple of days involving much paperwork, now may take as little as ten minutes using a unique EDI document. Therefore, the Singapore port is much more attractive (than other south-east Asia ports) to shippers sending freight to Asia, by allowing them to save time, and therefore money.

Moreover, this effort served to develop growing computerization skills that Singapore wanted to leverage in many other areas. The role of government was essential because it provided the means to create and sustain this electronic platform, to obtain the partners agreement on the new organization, and to improve the nation's technological skills.
(Konsynski, 1993)

In the United States, the *CALS* initiative, originally fashioned to provide the Department of Defence with computer-aided logistical support, linking governmen-

tal agencies and their suppliers, has recently been redesigned as a technical, standards-based platform to support company integration and electronic commerce.

The Danish MedCom initiative aims at developing a national electronic platform for healthcare.

Many examples could be cited to illustrate government initiatives launched to rationalize their internal processes and promote technologies for the private sector by adopting electronic platforms for its own needs. It is also interesting to mention the large number of public-sponsored initiatives (Blacksburg and Urbana-Champain in the United States, Namur in Belgium, for example) recently launched to propel their city or their region into the global information society. Most of them sustain a large number of partnerships with private companies in order to achieve their modernization goals; most adopt the Internet as the main medium to build their infrastructure but some of them adopt more sophisticated and futuristic ICTs.

5 Conclusion

The advent of a more and more global information-oriented society and its electronic commerce practices requires an appropriate reaction from companies and public authorities.

The opportunities and critical success factors exist but need to be actively sustained, quickly improved and permanently developed. Obstacles, threats and side effects also exist and must be detected and circumscribed.

The role of government, at all levels, is crucial: it has to define a voluntaristic approach in order to promote, regulate and educate in matters of electronic commerce.

This 3-by-3 pre-study has given a first insight of the current situation focusing on the competitive posture of companies but it needs to be refined by a set of more detailed studies.

5.1 Opportunities are multiple but threats exist

The appropriate use of the information and communication technologies may be a source of more efficient competitiveness for companies in their trade, retail and procurement activities.

Nevertheless, there are some potential risks:

- Companies could be unable to reengineer their business processes at the right time and integrate ICTs in their commercial strategies in order to maintain their competitiveness
- The ICTs could generate ICT winners and losers: highly educated individuals able to learn and master the ICTs versus unskilled or old-generation persons without any effective access to these ICTs
- The public sector could have some difficulties to act as a driver, an educator and a regulator in this modernization process.

If companies, consumers and public authorities realize the change in the trade

and commerce practices, perceive the potential of the ICTs and master the risks inherent in these ICTs, a voluntaristic and proactive approach has to be adopted to face the challenge of the global, information-based and highly competitive society briefly sketched in the introduction.

5.2 Government has to play an active role

Electronic commerce is too crucial an issue to be left purely to market forces. Government has a key role to play in setting priorities, providing incentives, regulating and educating in order to ensure that development proceeds in the right direction.

Final proposition - It is time to act. Authorities need to define a voluntaristic and proactive policy in order to better compete in the global information-based society.

First of all, the government should be a **promoter**. It must play a visionary role through the catalytic effects of public policy for determining the national interest and facilitating a coordinated movement in that direction. In this case, as we tried to show in this text, electronic commerce is a competitive necessity for most industry activities in the current global information-based society. The private sector needs a clear signal and support from the public authorities.

Secondly, the government should be a **regulator**. It has to remove the regulatory hurdles to electronic commerce, adjust its regulation to worldwide practices, and improve the regulatory conditions for its companies playing in the global competitive world. Moreover, it clearly has a role to play in safeguarding individual rights and mitigating the potential negative impacts on society. Every new technology, economic activity and unfettered market has some side effects which are not always desirable. The government must address the key issues of individual privacy and information security; it also has to control the intrusiveness of ICTs and assure universal access to ICTs for preventing the emergence of “haves” and “have-nots”. This regulatory role is complex because the social and cultural impacts of electronic commerce are not clearly apparent due to the youth of these new business practices.

