Internet-Based Business-to-Business Electronic Commerce

By

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ABSTRACT

Business around the world has been rushing to the Internet at an incredible pace by marketing and selling goods and services over the Internet The Internet provides opportunities for an organization to enhance its business in a cost-effective and practical manner. The Internet is also a useful tool for gathering intelligence on customers, competitors, and potential markets, as well as communicating information about companies and/or products. Companies that do not learn how to use the Internet effectively will be at a major competitive disadvantage in the near future.

The objective of this thesis is to gain an in-depth understanding about Internet application in business and to examine what companies can do with Internet to create competitive advantage in the global market place.

This dissertation is split into four chapters. The first chapter introduces the background and purpose of the research. Next, the history of the Internet & e-business is explained, and the main technologies used today are analyzed. In chapter 3, four successful b-to-b e-commerce cases are examined. These companies took full advantage of e-commerce in the global market. Finally, the report concludes with firm conviction of the continuous e-commerce development and proposes further study on specific e-commerce applications.

Chapter 1

Introduction

1.1 Background and Importance of the Study

One of the hottest topics in business today is electronic commerce, including such technologies as EDI(electronic data interchange), electronic classified advertisement, and on-line services such as CompuServe and America On-line The Internet and its graphical interface, the World Wide Web(WWW), are the key components of an electronic commerce initiative that is playing an ever increasing role in the future of the global marketplace (Edward Arnold and Matthew Adlai-Gail, 1996) Incorporating the WWW into a firm's strategy eliminates a number of national and global market entry barriers, such as marketing costs, distribution, and shelf-space acquisition. Additionally, international communications generated by the Internet are likely to result in greater levels of satisfaction between companies and customers (A. Coskun Samli, James R Wills, Jr., and Paul Herbig, 1997).

The Internet's quick transformation to a business tool is reminiscent of the fax machine's leap to prominence in the office in the mid-1980s. Two Internet services, e-mail and WWW, are already near necessities for effective business operations Few large companies operate without internal e-mail, and most find it necessary to be connected to the Internet for global e-mail. Likewise, many large companies have sites or marketing and technical support. Small companies and even individuals are adding e-mail and the WWW to their arsenal of business tools so that they can communicate on an equal footing with larger competitors. Companies that do not learn how to use the

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Internet effectively will be at a major competitive disadvantage in the near future

The Internet provides opportunities for an organization to enhance its business in a cost-effective and practical manner. That is, the Internet can be used to conduct marketing research, reach new markets, serve customers better, distribute products faster, solve customer problems, and communicate more efficiently with business partners. The Internet is also a useful tool for gathering intelligence on customers, competitors, and potential markets, as well as communicating information about companies and/or products (Donath, Bob, 1995).

Figure 1. Growth of Internet Users in Korea
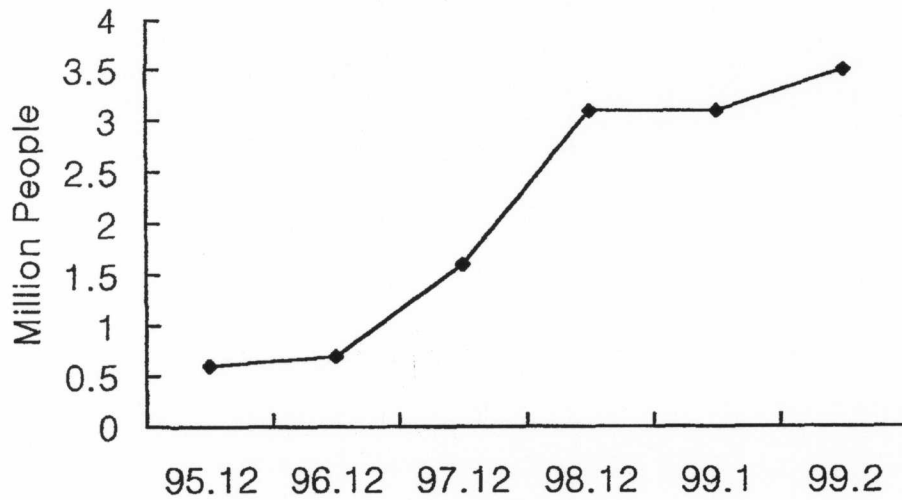
Source : Korea Internet Information Center(1999)

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Much has been written about the overall size of the Internet user-base and its phenomenal growth rate. The number of individuals currently connected to the Internet is estimated at more than 3 million in Korea, and will be more than 10 million by the year 2002. It is projected that Korea's total market for Internet commerce will reach $3 billion by the year 2002, whereas the world Internet business will reach $293.8 billion.

Figure 2. World Internet Business Forecast
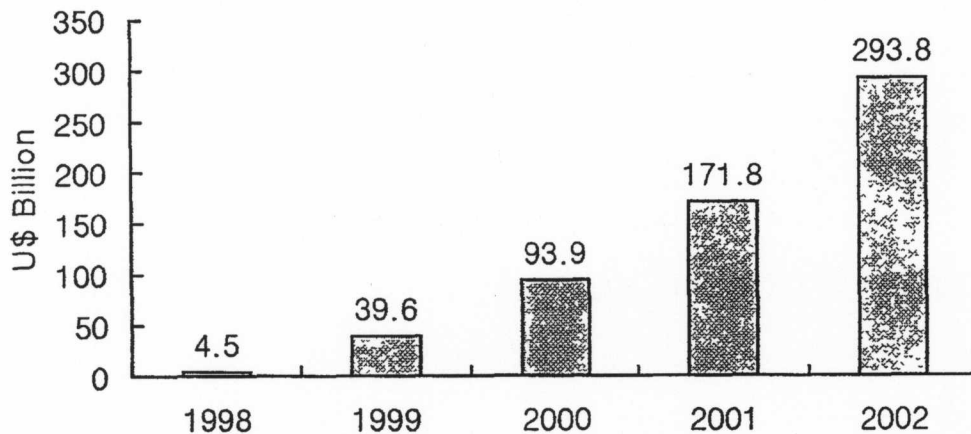
Source: e-Marketer, 1998 e-Commerce Report

Many experts in the field agree that the growth rate of Internet users has doubled every year since the inception of the WWW in 1993. Presently, fifty-one percent of large companies and twenty-five percent of medium-sized companies are known to utilize the Internet in the U.S.

Computers process data faster than ever. They come in smaller and more portable packages, and are less expensive than in previous generations (John A. Courtney and Doris C. Van Doren, 1996). Yet, few companies have employed fully integrated,

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Internet technology-based, business-to-business electronic commerce solutions More than 99% of all business-to-business e-commerce is still carried out in the VAN/private network arena.   Moreover, many companies initially use the Internet as a complementary solution for clearly defined, non-production e-commerce applications (e.g. database sharing), whereas the bulk of mission-critical applications still rests with VANs.   This raises the question whether the hype currently generated for Internet technology-based e-commerce is really worth the attention.   The answer must be an emphatic yes, as this new concept will radically transform the way companies interact on a global scale.

1.2   Purpose and Objectives

The purpose of this thesis is to provide comprehensive information on the business-to-business electronic commerce in the global marketplace.   There are large uncertainties about who the Web users are, how they use the medium, and what are the general strengths and weaknesses of the Internet as a marketing tool.   Thus, the objective of this thesis is to gain an in-depth understanding about Internet as a business tool and to examine what the companies can do with internet to achieve competitive advantage in the global market place by studying successful e-commerce cases.

1.3   Research Methodology and Scope

The methodology used to analyze the Internet as an e-commerce is based on various literature and statistical data, especially the numerous internet websites.   To verify that the Internet creates competitive advantage in the global market, four cases of successful Internet application are examined.

The research focuses on the strategic b-to-b applications of the Internet. Therefore, detailed technological explanation and lengthy theory will not be provided in

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this paper.

Internet-based e-commerce includes trading and subsequently, traceable transactions. Therefore, it includes the corporate buying of goods and services, but excludes stock trading and money transmissions between financial institutions (but not between business and financial institution).

1.4 Organization of the Thesis

The thesis is divided into four parts. First, a brief overview of the nature and uses of the Internet as a marketing tool is provided. In the literature review part, an explanation of using the Internet as a b-to-b e-commerce tool is provided, which can help us understand what the Internet is and how to use it. We then present e-commerce cases of four companies as successful entrants to the Internet-based e-commerce Finally, based on the cases of these companies, we conclude by suggesting recommendations for business managers for electronic commerce development.

