

The Impact of Electronic Commerce as it Intermediates the Value Chain

By Brad Morantz
Georgia State University, Atlanta GA USA

Abstract

The Internet has become almost limitless and its audience is expanding rapidly. Countless items and services are available directly to the consumer via this electronic medium. Both individuals and companies find that they can save time and money shopping on the Web. It is changing how people browse and purchase. No longer just a source of information or entertainment, the Internet is also a 24 hour a day, 7 days a week electronic shopping mall. The way business is conducted is changing at a rapid pace. Some functions of the value chain will diminish or disappear while new ones are expanded or created.

Background

The traditional value chain has been the accepted route of the manufacturer supplying the distributor. He in turn supplies the jobber who supplies the retailer or installer. There are many intermediaries handling the product before it finally reaches its destination, the consumer.

Sales people and support staff are needed. Tangible product requires warehousing and shipping. Each one of these businesses attempts to make a profit, and in so doing, increases the final cost of the product.

Product literature was in print format, starting first with a product manager, then a graphic artist. Plates had to be made and then run on a printing press. The catalog was then distributed by some physical means such as the Post Office. If any mistakes needed correcting, or updates were required, it was relinquished to the subsequent printing, at some later point in time.

Introduction

The value chain is the string of activities, functions, and business processes performed in getting a product or service to market. This includes designing, producing, marketing, delivering, and supporting the product or service. The chain begins at raw material and idea and ends with the customer. [Thompson & Strickland]

Electronic commerce is commerce that involves use of E-mail and/or Internet web sites to communicate, deliver information, and conduct business. This includes sales to businesses and end-users. The International Trade Administration has defined electronic commerce as "Any activity that utilizes some forms of electronic communication in the inventory, exchange, advertisement, distribution, and payment for goods and services". [Campbell]

Digital Equipment Corp (DEC) was one of the first on-line marketers, opening their web site in 1993. In 1996, revenues from this new medium were \$210 million. The following year they reported nearly 1 million hits a day on their site. [Stevens]

On-line brokers expect to spend \$500 million to advertise their services on the web. [Kuchinskas] Amazon.com, the web based bookstore, reported \$150 million in sales in their last fiscal year. [Jeffrey] The travel agency industry did \$276 million online in 1996, which grew to \$816 million in 1997. Auto-by Tel, an auto selling web site, went from \$1.8 million in 1996 to an estimated \$6 million in 1997. [McCoy]

@plan, a Stamford Connecticut research company, reports that more than 10% of adults using the web have shopped for apparel in 1998. While 4.6% of them purchasing does not seem like a large amount, it is an increase of 200% over the previous six months. Jupiter Communications of New York predicts that the 1998 total for sales of clothing over the web will be \$71 million. [Kuchinskas]

The M/A/R/C group of Dallas and Peapod of Chicago states that the average on-line grocery shopper spends \$2,072 per year. Heavy users may spend more than \$4,000 per year. [Kuchinskas]

Morgan Stanley estimated retail sales in 1996 would be \$600 million and just over \$2 billion in 1997. Their analysts are predicting about 150 million users in the year 2000, with sales somewhere between 21 and 56 billion dollars. They expect this to grow to \$115 billion by 2005. [Kotkin]

Reality exceeded estimates as Internet purchases in 1997 were \$5 billion [Campbell]. International Data Corp, (IDC), a Framingham Massachusetts based research group predicts that web based commerce will be about \$20 billion in 1998 [Unknown, Jan 1998] and will ten fold to \$200 billion by the year 2001. [Baer] [Unknown Feb. 1997] Another study states that 7% of U.S. households have purchased products or services on the Internet. [Unknown March 1998]

Louis Harris/Business Week did a survey in spring 1997, and estimated that 40 million Americans were online. In a November 1997 Intelliquest survey, it was estimated that the U.S. online audience was about 55 to 60 million. [Branigan] That comes to about a 50% growth in less than a year.