Another issue which has to be addressed by the regulatory authorities is the high cost of infrastructures (telecom, salary, education, etc); this could give a major disadvantage when competing in traditional ways with conventional organizations.

Thirdly, the government should be an **educator**. It can play a role in public education, of both individuals as well as companies, especially SMEs.

As many actors are involved in this process towards a better competitiveness of companies, a key role of the government is to insure the convergence between ICTs, companies, consumers and public administrations onto a common vision in order to speed up the transition.

5.3 A framework to validate

In this paper, we suggested a 3-by-3 matrix framework and 9 hypotheses to describe the state-of-the-art in the field of electronic trade, retailing and procurement and analyze the use of ICTs by the so-called extended enterprises.

References

M. Bangemann & al.; *Europe and the Global Information Society*; Brussels, May 1994

R. de la Beaume & J-J. Bertolus; *Les nouveaux maîtres du monde*; Belfond, 1995

M. Bloch & Y. Pigneur; *On the Road of Electronic Commerce: a Business Value Framework, Gaining Competitive Advantage and Some Research Issue*; tronic Commerce for Trade Efficiency and Effectiveness, Bled, June 1996, pp. 91-112

S. Bobin; *European CEOs Should Prepare Now for the Information Superhighway*; Gartner Group, vol. XI, no. 6, February 1995, 5 p.

A. Bressand & C. Distler; *La planète relationnelle* ; Flammarion, 1995

T. Breton; *Les téléservices en France*; La documentation française, 1994

I. Cathomen & H. Williams; *The Adoption of Financial-Edifact in the United Kingdom & Switzerland*; Hochschule St. Gallen, IWI, WWW document, 1995

B. Enslow; *Seeing Past the Internet Hype: part 2*; Gartner Group, vol. XI, no. 6, February 1995, 5p.

R. Goldsborough; *Straight Talk about the Information Superhighway*; Alpha Book, 1995

B. Gotteiner; *The Possible Futures of Multimedia*; Andersen Consulting, 1994

D. Hoffman & T. Novak; *Marketing in Hypermedia Computer-Mediated Environments: Conceptual Foundations*; Working Paper 1, Vanderbilt College, July 1995

P. Howard; *Electronic Trading - Building a Business Community*; Financial Times, 1995

P. Kalakota, A. Whinston; *The Frontier of Electronic Commerce;* Addison-Wesley, 1996

R. Kanter; *World Class - Thriving Locally in the Global Economy*; Simon & Schuster, 1995

S. Klein & H. Williams; *Emerging Electronic Markets: Economic, Social, Technical, Policy and Management Issues*; Hochschule St. Gallen, IWI, IM HSG/CCEM/23, September 1995

B. Konsynski; Strategic *Control in the Extended Enterprise*; IBM Systems Journal, vol. 32, no. 1, 1993, p. 111-142

N. Negroponte; *L'homme numérique*; Laffont, 1995

D. Nora; *Les conquérants du Cybermonde*; Calmann-Levy, 1995

OTA; *Electronic Enterprises: Looking to the Future*; August 1994

Y. Pigneur & M. Schenk; *Vers des activités commerciales dans Internet*; Bulletin HEC 47, février 1995, p. 25-31

J. de Rosnay; *L'homme symbiotique*; Seuil, 1995

L. Scheer; *La démocratie virtuelle*; Flammarion, 1994, 155 p.

J. N. Sheth & R. S. Sisodia; *The Information Mall*; Telecommunication Policy, June 1993, 23 p.

G. Sundt; *The Information Super Highway of Tomorrow* ; Gartner Group Annual Symposium on the Future of Information Technology, november 1994, 26 p.

S. Talbot; *The Future Does Not Compute* ; O'Reilly & Associates, 1995

D. Taylor; *Electronic Commerce Strategy (ECS)*; Gartner Group Annual Symposium on the Future of Information Technology, november 1994, 23 p.

G. Théry; *Les autoroutes de l'information*; La documentation française, 1994, 120 p.

UNCTAD; *Draft Guidelines on Key Sectors for Trade Efficiency*; The United Nations, TD/B/WG.2/ 11; February 1994