Chapter 2

Literature Review

2.1 History of Internet and Electronic Commerce

Internet

What we call the Internet today has its roots in a network set up by the United States Department of Defense in the late 1950s. This network(ARPAnet), established by the Advanced Research Projects Agency(ARPA), connected various military and research sites, and was a research project on how to build reliable networks. In the ARPAnet model, communication always occurs between a source and a destination computer. The network itself is assumed to be unreliable; any portion of the network could disappear at any moment. The methods they developed included a "protocol" allowing dissimilar computer systems to communicate, and a method that routed data through multiple communications paths using groups of data with their own destination addresses built in packets (J. H. Ellsworth and M. V. Ellswoth, 1996). Prior to this technology, even with machines that were compatible, the user had to physically carry magnetic tapes or punched cards and insert them into another machine to transfer data from one computer to another. With the new technology, a computer simply had to put its data in an envelope, called an Internet Protocol(IP) packet, and "address" the packets correctly to send a message on the network.

A half-dozen scientists gathered at UCLA's Boelter Hall, home of the computer science department, and watched as one computer booked up with another hundreds of miles away at Doug Englebart's lab at the Stanford Research Institute. These methods

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were so successful that many other networks adopted these standards, known today as TCP/IP (J. H. Ellsworth and M. V Ellswoth, 1996). Internet developers in the United States, United Kingdom, and Scandinavia, responding to market pressures, began to put IP software on every conceivable type of computer. About the same time as the Internet was coming into being, local area networks(LANs) were developed. LAN technology matured quietly until roughly 1983, when desktop workstations became available and demand for local networking surged. Most of these workstations came with Berkeley UNIX, which included IP networking software. This created a new demand· rather than connecting to a single large timesharing computer per site, organizations wanted to connect their entire local area network to the ARPAnet. This would allow all the computers on the LAN to access ARPAnet facilities. At the same time, many companies and other organizations started building private networks using the same communications protocols as the ARPAnet. namely, IP

Beginning in the late 1980s, the National Science Foundation(NSF), a federal agency, started expanding its own NSFNET in steps, using the technology developed by ARPAnet, a high-speed backbone network.

In the early 1990s, the network was opened up to a few commercial sites, and international Internet access has also started expanding rapidly. All of the activity points towards continued growth, solutions to networking problems, evolving technologies, and job security for networkers. Many people are going further: After getting a connection at work, the next logical step is to get connected in their home.

Figure 3. Number of Years to Reach 25% of U.S Households
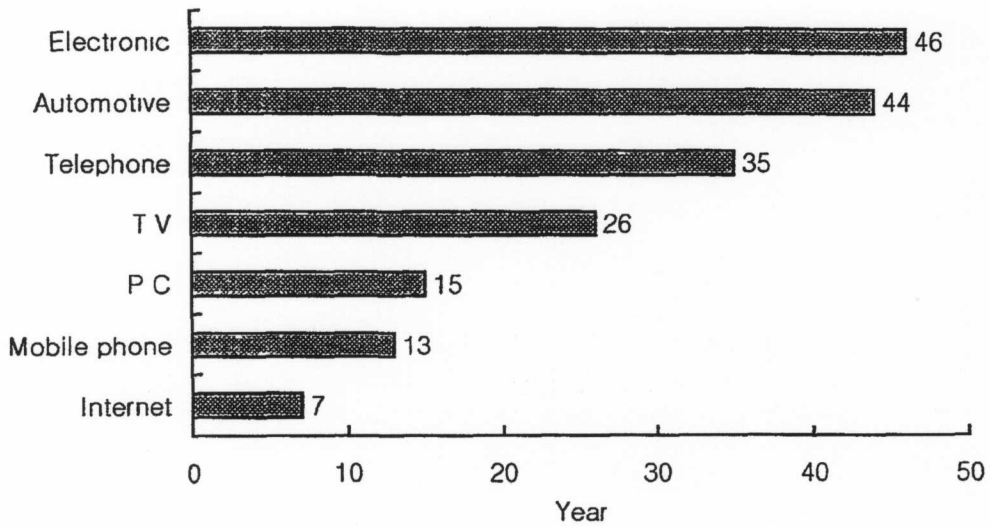
The backbone of the Internet is high-speed links. It is funded by the National Science Foundation(NSF) and is currently managed by advanced Network system(ANS). There are more than 6,000 attached regional, state, federal, campus, and corporate networks (J. H. Ellsworth and M. V. Ellswoth, 1996). And the hosts were increased rapidly around the world.

Table 1. World Host Number by Year

Year	Numbers	Year	Numbers
1981	213	1989	159,000
1982	235	1990	313,000
1983	562	1991	617,000
1984	1,024	1992	1,136,000
1985	1,961	1993	2,056,000
1986	5,089	1994	3,864,000
1987	28,174	1995	6,642,000
1988	56,000	1996	9,472,000

Source: J.S.Yoon (1996)

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Electronic Commerce

Electronic commerce, like the Internet, is not a new development Large IT organizations started working on ways to electronically automate commercial processes more than 20 years ago, whereas academic and research users in the U.S. were laying down the foundations for the Internet by developing the U.S. Department of Defense network, ARPAnet (Datamonitor, 1997).

EDI (Electronic Data Interchange) can be considered as being the longest established technology to enable business organizations to conduct e-commerce EDI provides solution for the delivery of structured messages, and is totally focused on the business-to-business market. The first EDI standards were devised by the U.S transportation industry in 1968. Eleven years later in 1979, the American National Standards Institute (ANSI) started to develop EDI standards for business documents, which, became known as the ANSI X.12 standards.

During the 1970s, a group of UK retailers also developed a standard for the presentation of commercial invoices. These efforts were consolidated into the Tradacoms EDI standards at the beginning of the 1980s, and the world's first dedicated EDI network, Tradanet, was set up to support the use of Tradacoms standards. Tradanet is still widely used today and was instrumental in developing the e-commerce expertise of various large IT vendors such as General Electric.

Today, there are three dominant global EDI standards, namely:

☐ ANSI (ASC) X.12;

☐ EDIFACT (EDI for Administration, Commerce and Transport);

☐ UN/GTDI (United Nations Guidelines for Trade Data Interchange).

In addition, there are about ten semi-proprietary standards for Electronic Data Interchange. These are used in specific industries, such as Odette in the European automotive industry and Dish in the shipping industry.

The best-known EDI standard, however, is SWIFT (Society for Worldwide Interbank Financial Telecommunications), which was formed in 1977. SWIFT is by far the largest international financial communications and money transfer network, used by about 3,600 financial organizations in 100 countries including banks, brokers, dealers and fund managers.

More recently, the U.S. Department of Defense has also been addressing the issue of electronic commerce and information sharing for supply chains, especially in the areas of electronic document interchange and collaborative working (e.g. concurrent engineering systems). Although its computer-aided acquisition and logistic support (CALS) initiative definitively has a military focus, since it was set up to make the procurement and development of weapons systems more time-efficient and cost-effective, many lessons can be applied to e-commerce between civil trading partners. For example HTML has borrowed a number of concepts from SGML, the document mark-up language employed in CALS.

Internet technology-based e-commerce is the result of a technology maturation process. Preceding technologies tended to focus on the provision of e-commerce solutions to particular market segments (e.g. the automotive sector). Although these technologies did, and to a large extent, still do show a positive return on investment, the initial investment threshold was too high for widespread adoption, especially in the SME sector.

For example, EDI still has a bright future in Internet technology-based e-commerce, provided that Internet EDI vendors can ensure the same level of security and accountability as proprietary EDI network service providers, and provided that the EDI system can be implemented easily and quickly between trading business partners.

Over the last two years, EDI software for the Internet has begun to gain acceptability in the market. This enables a company that has implemented EDI solutions internally to publish an interactive form on the Web. The business partner fills in the form, which is translated into EDI messages. These EDI messages can then be sent securely to the other business partners where they can be processed immediately and automatically by the company's internal systems (Keith Fletcher, 1995)

Therefore, some technologies and concepts behind the Internet and electronic commerce have reached a point where they can be used in conjunction with one another to drive down the costs and widen the scope of doing business across public and proprietary networks.

2.2 Internet Technology, Internet as a Marketing Tool, and Internet Limitations

Internet Technology

The Internet is a network of computers that all understand the same "communications protocols". When one computer "speaks", the others understand what it said. The computers on the Internet consist of "clients" and "servers". Clients are end users, usually on desktop computers. Most transactions on the Internet consist of clients, operated by users, making requests for information from servers. Servers respond with the requested information, and the client displays the result to the user. The Internet is not a "broadcast" medium like radio and TV. Servers can't deliver any

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information that a client hasn't asked for first. That is an important principle to understand (Georganna Hall & Gemmy Allen, 1996).