In early 1998, about two thirds of Internet users were in the U.S.A., but growth rates are even higher overseas. Japan and Western Europe are showing exceptional growth that will result in more even distribution internationally. [Branigan] The telecommunication industry will deregulate in Europe in 1999. It is expected that this will reduce the cost of Internet connection and that the number of users will grow from the current 9 million to 35 million by 2000. [Schavey]

It is estimated that 100 million people will be accessing the web by the end of 1998. [Unknown Jan. 1998] Another research organization, NUA, predicts that the Internet will be host to 119 million people in 1998. [Campbell]

Who Uses Electronic Commerce

About two thirds of Internet users do so from home. They are in their prime spending years with a median age of 38 and median household income of \$66,000. About half of them have children living at home; and about the same ratio are college graduates. About 60% are male. This is a direct marketer's dream, as it is his prime target. [Branigan]

The direct marketing industry grew 18% from 1980 to 1996, three (3) times faster than the total retail market. These home shoppers tend to be better educated and wealthier. 33% are college graduates, a rate that is double the national average. While only 38% of the general public has income of \$30,000 to \$70,000, this group has 57% in this range. [Kotkin]

Another survey in November 1997, found that about 75% of the users find great value in using the web. Find/SVP's American Internet User Survey also said that 45% consider it 'somewhat indispensable' and 28% said that it was 'very indispensable'. [Branigan]

Charles Schwab E-Schwab division, one of the more successful on-line brokerages, claims that their typical E-commerce customer is 10 to 15 years younger than a typical brokerage customer. The fastest growing segment of E-Trade's business is the under 25 group. [Branigan]

Why do People use Electronic Commerce?

About half of Americans consider shopping to be an unpleasant chore, according to a Deloitte and Touche Consulting Group study. For those under 34, the percentage rises to 55%. A 1997 Kurt Salmon Associates' study found that 52% of consumers want to reduce their shopping time. [Kotkin]

This shopping time is one of the search costs and has related opportunity costs. Other search costs are actual expenditures including driving expense, telephone calls, computer fees, magazine subscriptions, etc. [Bakos]

Online shopping has combined four (4) important aspects of shopping namely
1) selection; 2) convenience; 3) service; and 4) price. [Belsky]

Consumer desire for online shopping is growing. Studies show that 70% of the users are looking for product and/or service information. They are doing the first three of the four essential phases of the classic purchase cycle. These four phases are: [Desrosier]

1) Awareness; 2) Interest; 3) Desire; and 4) Action

It is more sales friendly, in that it is easy to find what one is looking for. Search engines such as Yahoo, Lycos, Alta Vista, Infoseek, Excite, and more direct people to the desired subject. Editorial sites link to the vendors, in return for a share of the commission. [Branigan] These allow people to find almost anything that they are looking to buy.

There are shopping channels and shopbots (shopping robots) that compare features and prices of many of the alternatives. They search the web and do comparisons, an idea that used to be a dream. [Kuchinskaskas]

Features that cannot be found at most retail stores abound. Interactive media and application programs make purchasing more effective. Music stores allow one to sample from a selection of music clips. One such company advertises 275,000 clips to choose from. No physical store can offer a selection like this. [Branigan]

One ladies clothing vendor displays all of the latest fashions in 3-D, and then allows one to see photo realistic simulations of mannequins with clothes and accessories on them. This provides a preview of the total look of the items. [Kuchinskaskas]

Amazon.com, the bookseller, encourages their customers to submit book reviews, which are posted along with the catalog. Not only does it help sell the books; it gives the customers a sense of community. This can cause more visits, as well as a more customer loyalty. [Branigan] These customer reviews along with online information, 2.5 million titles to select from, and discount price adds up to a hard sell. The result is 3.1 million book buyers. [Kuchinskaskas] [Schavey]

Amazon.com is now also selling CD's, with a selection of over 200,000 titles, all at discount pricing. The goal is to provide selection, convenience, and pricing, to get people to change their buying habits. [Kuchinskaskas]

One online grocery store has a program that allows one to select what it is they want to make for dinner, and the program automatically places all of the required items into their order. [Kuchinskaskas] This convenience not only helps the customer, but also increases revenues for the store.