As the Internet grew in the academic and research communities, businesses were changing from traditional mainframe computing to network computing and implementing Local and Wide Area Networks(LAN and WAN respectively). These connected buildings and/or offices world-wide, facilitating, for example, inter-company email, and file and printer sharing (Keith Fletcher, 1995). However, different organizations would use different, often incompatible, software and hardware standards, making communications between these networks difficult.

Computers can be connected on the same wire, or on completely different kinds of wires, as long as there is some appropriate electrical translation between the two. To be on the Internet, both computers need to speak IP, which stands for "Internet Protocol" Actually, there is another level involved, so the whole packaging protocol is called "TCP(Transmission Control Protocol)/IP". They always go together to form the information package. Finally, the two computers both need to understand the contents of the package, at least well enough to know what to do with it (Georganna Hall & Gemmy Allen, 1996).

The traffic on the Internet is mostly carried by traditional telecommunication companies like Sprint, MCI, and AT&T, so you won't see any new Internet wires being strung from the phone poles. The Internet is just special traffic running over the same telephone company wires that they use to carry cables, as well as a lot of voice traffic. Although the traffic ends up being carried by the phone companies, you don't usually call the phone company to get a connection. Instead, you call an "Internet Service Provider"

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or ISP ISPs have contracted with other ISPs, who've contracted with the primary carriers. You only need to worry about getting connected to an ISP, and they take care of getting you connected to everyone else in the world.

Every single machine on the Internet has a unique "address", which is actually a weird looking number(e.g. 194 598.32.25 is Microsoft's main Internet server's IP address), but is usually assigned a name as well, like "www.ibm.com". Domain Name Servers(DNSs) translate plain-English domain names to the numerical TCP/IP addresses that computer understands (Georganna Hall & Gemmy Allen, 1996).

Electronic mail (e-mail) enables a computer user to send a message automatically to another computer user anywhere in the world. To use e-mail, you need an electronic mailbox from where your mail can be sent. There can be several users on a domain name, using the following email syntax (user name)@(name of organization) (kind of organization).(country), where everything after the '@' is the Internet domain name. In today's marketing environment, when a client asks some questions about your product and requests that you send the answers via e-mail, how are you going to respond? Hopefully, you'll say, "Certainly, I'll get the answers to your questions and send you an e-mail within the hour." Hopefully, you won't say "What's e-mail?" Or "I don't know how to use e-mail." (Georganna Hall & Gemmy Allen, 1996)

The World Wide Web(WWW) was developed in 1991 at CERN(the European Particle Physics Laboratory in Geneva, Switzerland). WWW uses hypertext software. The benefit of hypertext software is that it can combine sounds, graphic images, video, and hypertext on a single page and can link to other pages and other Internet resources. Thus, you can click on highlighted text and be immediately led to another part of the

document, a separate document on the same computer, or a document on an entirely different server. A WWW address follows the syntax: http //www.(domain name) and is usually where the 'homepage'(an entrance page) of the website is located('http://' signifying the protocol begin used).

The Web is the most flexible and powerful of the network navigation tools since it brings different Internet resources to your screen with a minimum of effort on your part. Furthermore, the development of graphical Web browser software that can display the contents of the Web has made it easy to access hypermedia documents. Most graphical Web browsers have been derived from the original Mosaic program developed at the National Center for Supercomputing Applications in 1993. All of the major commercial on-line services, including American Online, CompuServe, The Microsoft Network, and Prodigy, provide WWW access to their subscribers.

Usenet is the Internet's version of discussion groups, newsgroups, or electronic bulletin board systems similar to those offered by commercial on-line services. Computer users can search for discussion groups pertaining to specific topics, browse bulletin boards, and post messages to newsgroups enabling others across the globe to read them. Marketers can use electronic bulletin boards to monitor what consumers are saying about their products and services. Furthermore, marketers can identify new product opportunities by observing the discussions of consumers on electronic bulletin boards.

Telnet is the software that permits authorized users to log on to a remote computer and access resources as if it was directly connected. A common application is searching on-line databases, library catalogs, and electronic journals at hundreds of colleges and

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public libraries. Telnet is used by the Internet tools, to gather information, send information, and transmit e-mail messages. With some Internet tools, we can type the telnet command. However, it is more common that the telnet command has been issued without our knowing it has been executed.

File Transfer Protocol (FTP) is the software that allows us to transfer files over the Internet from one mainframe computer to another. Anyone who has access to FTP can transfer publicly available files to his or her computer.

In the client-server model of information interchange, the work is shared between the host computer that serves out the information and the client computer that receives the information. On our personal computer, client software can be installed which can perform the tasks of displaying menus to the screen, negotiating connections to a remote computer, saving files, creating your screen environment, and similar tasks. At approximately the same time, the remote host computer performs tasks such as searching a database and sending you the results.

Gopher is a document retrieval system. Its main purpose is to search for information. Gopher lets you access data on many hosts. If a gopher client is installed on your system, access gopher by typing the word gopher at the system prompt. Gopher can invoke tools, such as Archie or Veronica to assist in searches. Archie is an electronic directory service that limits the range of the search to a single server. Veronica is an acronym for Very Easy Rodent-Oriented Net-wide Index to Computerized Archives. Veronica permits you to search gopher menus by keyword.

Wide Area Information Server (WAIS) is the software that enables you to search for keywords in specific databases and full text information. WAIS locates information

by performing full text searches on a large collection of documents simultaneously. Many WAIS databases can be accessed using gopher or the WWW.

The Internet as a Marketing Tool

One unique aspect of the Internet is that it is appropriate for developing closer customer relationships. In addition to being viewed as a low-cost alternative to the facsimile, express mail, and other communication channels, the Internet enables employees to access vital information without being present in the office However, experts advise that Internet marketing differs from traditional marketing. This medium requires a paradigm shift because marketing over the Internet is similar to traditional person-to-person networking, where the quality of the information provided and the credibility of the organization doing the offering are everything (Earl D Honeycutt, Jr., Theresa B. Flaherty, and Ken Benassi, 1998).

The emergence of the Internet and electronic communications has changed the traditional marketing transactional process. The Internet enables prospective customers to enter into direct communication with the firm's information workers and make a case regarding their needs and their unique problems. Hence, it will reduce the reliance on the technical backgrounds of the high-tech sales people and will bring the seller and buyer closer together in an effective two-way communication system (A. Coskun Samli, James R. Wills, Jr., and Paul Herbig, 1997).

The Web provides powerful capabilities that can enhance and enable the efforts to achieve each of these business goals. Marketing efforts typically focus on seven key business areas (Margo Komenar, 1997):

1) Products and Services Marketing: product marketing, pricing, positioning,

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demonstrations, distribution, marketing programs, partnerships, and other strategic activities.

2) *Fulfillment:* enabling ordering as well as acquisition, authorization, and authentication of customer funds; enabling the flow of goods and services from sellers to buyers through all wholesalers, jobbers, distributors, dealers, and representatives.

3) *Advertising and Promotion:* development and dissemination of image and brand-enhancing persuasive information about products and services.

4) *Customer and Business Tracking:* market research to determine customer needs and evaluate business performance in meeting those needs

5) *Customer Service and Support:* Technical support, customer service, requests for information, product registration, and warranty service.

6) *Corporate Communication:* product and service information, press releases, and related information for buyers, suppliers, contractors, dealers, representatives, shippers and so on

7) *Customer Communications:* customer feedback and requests for information.

Each of these functions and activities can be enabled and enhanced on the Web with powerful interactive communications capabilities. To help you get a feel for the potential of the Web as a marketing platform, we'll look at how a few businesses are using their Web sites to achieve important business goals, and maximize their return on investments in the Web.

With the emergence of Internet in the scene, now the international sales force will set up the sales process in such a way that the prospective buyer is highly qualified in the

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technical aspects of the product and the companies' needs, and there will be a very high level two-way communication established between the buyer and seller via Internet. This two-way direct communication between customer and information workers is more efficient than the traditional method of talking to the seller's information workers via its salespeople. The new system will be superior to the old one on the basis of the following (A. Coskun Samli, James R. Wills, Jr., and Paul Herbig, 1997)·

1) No middle parties (intermediaries) that may disrupt the communication or provide interference or noise in the communication process are involved in the transaction; no interpreters are needed and the exact message, not a third party's rendering, gets communicated.

2) Visual communication in writing has long-lasting duration. The parties can work on it and get back together at their discretion. The written word is still worshiped in the American business community and the written communication via the Internet can provide a paper trail of the transaction.

3) No physical intimidation exists to be triggered by personalities, their respective performances, or their knowledge bases. The advantages to written computer communications is seen in the use of anonymous computer systems for brainstorming, for managerial and peer feedback, and evaluations. The reasons for the success of these system is analogous to the advantages in using the Internet.

4) Flexible time and immediate response are extremely beneficial in an involved, time-consuming, and complicated negotiation process. The Internet offers a 24 hours per day, 365 days per year access to data files. Singapore and New York are halfway around the world from each other. One sleeps while the other works. Having a

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system such as the Internet, which never sleeps and logs in all calls, allows one to work when one wishes and, vice versa, to not work when one wishes. Night owls can work all night long and the day people, when the sun is up. No longer will work create with time lags, to be sent at a later date and time. Receipt of the message can be requested so as to create a log (analogous to certified mail) and record of the receiver's receipt of the message. One message can be transmitted to literally hundreds, if not thousands of people, at the touch of a keystroke Each message, sent or received, can be timestamped, thus presenting an additional papertrail, if needed, by the sender.

5) Cost advantages exist in that all calls, no matter to whom or where, are through a local access telephone number. In essence, using the Internet has changed communication costs from an uncertain variable cost to the extent that electronic mail (e-mail) via the Internet is much cheaper and faster than even using a fax machine.

6) Having the ability to carry on a detailed two-way communication may have a special impact on the creativity of all of the parties involved. In fact, some ideas may never surface unless such a communication setting is in place and used properly.

Just as personal computers revolutionized the office over the last decade, the Internet will cause radical changes in communications. Although the Internet has numerous problems to resolve, it is inevitable. Managers should begin to explore with the Internet and become creative on how to best utilize the immense information power available through the Internet.

Internet Limitations

There are several shortcomings that must be effectively addressed before the

Internet can reach its full potential as an electronic commerce vehicle. These downsides include dull Web sites, unreliable technology, and one of the biggest concerns, security issues. Industry experts are, however, attempting to overcome the security concerns of both consumers and businesses (Earl D Honeycutt, Jr., Theresa B. Flaherty, and Ken Benassi, 1998)

Another challenge is the fact that the Internet culture operates within very specific behavioral protocols or "netiquette". One of the noteworthy characteristics of today's Internet users is that they tend to hunger for information, yet they are highly resistant to traditional, aggressive advertising. To utilize this medium effectively, smart advertisers have learned to be more "lowkey", by making their Web sites value-added information services for the consumer.

Finally, with the tremendous growth of on-line users, traffic congestion has become a significant problem. Coupled with the growth of on-line users is the plethora of information available on the Internet. As the amount of information available on the Internet increases, the more difficult it will become to efficiently search for information.

2.3 Internet Technology-Based Electronic Commerce

Electronic commerce involves more than just the on-line buying and selling of goods and services. Business management and consumers are presented with exciting scenarios of the future of electronic business at every juncture. The opportunities for electronic commerce appear limitless, and yet, within everyone's grasp. Consumers can afford the time to learn to purchase products over the Internet, but for a company to survive and stay competitive within the electronic commerce environment, its message cannot be viewed as wasting the consumer's time, rather it must augment consumer

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convenience.

There are practical considerations that argue for a web site. Some of the factors are: cost reduction benefits by not having to print and mail brochures, the facilitation and release of time-sensitive information, and the enhanced ability to accumulate valuable sales leads. For companies to be successful in electronic commerce, firm should follow the mercantile model. This will ensure maximum consumer contacts, which will certainly enhance market expectations.

Conducting business on the Web is an electronic market activity Electronic commerce, the selling and buying of goods over the Internet, is growing at a steady pace While Web transactions still make up only a small percentage of total retail sales today, businesses seeking to expand their markets are establishing storefronts on the Internet

The initial wave of commercial activity on the World Wide Web involving commercial activities is occurring in three stages; enterprise communications, business-to-business commerce, and consumer commerce (K. H Kim, 1999) The b-to-b wave is just picking up steam. The Internet will level the playing field by enabling smaller market participants to offer similar b-to-b exchange as larger competitors.

Internet commerce seems to be an interesting and exciting way to do business However, before Internet commerce can move forward and start being used by a significant number of Internet users, several issues related to marketing need to be resolved. These issues are: security, payment systems, visibility, loyalty (how to keep consumers returning to a particular vendor), and consumer privacy. Companies in the retail, as well as b-to-b electronic commerce market segments, are hurrying to maximize what the Internet can provide for business expansion. Firms are attempting to make

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complete use of the Internet's potential as an open, convenient, and powerful channel to bring buyers and sellers together (I. S. Shin, 1998).

Figure 4. U.S Electronic-Commerce Goods Forecast
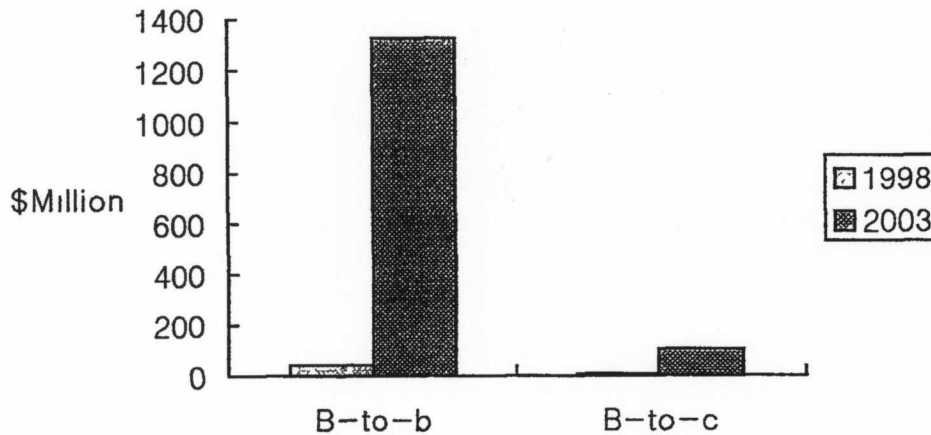
Source : Internet Marketing (1999)

Today, Electronic Data Interchange (EDI), a service generally provided by value-added networks, enables many companies to securely conduct b-to-b transactions, such as the exchange of documents and payments. In the 1990s, the Internet has emerged to offer consumers and businesses a low-cost and easily accessible method of commerce Now, companies in the retail as well as business-to-business market segments are rushing to see what this public network can do for them

2.4 The Advantages of the Internet Technology-Based E-Commerce

Increasing Computing Compatibility and Enhancing Communications with the Internet

The goal of enterprise-wide Internet Technology efforts should be to improve a

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company's entire value chain, thereby enabling the enterprise to acquire and sustain a competitive advantage. Web applications can be used strategically in a corporation's portfolio of projects to integrate heterogeneous platforms across the enterprise and improve internal and external communications.

A company can also improve its competitive position by improving its internal and external communications. Internal communications typically involve sharing critical business information among employees who represent departments in divisions within an enterprise. These departments typically include corporate communications, sales, marketing, Management Information Systems (MIS), product development, engineering, finance, accounting, and human resource. External communications refers to communicating business information to external entities such as customers, distributors, suppliers, stockholders, and philanthropic and government organizations. From the value chain perspective, communicating with suppliers at the input of the value chain and customers at the output of the value chain typically effect the competitiveness of a company. Communication among functional groups within a corporation also effect the competitiveness of a company. Since Internet applications are technology independent, they simplify integration and interface of heterogeneous computing platforms through the use of global communication standards.