Why Do Companies Use Electronic Commerce to sell

In order to be successful, an E-commerce company needs to adopt a strategy that seeks competitive advantage in at least one (1) of the following ways:

- 1) Selection or assortment of complementary merchandise
- 2) Distribution efficiency

- 3) Unique merchandise
- 4) Presentation of information via electronic medium
- 5) Collection and utilization of customer information. [Alba et al]

E-commerce can increase competitive advantage in a number of ways. It can lower transaction cost by eliminating or reducing parts of the value chain. It can also save money in the way that it accomplishes some tasks. Many use the Web to reduce costs and to increase sales. They are also lured by the international exposure and export sales. [Unknown March 1998]

As an example, compare the cost of mailing a color catalog to 120 million people around the world to the cost of a web site. The advantages are obvious. This is an example of faster and cheaper delivery of information. [Campbell]

It helps communications between the company and their customers, sales people, and marketers. It is also used for finding new employees, much less expensively than hiring an employment agency or recruiter. [Campbell]

It is inexpensive to post a web page. A firm can buy a program to create their own page, which is as simple to use as a word processor or desktop publishing program. The sites can be posted for as little as \$15.00 a month, depending on the Internet service provider, or ISP, and the features desired. [Campbell]

Updates and corrections are very fast. Printed catalogs require new artwork to be created, then printed and distributed. Now it becomes a simple task of updating the web page. If new products arrive or there become new applications for an existing product, it can quickly be communicated to all potential customers. This provides clear competitive advantage over a firm using an older, slower method.

The web site is open 24 hours a day, seven days a week. This allows customers to visit whenever it is convenient to them. People can browse the entire product line and purchase what they need when they need it. [Campbell] AOL reports that 40% of member shopping takes place after 9:00PM, after physical stores have closed. [Kotkin]

As mentioned earlier, the World Wide Web is just that, worldwide. Suddenly the audience is much larger. This brings the possibility of exporting. Some companies offer their site in several foreign languages, to encourage this international business. ActivMedia estimated that 33% of small businesses are likely to export. [Campbell] The more customers, the greater the revenue.

Small to medium size enterprises are becoming involved with it. An April 1998 NUA survey estimates that 78% of these are online. Further, more than 25% of them attribute increases in revenue to applications of these new technologies. [Campbell]

Many government agencies and medium to large companies are requiring that their suppliers and distributors be EDIcapable (compliant). This means using the Electronic Data Interchange, or EDI, to link producers, suppliers, and sellers together. This shortens the ordering cycle, saving money as well as time. [Campbell] [Baer]

Why Do Businesses Use E-Commerce to buy?

Electronic data Interchange, or EDI, as mentioned earlier, automates exchange of business transactions, and has been in use for twenty (20) years by some of the world's largest manufacturers. Ariba Technologies has created a program to manage procurement for smaller needs. Advanced Micro Devices, (AMD), uses it for incidental office and facility supplies. [Baer]

This program saves time and paper (by eliminating paperwork), and frees time for relationship management. Purchasing departments now have time to troubleshoot problems and negotiate better deals. [Baer]

AMP Inc. has made it very easy for engineers to specify and select their products. Their printed catalog lists 90,000 parts, presenting an overwhelming task to find what one is looking for. Their site contains an interactive search engine that selects the part parameter and then provides specifics and 3-D CAD drawings. [Stevens]

What Kinds of Businesses are on the Internet?

A U.S. Business Internet Survey shows that small businesses are becoming increasingly dependent on the Internet. [Campbell] Fragmented industries with many independent buyers and sellers have good potential for growth on the Net. Products that come in complex configurations will succeed because people will value a uniform way to search for product and/or service information. Industries with complicated or expensive distribution channels will benefit with a streamlined value chain, such as an automated site with a search engine. [Gurley]

Anyone with a few thousand dollars can become a merchant. In 1997, a US trade association stated that there were no Internet businesses over two (2) years old. They went on to say that most of the estimated 250,000 commercial sites have been in business less than one (1) year. [Wyckoff]

Some of the most common types of popular web sites are: Automobiles [Sullivan] [Wallace Aug. 1998] [Wallace May 1998]; Consumer Electronics; Computers [Jacobs Aug. 1998] [Jacobs April 1998]; Cosmetics [Machlis]; Books [Tweney] [Barron]; Travel; Mortgages [Wasik]; Music [Martin] [Jeffrey] [Sacharow]; Health Insurance [Schwartz]; Clothing [Mand]; Video [Fitzpatrick]; Wine; Ticketing [Reece]; and Flowers and plants. [Belsky]

Dell Computer of Austin Texas uses both private Intranet connections for special customers and the Web. They are now generating sales of \$1 million per day. [Stevens]

How Has This Affected Business?

Electronic commerce links people and technology to solutions. This allows customers and suppliers constant access to information, products, and services. Information retrieval is the power because of its ability to find previously inaccessible things. [Levin & Guinther] It has had a tremendous impact on traditional ways of doing business, as bringing producers and consumers closer has reduced many of the costs associated with business. [Wyckoff]

In a project that IBM did for Animal & Plant Inspection Service of the Federal Department of Agriculture, the results were reduced costs and time. The costs of doing business are now about 5% of sales, a very low number. Order cycle time is now 14 days, down from six weeks before this improvement. They have saved enough from not having to print catalogs to pay for the site. [Stevens]

Software can be delivered online, omitting the need for a physical store. This electronic delivery allows the manufacturer to do the installation, keep track of licenses, check the version number, and verify upgrades. It has been estimated that this can reduce technical support costs by 55%. [Wyckoff] Eliminating retail sales, delivery, and technical support expense will reduce the price of this product.

Interactive web sites make the salesperson more of a consultant, as the mundane catalog selection is done online. The sales staff can now concentrate on improving the customer relationship. [Stevens] This will allow reduction of the sales force translating to lower operating costs.

Amp Inc., using proprietary software, tracks every visit to their site. They monitor where someone goes, how long they stay, how often they visit, and watches for dead end paths. They use this to determine if they are missing what could be a potential account, to look for holes in their product line, to notice dead items, and to be aware of any opportunities that might arise. [Stevens]

Several companies allow registered users to maintain a catalog page in their site. Each customer, on their protected page, posts the products that they use, and in-house part numbers. This information is then available to registered users at the company, to know what is currently available. The supplier, knowing the customer's area of interest, can tailor promotions and information directly to any particular customer's need. [Stevens]

HP is using the Internet to link their sales team around the world, and provide them with needed information. They credit most of their big sales in recent years to their ability to globally link their teams on the Net. Presentations are posted and can be shared by teams at varying locations. [Stevens]

Manufacturers have discovered that they can sell from their own web site at a big discount directly to the consumer, allowing the consumer a lower price, yet they still realize a larger profit than they would selling through normal channels (i.e. retail or discount store). The only delay in this becoming the mode of business is that many producers are afraid of alienating some of their big customers. [Kotkin]

A 1996 study by Kurt Salmon Associates showed that 15 to 20% of total retail sales was not done in stores, but by catalog, TV, and online. This is expected to grow rapidly, and within 15 years could account for more than 55% of all retail sales, with online becoming the biggest part. [Kotkin]

There exist other benefits besides lower prices and improved sales from the use of electronic communication. Manufacturers receive customer feedback and marketing comments very quickly and can use this information to improve both product and sales efforts. [Waitley]

Logistics

The cost of transporting the product from producer to customer has been estimated to be 10% of the GNP [Ref #8 in Bakos]. Information sharing provides quick JIT deliveries and reduced inventories, reducing logistic costs. Intangible goods like music, software, and information are now being distributed electronically, totally obsoleting physical delivery systems, and reducing overall costs. [Bakos]

When companies direct sell tangible goods, they have eliminated the intermediaries, reducing the cost of goods. In so doing, they have created a new emerging class of intermediaries, the delivery companies. United Parcel Service and Federal Express are committing themselves to further improve upon their expertise and economies of scale and creating an important market position for themselves. [Bakos]

What Does the Future Hold?