Figure 5. The Business-to-Business e-Commerce Value Chain
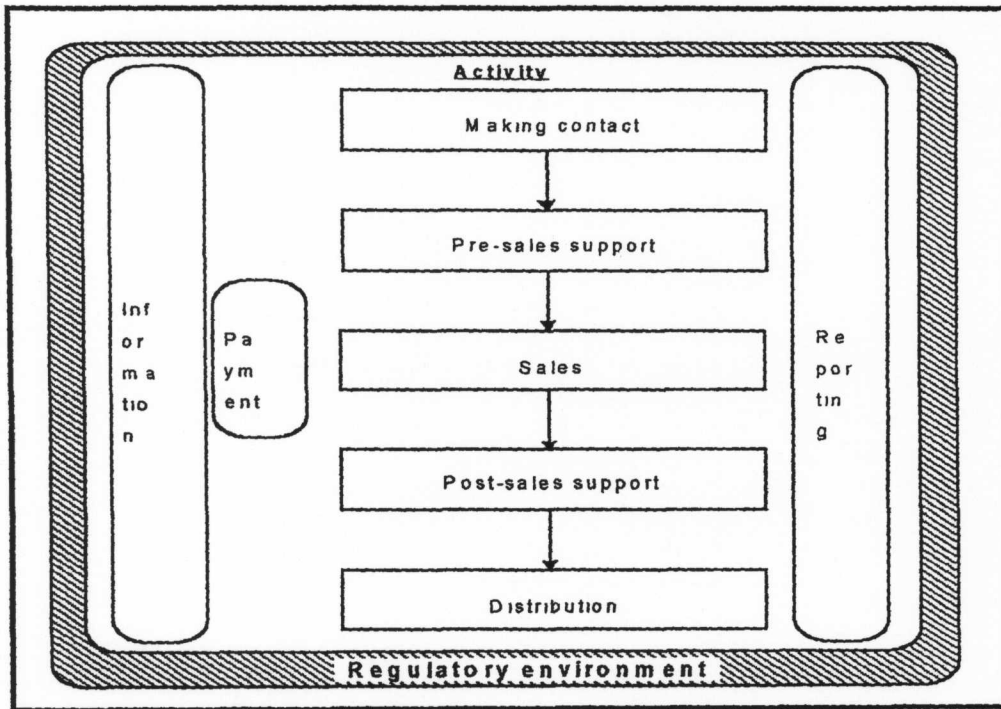
Source : Datamonitor(1997)

Internet technology is used for improving corporate communications by integrating legacy applications to client/server systems and extending Internet applications to thousands of Internet end-users. One company that uses the Web to integrate information resources is Lockheed Martin, an aerospace company that is focusing its research on commercial markets. Lockheed's Research and Development Division's(R&DD) business objective is to use technology to share information and reduce the cost of system development. R&DD has achieved a significant cost savings through the use of Internet technology to support the use of existing enterprise-wide and external research documentation.

Companies such as Schlumberger and Digital Equipment Corporation are quickly deploying Internet and intranet business applications internally to enhance corporate

communications. These firms are effectively extending their infrastructure to technology-independent platforms residing almost anywhere on the global Internet. Web-based business applications can enhance the effectiveness and efficiency of communications both internally and externally by providing a standard communications platform.

Schlumberger, an international company whose business consists of acquiring, analyzing, and distributing information, uses the Web to improve corporate communications. Schlumberger also successfully uses the Internet to enhance communications throughout its global workforce in over 100 different countries. Deployment of Web technology also enables Schlumberger to automate information distribution to customers, suppliers, and future employee candidates Customers can access research information, supplier provide research information, and future employee inquire about job postings at Schlumberger's Web site.

Proliferation of Web Use

Popular Web-based applications are expected to evolve into key business applications such as host-database access, host-application access, host publishing, and information capture and distribution. It is estimated that over 90 percent of Fortune 100 companies use Web applications somewhere in their corporation.

American Express is an example of a company that provides global access to internal applications, database, and publications via the Web. Customers use the American Express Web site to obtain information about products, services, and travel. Customer also use the Web site to make travel reservations. The Web site is interconnected with secure back-end systems that in-turn connect the customer with hotel,

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rental car, and airline reservation systems.

When Web-based application are adopted for enterprise-wide application, employees are readily able to design and publish Web pages in the same manner that they create word processing, spreadsheet, and presentation documents. Rather than creating documents and distributing them via e-mail or paper mail, individuals can place their documentation on a secure corporate intranet. Users of this information are provided with a set of searching tools and indices for finding information and applications. Qualcomm is an example of a corporation that uses its intranet to store and deliver employee-generated content. Qualcomm's rapidly expanding workforce makers sharing business and technical information via its intranet crucial for its survival.

If used properly, Web-based applications can become strategic weapons for improving a company's competitive position Web technology creates an intimate dialogue with customers and promotes collaborative work throughout the enterprise. Improving the ability of a company's workforce to collaborate, to learn, and to focus on customers improves its competitive position.

Leveraging Core Competencies

Fortune 1000 companies are leveraging their core competencies with Web technology to expand markets, increase efficiency, accelerate product development, and differentiate products and services. Sun Microsystems utilizes the Web to enhance international market penetration, Cisco Systems uses it to increase the efficiency of international operations, Texas Instruments employs it to accelerate product development, and Federal Express utilizes it to differentiate its products and services.

This research is not intended to imply that Web technology alone is capable of

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creating a competitive advantage People, organizational structure, management and control systems, and information technologies must all be in place to facilitate implementation of technology strategies. An IT organization is required to perform the ongoing system and network management activities required to keep the Web-based applications operational. Additional support is also required to keep data used by the Web applications and content current Content is a term used in this dissertation to describe the hypermedia and multimedia information contained within web applications Organizations intentionally change the content of their Web sites in order to keep their sites interesting and thereby motivate users to periodically navigate the sites It is important to note that the Meta Group performed a study of Web use by Global 2000 companies and determined that organizational culture and organizational IT significantly effect the success or failure of an intranet deployment.

In order to derive a competitive advantage, organizations must strategically evaluate Web applications in the same way as they assess traditional IT applications. The applications that tend to provide a competitive advantage are those applications that are in line with a corporation's major business objectives. To achieve competitive advantage benefits, companies must allocate resources to Web technology and incorporate the Web into overall strategic IT planning activities. These strategic planning activities help align the Web with the business in order to allow companies to leverage the core competencies of the corporation.

2.5   Strategic Issues Involved in B-to-B Electronic Commerce

Private and Value-Added Networks vs. the Internet

While VANs and EDI have been evolving for more than 25 years, the widespread

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adoption of the Internet in the corporate sector has inspired many to hype the B-to-b electronic commerce opportunity to new heights, continuously producing higher and higher forecasts of usage and transactional values. These optimistic forecasts have not happened without reason. The global one-to-one marketing and trading capabilities inherent in the Internet are certain to dramatically alter how products are traded, marketed and sold and how customers are serviced.

The following subsection will explain the strategic issues involved in moving from VAN-based solutions to Internet technology-based electronic commerce. It will specifically discuss the following points:

- Cost Issues

- Networks and Services

- The Real and Imagined Security Issues

- Internal Business Attitude and Organisation Changes.

Cost Issues

Cost is probably the most often cited reason for companies to opt for Internet technology-based b-to-b electronic commerce solutions rather than private networks or VANs. Especially for SMEs, it is crucial that the medium and long-term benefits of conducting business electronically outweigh the costs, in particular if there is a large amount of capital necessary to set up a certain system.

The table below shows that the Internet appears to be by far the most cost-effective solution for conducting b-to-b electronic commerce. The fixed and operating costs are significantly lower than those of private networks and VANs, making it an attractive solution for less frequent usage and less mission-critical applications for mainly smaller

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business organizations.

Still, set-up costs for both VAN and Internet electronic commerce solution can be perceived to be quite high, but they are.

1) Still lower than the money spent often for proprietary software and expensive hardware for point-to-point private network solutions.

2) Subject to increasing price competition due to the constantly growing number of solution providers.

Table 2. Principal Comparative Cost Advantages for e-Commerce Networks

	Private network	**VAN**	**Internet**
Set-up costs	large disadvantage	advantage	advantage
Fixed costs	disadvantage	advantage	large advantage
Operating costs	small advantage	disadvantage	advantage

Source: Datamonitor

The question for the company wishing to exploit the benefits of electronic commerce is, however, which solution offers the best combination of costs and benefits for its particular business case. For example, if the success of the company crucially depends on the level of control over the data traffic (such as in an investment bank), a private network might be the most appropriate solution despite its extremely high costs.

Alternatively, if a VAN provider can pledge the 100% reliability of its network for the sending of mission-critical data (such as 'just-in-time' purchase orders of an

automobile manufacturer), it might make sense for the company to 'outsource' the control of the data transmission to a VAN provider with large economies of scale, more experience of data transmission in general and thus cost advantages.

Another issue is the size of the user group   Due to the increasing globalization of business in general, the Internet is regarded as the optimal medium for conducting international business-to-business electronic commerce, due to its easy access in all developed countries.   However, in some instances it is in the company's best interest to limit the number of business organizations it conducts electronic commerce with, simply because it wants to limit the number of entities with access to what could be confidential company information.