We are experiencing lowering costs of Internet connections because of proliferation and competition among service providers. Telephone deregulation and communication satellites are further reducing the cost and expanding the coverage. It can bring news to the world and provide

education to those in poorer nations. Marketing of goods and services and electronic communication throughout the world will continue to be the main impact. [Waitley]

It has been estimated that electronic commerce grows 200% a year. Another survey predicts that by 1999 39% of all retailers will be selling online. [Wyckoff] Deloitte and Touche Consulting Group predicts that this new retail channel will become the number one alternative retail outlet, doubling the volume of TV and catalog shopping combined. [Unknown Feb. 1997]

As stores become less socially interactive, and people stress information, price, and availability, the retail industry will change. Soon a store will be an automated screen in our home, offering a selection of discounted items, from a supplier at an unknown or irrelevant location. [Kotkin] Our purchases will be done electronically, and then either delivered or prepared for pick-up.

The distance between producer and consumer is shrinking. People will make their purchases directly from the manufacturer without involving any intermediaries. In general, E-commerce will bring economic activity closer to the theoretical ideals of perfect competition. [Wyckoff] Most experts predict a radical shift in business processes in the next century. The changes will be in business strategy, technical improvements, government taxes and regulations, and how people respond to these changes. [Lohse & Spiller]

Summary

The four (4) important key factors of shopping are affected by E-commerce. Some suppliers offer tremendous selection, and search engines to help find the correct item. They are operative 24 hours a day 7 days a week to give service and convenience. Reducing overhead and eliminating parts of the value chain can help to create a lower price. The open information forum also forces lower prices.

Electronic commerce is having a definite impact on the marketplace. Companies are buying and selling in what is becoming theoretical perfect competition. They will all need to reformulate their strategies and adapt to the fast changing environment. Intangible goods will feel the greatest changes.

Many intangible items, like software and music, are being delivered electronically, making physical delivery systems unneeded. Purchasing directly from a producer reduces the dependency on stores, but creates new demand on delivery services. While printing companies are seeing a reduction in need, there is a great demand for design and production of effective web sites. Sales staff are no longer doing daily sales tasks, but can now concentrate on relationships and other aspects of business.

Some jobs are being replaced or alleviated by this technology, allowing personnel to perfect other parts of the relationship. Overall, prices should be decreasing while availability increases. Many jobs will be lost by reductions in the value chain, but new ones will be created to support the process.

References

[1] Alba, J; Lynch, J; Weitz, B; Janisweski, C et al; Interactive Home Shopping: Consumer, Retailer, and Manufacturer Incentives to Participate in Electronic Marketplaces, *Journal of Marketing*, vol. 61 no. 3, July 1997, pp. 38-53

[2] Baer, T; E-commerce is a Contact Sport, *Manufacturing Systems*, vol. 16 no. 6, June 1998, pg. 32