Additional value-added services are key for the network providers to gain and keep a b-to-b electronic commerce customer.   However, it must be stressed that the costs for these services are generally passed on to the customer in one form or another, hence the argument of the major VAN providers that the value-added services for Internet technology-based electronic commerce offered by the large global ISPs reduce the cost advantage the ISPs might otherwise possess.   Nevertheless, one should not forget that the ISPs are in a much better position to scale their value-added services exactly to the requirements of each business organization. It has therefore been argued that VAN customers are still paying for a comprehensive portfolio of service offerings they might not want or need.

Network and Services

It is important for application-to-application communication that both protocol and line speed match, otherwise company interaction is very difficult   As most companies

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have multiple electronic commerce trading partners, this can prove to be quite difficult to execute. The VAN can act as the intermediary by supporting multiple protocols and line speeds in a secure environment. Moreover, the VAN also acts as an electronic repository, accepting data 24 hours a day, 7 days a week and then providing control reports (audit trails).

As a differentiation tool, most VANs also offer a number of additional services that go beyond providing simple connectivity and a few large servers A number of electronic commerce VAN providers offer mediation services when disagreements occur, and, very important, offer various methodologies to facilitate the mass implementation of electronic commerce using EDI across multiple trading partners.

Technology-driven value-added services have to a large extent already been replicated, but the more 'human' value-added services such as the role of a trusted mediator at times of disagreements between business partners might be more difficult to establish, especially in the short to medium term. It remains to be seen whether a potential increase in usage by small and medium-sized companies connected to VANs will drive economies of scale and subsequent price reductions.

Another important issue is the required speed for the transmission of the messages. VANs, by definition, are store-and-forward networks. Most VANs do not process the data files until all of them are transmitted to the mailbox, which can take up to 30 minutes depending on the number of messages. Then, it takes the VAN some minutes to sort through and filter the files to the mailboxes of the trading partners.

Some trading partners dial in every hour; others only once or twice a day. So even after a message had been delivered to the mailbox, it can sit there for hours while a

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shipment is already on the way. Priority EDI systems can fix these time delays, but they also add substantial costs

An extranet, however, enables the trading partners to transfer the data almost immediately, without the VAN as a delivery-delaying intermediary. Moreover, the connections to the extranet are permanent In many vertical industries, the timely transfer of data is becoming increasingly important (due to 'just-in-time' supply chain management), therefore ISPs can now argue that their IP networks can offer superior time performance at a lower price than most VANs.

All messages sent and received are stored in mailboxes by the VAN providers on the central database of their network. The audit trail represents a journal of the activity on a given mailbox, basically a list of inbound and outbound messages with the date and time of each session. The trader can be sure that it is possible to trace all the transactions with his business partners.

To back up audit trails, most VANs provide customers with a long-term repository for messages. These can be retrieved from the archive as message groups relating to a particular day or particular sender or receiver.

The sender of the message has to satisfy himself that the message is going to the correct recipient, and also that compatible authorization and payment rules are in place for that particular type of transaction.

Non-repudiation of origin services means that the recipient is assured that the message comes from the claimed sender. The sender must be alerted that the information has arrived. The system should alert the sender if a message has not been acknowledged after a fixed period of time. Of course, ISPs can also provide these

services, but they still lack the hard-earned trust among the end-user community VANs have managed to establish over many years or even decades

VANs are still the medium of choice for mission-critical b-to-b electronic commerce transactions. ISPs can only convince current and potentially new users to try the Internet if they can offer a similar level of the above discussed services at significantly lower costs, while maintaining the same security and reliability standards.

Security Issues

One of the biggest stumbling blocks to the adoption of electronic commerce is security. After all, although a company may be willing to share some confidential data with its partners, the company certainly would not want those data to get into the hands of competitors. An unguarded web server, particularly one linked to a company's operational databases, can give intruders access to the entire set of operational data, and it can even provide an entry point to the company's internal WAN or LAN.

There is no single 'magic' technology solution that can ensure that the transmitted data will be secure and reliable. Accomplishing that goal requires a range of technologies and effective, consistent use of those technologies, all supported globally by trustworthy key and security management infrastructures, most importantly human expertise.

A firewall is a hardware and/or software solution (such as a router with firewall software) that allows only specified information and commands to pass between an organization's web server and the web itself. There are, however, many different firewall systems with different levels of security and complexity (e.g. router-based, OS-based), which can turn choosing an appropriate system into a much more complex than

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initially anticipated analysis of the company's data traffic.

One issue to consider is IP spoofing, where an intruder gets around the firewall by changing an IP address to that of a user who has access behind the firewall   To prevent IP spoofing on an extranet, a company needs to set up an authentication scheme to validate that users are who they say they are.

Data travelling over the web are also vulnerable to interested but hostile third parties.   Data travel through the Internet in a circuitous route from one computer system to another, each system passing them along to the next, until them reach their final destination.   An intruder can access data at any of those hand-off points   As a result, data need to be protected while they are in transit.

When comparing Internet technology-based with VAN-based business-to-business electronic commerce, it has been argued that VANs are only secure because they handle the business of comparatively small communities.   However, very few messages over the proprietary VANs are encrypted, whereas encryption is the *norm* for sensitive messages over the Internet.   Most computer fraud activities come from the inside of the business network, therefore encryption would stop many of them.   There could be an argument that once the Internet improves its reliability and once software houses write adequate audit trails into their packages, point-to-point connection over the Internet could even be more secure than the traditional VANs.

Some extranet-bound messages carry with them commercial meaning, and in business it is desirable to know who is on the other end of the line and to be able to prove who sent the message.   This kind of verification can be accomplished by a process called authentication, using digital signature products offered by vendors such as VeriSign.

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Digital signatures are important for both application-generated and human-generated e-commerce messages, although, at the beginning at least, any authentication problems are more likely to occur in messages between people and computer applications (e.g. ordering and payment systems).

Internal Business Attitude and Organization Changes

The move to b-to-b electronic commerce has widespread implications for the internal organization of the business, which can create considerable internal barriers to the implementation of an e-commerce solution. In fact, in some companies, as inertia to the rapid implementation might be the cause of a considerable decrease in the competitiveness of the business.

The company must also change its attitude to what was previously regarded as private and often confidential data. Rather than focusing on keeping the dissemination of information as tightly controlled as possible, the company must change its attitude towards sharing it in a regulated manner.

Bandwidth requirements are not yet an issue for most VAN providers. The question is whether they will have the necessary expertise and funds to do this rapidly; large ISPs have historically more knowledge about scaling their networks and securing funding for their projects. This might be less of an issue for telecommunication operators such as France Télécom who are also operating as large VAN providers and corporate ISPs in their national markets.

The scalability of backbone networks as the underlying infrastructure for Internet technology-based business-to-business electronic commerce is important if large-scale implementation is to occur in the future. Large sums of money are currently being

invested to upgrade the network, but due to the fact that there is no separation of business and consumer traffic on the public Internet, any increases in the backbone bandwidth capacities are likely to be used up very quickly.

The Impact of Governments on Electronic Commerce Markets

The interest of governments and other official institutions in business-to-business electronic commerce is based on three principal, partly overlapping, points:

1) Electronic commerce is seen as being crucial to ensure the long-term competitiveness of companies, thus it has a direct impact on the job market

2) It can provide new sources of revenues; either directly through direct taxation on electronic commerce or, indirectly, through a more competitive and therefore financially healthier economy.

3) The avoidance of misuse and fraud that might damage existing business infrastructures.

All countries in the leading industrial blocs in the world - the US, the European Union and Japan - have developed numerous initiatives to promote b-to-b electronic commerce on a national and international level. For example, the G7 pilot project 'Global marketplace for SMEs', coordinated from the European side by DGIII of the European Commission and equivalent agencies in the US and Japan, has provided a significant input and driving force to business-to-business electronic commerce. The main areas of discussion for every government-mandated electronic commerce project are:

☐ Financial Issues (e.g. costs, customs, taxation, electronic payments)

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- Legal Issues (e.g. customer protection, intellectual property protection, security)
- Technological Issues

A government can have a significant effect on the growth of electronic commerce. With its actions, it can facilitate or prevent it. Moreover, the government's ability to know 'when to act and when not to act' will be crucial to the development of electronic commerce.

Financial Issues

The financial issues related to b-to-b electronic commerce are often regarded as the most important group of issues when global agreements have to be found. Having just decided to start to actively regulate the Internet (or not to regulate, with the extent of the regulation depending on the individual country), governments are now realizing the financial implications of a global electronic commerce infrastructure. Projections of multi-billion dollar electronic commerce markets on the Internet have some governments licking their fingers in anticipation of large revenue streams from taxing these markets.

Historically, tariff reductions have been negotiated because of the global recognition that everyone benefits from freer trade. Especially over the Internet, global electronic commerce does not have the precisely defined lines of transit that have previously characterized the trade of physical goods. Therefore, it is only possible to administer tariffs for products (usually tangible goods) ordered over the Internet but delivered via traditional means of transport. The structure of global data networks such as the Internet simply makes it very difficult to levy the same charges when the product is delivered electronically (e.g. software or information services).

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Discussions on the taxation of electronic commerce are currently being held at the Organization for Economic Co-operation and Development (OECD), which is widely regarded as the primary forum for co-operation in international taxation. In its Sacher report published in June 1997, the OECD clearly suggests an agenda for government action in respect to taxing electronic commerce transactions.

Regarding the cost of telecommunications, recent international agreements to eliminate tariff and non-tariff barriers should rapidly bring down the cost of key information technology products, and subsequently encourage the take-up of business-to-business electronic commerce.

Electronic payment systems were topic of the Economic Communiqué issued at the Lyon summit by the G7 heads of state which called for a co-operative study of the implications of these new systems. In response, a working party was formed with representation from the finance ministries, the central banks and law enforcement authorities of the participating countries.

Legal Issues

Naturally the companies in the business-to-business electronic commerce marketplace should define and articulate most of the rules that govern electronic commerce, but it is widely felt in government circles that in order to enable companies to perform this task and fulfil their roles properly, the government should encourage and lead the development of domestic and international rules and norms that will serve as the legal foundation for commercial activities in the new business-to-business online world. As outlined in the above, the legal issues related to the conduct of business-to-business electronic commerce concentrate on:

1) Uniform commercial codes for electronic commerce (predictable and widely accepted legal environments supporting business-to-business electronic commerce that will drive its acceptance)

2) Intellectual property protection (to promote the sale and licensing of intellectual property via online services, sellers must know that their property will not be stolen and buyers must know that they are obtaining authentic products)

3) Privacy (the Internet facilitates the collection, re-use and instantaneous transmission of information. Although this issue is more important in the business-to-consumer and small-scale business-to-business electronic commerce sectors, the protection of privacy rights of individuals is crucial if they want to feel comfortable doing business online)

4) Security (if business organisations do not have the confidence that their data are safe from unauthorised access or modification, they will be unlikely to use the Internet on a routine basis for mission-critical transactions).

The development of an international electronic commerce system also crucially depends on the participants' ability to achieve a reasonable degree of certainty regarding their exposure to liability for any damage or injury that might result from their actions. As emphasized by the US government, inconsistent local tort laws, in addition to uncertainties over jurisdiction, could increase the potential for litigation claims and thus create costs that will ultimately be borne by the participants in the business-to-business electronic commerce scheme.

Uniform commercial codes for the conduct of business-to-business electronic commerce have been completed by the United Nations Commission on International

Trade Law (UNCITRAL).

UNIDROIT and the International Chambers of Commerce also develop additional uniform rules and norms to eliminate administrative and regulatory barriers to b-to-b electronic commerce Clearly, uniform commercial codes are important for companies to facilitate the conduct of e-commerce on a global level, one of the principal pillars of Internet technology-based e-commerce.

The protection of intellectual property, especially with regarding copyright, protection of databases, patents, trademark and domain names, is deemed to be necessary to prevent piracy and fraud.

There are several treaties that establish international rules for the protection of copyrights. The most important treaty is the Berne Convention for the Protection of Literary and Artistic Works, another important treaty is the Paris Convention for the Protection of Industrial Property (Paris Convention). These treaties link nearly all major trading nations and provide them with a means of protecting, under their own national laws, each other's copyrighted works and sound recordings.

On 20 December 1996, the World Intellectual Property Organization (WIPO) brought the Berne Convention up to date by providing new protection for performers and producers of sound recordings. Two new treaties, the WIPO Copyright Treaty and WIPO Performances and Phonograms Treaty, were finally adopted

Although these issues superficially seem to be important only in the business-to-consumer e-commerce sector, the protection of intellectual property also extends into the business-to-business field. Especially for knowledge-based business organizations such as consultancies and research agencies, their intellectual property must be protected by

stringent regulation before this business sector will use online services as a new marketing and distribution channel.

Trademark rights are typically national in scope and conflicts may arise where the same or similar trademarks are owned by different parties in different countries. Countries may also apply different standards for determining infringement.

Some disputes have developed on the Internet, where third parties have registered domain names that are the same as, or similar to, registered or common law trademarks. Since an Internet domain name functions as a source identifier on the Internet and often forms part of the URL, a certain value is attached to them. Ordinarily, source identifiers are not protected intellectual property (i.e. a trademark) per se However, due the increasing use of domain names as source identifiers, legal disputes have developed and courts have started to recognize the intellectual property rights of domain names. The principal argument is that the misuse of a domain name could significantly infringe, dilute and weaken potentially valuable trademark rights.

The disclosure by the data-gathering organizations aims to stimulate the market resolution of privacy concerns by empowering individuals to obtain relevant knowledge about the reasons for the collection of information, the usage and protection of the collected information, the consequences of providing or withholding information and any rights of redress that they may have.

The privacy principles identify three values to govern the way in which personal information is acquired, disclosed and used online information privacy, information integrity, information quality.

An individual's expectation of privacy regarding access to and use of his or her

personal information should be assured, as well as the fact, that this information is not improperly altered or destroyed. Moreover, this information should be accurate, timely and relevant for the purposes for which it is provided and used.

The privacy principles are especially important for the part of business-to-business electronic commerce that focuses on the exchange of unstructured messages, such as for the purpose of customer support. For example, certain business customers (e.g. banks) at Cisco's electronic commerce web site would be quite unhappy about the knowledge that their increasingly strategic network support requirements could be accessed by third parties.

Technological Issues

International business-to-business electronic commerce is directly dependent upon a reliable, advanced, seamless, global telecommunications infrastructure In some countries, however, strong government intervention in the telecommunications sector is creating high costs, limited bandwidth and a restricted portfolio of services for advanced digital networks. Moreover, some countries establish trade barriers to imported information technology, making it difficult to purchase the equipment and software packages needed to participate in electronic commerce.

The liberalization of the global telecommunications markets has been discussed over the past ten years In 1994, the Vice President of the USA, Albert Gore, laid down several principles that can be universally applied in every national telecommunications market to facilitate the conduct of electronic commerce. These principles are:

1) To encourage private sector investment by privatising government-controlled telecommunication operators

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2) To introduce competition to monopoly phone markets, ensuring interconnection at fair prices, opening markets to foreign investment and enforcing anti-trust safeguards.

3) To implement, via an independent regulator, pro-competitive and flexible regulation that keeps pace with technological developments

It has been argued by the deregulated countries that a genuine market opening will lead to increased competition, improved infrastructures, more customer choice, lower prices, and an increased number of improved services.

The WTO Agreements on Basic Telecommunications and more recently on Information Technology will contribute directly to the emergence of a global marketplace in electronic commerce. The agreements ensure global competition in the provision of basic telecommunication services, Internet service provision included.

Although these international initiatives and agreements on the provision and deregulation of telecommunication services are very important in the short term, very little will change as the incumbent telecommunication operators often have economies of scale and local expertise that will be difficult for new entrants to obtain. Moreover, in many cases the government of the individual country is still the major shareholder of the incumbent telecommunications operator, which can slow down the national ratification and subsequent implementation of these international agreements.

Chapter 3

Cases of Internet-Based Electronic Commerce

3.1 Shell Chemical Redefines Supply Chain Management

Shell Chemical manufactures the base chemicals used in the downstream manufacturing of lots and lots of well-recognized industrial and consumer products Their customers use their detergents, solvents, plastics, epoxy resins and so on to produce everything from automotive paints and aircraft structures to diapers and plastic bottles. Annual revenues for 1996 were in excess of $5 billion.

SIMON (Shell Inventory Managed Order Network) basically enables the transfer of responsibility for inventory management from customer to supplier.   There is no need for a Shell Chemical customer to place an order.   Through SIMON, the company is able to proactively keep vital inventory on customer's shelves, so to speak.   Customers pay only for what they consume.   It's a cutting-edge supplier/customer business model -- one that's built on a relationship of mutual trust and a belief that there are significant benefits to be realized on both sides.

Let's face it, customers are painfully aware that if they run out of an essential chemical, plant time is lost and so are revenues.   Most address this issue by maintaining "safety stock" levels.   When inventory starts to get too close to these levels, they re-order They have to be diligent about this practice because a typical re-supply order takes about two weeks from the time the order is placed.   Miscalculations result in rush orders. Rush orders are more costly and all too frequent   Billing is difficult at best   An invoice is sent out for every single railcar load of product that is sent from Shell's

facilities to customers'

SIMON Delivers Significant Benefits to Shell Chemical Customers

- ☐ Eliminates expensive excess inventory, which means an increase in working capital.

- ☐ Facilitates timely, low-cost "re-synching" of supply chain

- ☐ Ensures product is on site whenever needed.

- ☐ Ensures quicker response times to changing conditions.

- ☐ Reduces transaction costs (e.g., invoices and data entry).

- ☐ Eliminates erratic order patterns.

- ☐ Reduces order processing overhead

- ☐ Streamlines financial statements and reconciliation processes

The customer is able to access the status of these orders and shipments; estimated dates of arrival, shipment weights, receipt and unloading dates; and current stock and consumption levels. And SIMON offers customers a "Reconciliation" tab, which compares metered and calculated consumption, and a "Site level agreements" tab, which shows the mutually agreed-upon plan for management of customer inventory. Once a month, an invoice is generated. The invoice is based on consumption figures, not shipments

Under the scheme, Shell would manage its customers' inventory and place orders for the customers instead of waiting for the customers to notice that they were running low. Shell now bills the companies monthly for actual consumption instead of per shipment.

3.2 POSCO (Pohang Iron & Steel Co.,Ltd.)

POSCO, the biggest steel-making company in the world, has been providing information service to its customers (e.g. car makers, shipbuilders, and large retailers) by Steel-VAN (Value Added Network) and EDI.

By Steel-VAN, which has been serviced since 1987, customers make orders and get various information on order generation, production and shipment status. The number of customers who are using the VAN has increased significantly since its inception.

EDI was serviced under the closed network(POS-NET) from September, 1997. By EDI, customers and POSCO can transfer official documents. By doing so, both of them can reduce the cost and time of transferring documents.

VAN was operated under the closed network(POS-NET) at the first time, but to improve the convenience of customers, POSCO developed the internet-based Steel VAN which can provide information more rapidly, accurately and conveniently to customers in March 1998.

The main functions of the internet-based VAN are:

- ☐ To provide customers with real-time information of ordering and production/shipment status.

- ☐ To get the dialogue-style information between customers and POSCO.

- ☐ To reduce costs of customers and POSCO

One of the most advantageous thing of the Internet-based VAN is to transact with foreign customers. POSCO expects to communicate with 160 foreign customers via Internet in the near future. Afterwards, POSCO will integrate VAN and EDI to make information services more convenient.

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Figure 6. POSCO Internet-Based Steel VAN Home Page

To improve its current business processes and information and logistics systems to be more customer-focused, and to maintain its competitive advantage, POSCO has launched Process Innovation (PI) Project.

In the e-commerce area, POSCO is aiming at establishing Internet-based integrated network, which will able POSCO to contact customers and handle all the transactions with external stakeholders electronically.

To achieve this goal, POSCO will:

☐ Establish information exchange/sharing system through Internet involving all the transactions POSCO makes.

☐ Introduce Internet-based electronic document transactions system and expand its scope.

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□ Establish infrastructure to speed up information processing, which supports customer' system environment.

□ Establish Cyber Steel Market including Internet auction of long held inventories.

The impacts of achieving the goal are as follows,

□ Reduced transaction time and cost and improved white-collar productivity.

□ Improved customer relations through real-time offering of customer requested information.

□ New markets and better market responsiveness toward all the potential customers worldwide.

3.3 Allegiance Healthcare Corporation

Allegiance Healthcare is the largest healthcare product manufacturer, distributor and cost-management services company in the United States. It distributes 900,000 boxes of such medical and laboratory supplies as surgical gowns, clinical diagnostic instruments and test tubes to more than 6,000 U.S. locations daily.

As Allegiance's market has grown, so has the volume of electronic orders, doubling every year since 1992. Despite Allegiance's reputation for swift turnaround, increasing numbers of customers in recent years have requested real-time EDI processing of their orders so they can receive even faster deliveries.

By 1995, company officials realized that their mainframe-based EDI system and its batch-mode communications no longer could cope with the increased customer demands. The company selected Internet-based Information Services' Enterprise System as its corporate gateway software. The system handles data translation to and from multiple

formats, supports real-time EDI processing, routes data traffic from a variety of external sources and internal legacy applications, and enables Allegiance Healthcare to customize processes for individual trading partners.

The solution was first implemented for Allegiance Healthcare's ValueLink customers, where the EDI volume for each customer ranges from 10,000 to 50,000 purchase order lines a month — a total of more than two million lines processed each month. With this high volume, ValueLink customers were having the most challenges with Allegiance Healthcare's mainframe-based EDI translator.

Allegiance Healthcare now is in the process of encouraging the rest of its customers to convert to the new EDI environment. When the changeover is completed, more than 800,000 customer purchase order lines per month will be added, bringing the total to more than 3.6 million. The new system will be the heart and hub of Allegiance Healthcare's EDI operations, as eventually everything will be moved off the mainframe. The EDI traffic will be more than 1.5 billion characters a month

Company officials believe the system not only will help Allegiance Healthcare continue to provide quality service to a growing base of customers but also will reduce operating expenses significantly. In addition, a 40 to 60 percent decrease in error rates is forecast.

3.4 Dynegy

Dynegy, which buys natural gas from pipelines and sells it to utilities and businesses, is the largest gas marketer in the United States. When the business, formerly known as Natural Gas Clearinghouse, in early 1997 began implementing Internet-based electronic commerce solution, the Enterprise System, it was one of the first companies to

comply with new Gas Industry Standards Board (GISB) guidelines for transmitting secure, time-sensitive EDI transactions over the Internet.

"We wanted to move forward with the standards quickly, using Internet-based solution, for two reasons," says Eldon Moreland, director of gas marketing systems for Dynegy. "First, it will increase our company's competitiveness. We will be able to exchange mission-critical transactions over the Internet with confidence, thus streamlining our operations, cutting costs and differentiating our services from competitors. Second, we feel strongly that the standards will improve the competitiveness of our entire industry. Our industry's lack of universal standards until now has made natural gas one of the most difficult forms of energy to market."

The Enterprise System, can be configured to support custom GISB modules, automates for Dynegy the process of HTML enveloping and de-enveloping of business data to GISB specifications. It tracks Internet EDI transactions for the company to ensure that documents are sent and received within GISB's strict time lines, and delivers documents via alternate routes such as fax, e-mail or VANs when the Internet cannot deliver a document on time. The system also automatically notifies Dynegy via e-mail, fax or pager of irregularities such as document delivery problems, and provides immediate on-line document status information.

Chapter 4

Conclusions

4.1 Research Findings

The Internet has already been proved as an indispensable avenue for many industrial companies to reach new national or global markets. Four business cases we have studied in the previous chapter led us to conclude that many industrial companies can enhance competitiveness in the global market by establishing e-commerce with Internet. For example, as we have studied, POSCO could reduce transaction time and cost and improve white-collar productivity, and also improve customer relations through real-time offering of customer requested information   And it could exploit new markets and strengthen market responsiveness toward all the potential customers worldwide through the Internet-based e-commerce

Needless to say, electronic commerce is a proven technology that can fundamentally change the way companies work. The Internet is the fastest growing mechanism for electronic commerce and offers a variety of techniques with which businesses can communicate.

It is quite likely that better business communication generated by the Internet will create greater satisfaction on the part of both transaction partners. Problems are still there, but will be solved more effectively. In the mean time, sales volume on the Internet will surely expand. The major benefits will accrue to those companies that are willing to change their organization and business processes to fully exploit the opportunities offered by electronic commerce.

4.2 Future Areas of Research

There is still a great deal of uncertainty surrounding Internet and electronic commerce. Insufficient national standards and inadequate computing infrastructure still pose substantial risks to many businesses and organizations already involved in the Internet marketing.

Even with the risks, companies have realized that the Internet is an important tool in their efforts to form good relationship with their customers. Our study in the previous chapter shows that many successful companies are utilizing the IT(Information Technology), including Internet or e-commerce, for better customer satisfaction.

One of the important IT applications is EDI communication system for just-in-time (JIT) in a business supply chain as shown in the SIMON case. It would be quite interesting to study the IT application and partnership strategy for specific relationship in the b-to-b market to achieve both transaction side benefits, especially between steel makers and automotive companies.

Another area for future study will be what national standards and infrastructure are needed for the b-to-b e-commerce and how strategic application of IT in the specified b-to-b market should be conducted to achieve competitiveness of both transaction partners.

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