- [3] Bakos, Y; The Emerging Role of Electronic Marketplaces on the Internet, *Communications of the ACM*, vol.41 no. 8, August 1998, pp.35-42
- [4] Barron, C; Borderless Bookstores, *Europe*, no. 375, April 1998, pg. 6
- [5] Belsky, G; Get it Quick- and Pay Less- by Shopping on the Web, *Money*, vol.26 no. 9, Sept. 1997, pp. 174-176
- [6] Branigan, L; The Internet: The Emerging Premier Direct Marketing Channel, *Direct Marketing*, vol. 61 no. 1, May 1998, pp. 46-48
- [7] Campbell, A J; Ten Reasons Why Your Business Should Use Electronic Commerce, *Business America*, vol. 119 no. 5, May 1998, pp. 12-14
- [8] Desrosier, J; Now's the time to Hitch Up the Ewagon, *Brandweek*, vol. 39 no. 35, Sept. 21, 1998, pg. 16
- [9] Fitzpatrick, E; Online Video Retailers Strike Up Deals with Web Networks, *Billboard*, vol. 110 no. 34, Aug. 22, 1998, pg. 73
- [10] Gurley, J W; Creating a Great E-commerce Business, *Fortune*, vol. 137 no. 5, March 16, 1998, pp. 146-148
- [11] Jacobs, A; Buying PC's Over Web Has Benefits, *Computerworld*, vol 32, no. 16, April 20, 1998, pp. 63-66
- [12] Jacobs, A; More Businesses Buying PC's Online, *Computerworld*, vol. 32 no. 38, Aug. 24, 1998, pp. 45-46
- [13] Jeffrey, D; Who's Buying Music Online? Mostly males Aged 12-17, *Billboard*, vol. 110 no. 38, Sept. 19, 1998, pp. 79-81
- [14] Kotkin, J; The Mother of All Malls, *Forbes*, ASAP Supplement, April 6, 1998, pp. 60-65
- [15] Kuchinskas, S; The E-commerce Cometh, *Adweek (Eastern Edition)*, vol. 39 no. 38, Sept. 21, 1998, pp. IQ8-IQ12
- [16] Levine, B; & Guinther, F; Electronic Commerce- Is the Distribution Channel Ready for It?, *Electronic News*, vol. 43 no. 2196, Dec. 1, 1997, pp. S12-S14
- [17] Lohse, G; & Spiller, P; Electronic Shopping, *Communications of the ACM*, vol. 41 no. 7, July 1998, pp. 81-87
- [18] Machlis, S; Estee Lauder Tackles Web, Channel Conflict, *Computerworld*, vol. 32 no. 27, July 6, 1998, pg. 79
- [19] Mand, A; Online Retailer Bluefly Has High Hopes for Web Sales, *Brandweek*, vol. 39 no. 31, Aug. 10, 1998, pg. 37
- [20] Martin, T; Sony Forces music Business to Accept the Logic of Selling Online, *Marketing Week*, vol. 21 no. 26, Aug. 27, 1998, pg. 35
- [21] McCoy, F; How Much in Sales? Um, a lot, *U'S News & World Report*, vol. 124 no. 16, April 27, 1998, pg. 62
- [22] Reece, D; Advance Tix are Latest Online Twist, *Billboard*, vol. 110 no. 37, Sept. 12, 1998, pp. 5,24

- [23] Sacharow, A; Rhapsody in BMG: Music Service Expands Online, *Brandweek*, vol. 39 no. 15, April 13, 1998, pg. 38
- [24] Schavey, A; Retailing Online: today's Promise and Tomorrow's Opportunity, *Business America*, vol. 119 no. 1, Jan. 1998, pp. 40-41
- [25] Schwartz, S; First Internet Health Insurance Sales System Debuts, *Insurance & Technology*, vol. 23 no. 9, Sept. 1998, pg. 18
- [26] Stevens, T; Set Sale on the 'Net, *Industry Week*, vol. 246 no. 8, April 21, 1998, pp. 56-68
- [27] Sullivan, C; Cars.com Launches \$26M Ad Campaign, *Editor & Publisher*, vol. 131 no. 37, Sept. 12, 1998, pg. 48
- [28] Thompson, A A Jr; Strickland, A J III, *Strategic Management Concepts and Cases*, 1998, Irwin McGraw-Hill: USA
- [29] Tweney, D; No Mere Bookstore, Amazon.com Wants to be an Online Retail Giant, *Info World*, vol. 20 no. 32, Aug. 10, 1998, pg. 46
- [30] Waitley, D; Instant Commerce, *Executive Excellence*, vol. 15 no. 9, Sept. 1998, pg. 13
- [31] Wallace, B; Car Dealers Yield Sales to Internet, *Computerworld*, vol. 32 no. 35, Aug. 31, 1998, pp. 1,17
- [32] Wallace, B; Ford Test-drives Used-car Web Site, *Computerworld*, vol. 32 no. 21, May 25, 1998, pg. 8
- [33] Wasik, B; The New Online Mortgages, *Fortune*, vol. 137 no. 7, April 13, 1998, pg. 150
- [34] Wyckoff, A; Imagining the Impact of Electronic Commerce, *OECD Observer*, no. 208, Oct. 1997, pp. 5-8
- [35] Unknown; Internet Shopping Study Reveals Impact of New Medium, *Direct Marketing*, vol. 60 no. 11, March 1998, pg. 11
- [36] Unknown; E-commerce in 1998, *Editor & Publisher*, vol. 131 no. 1, Jan. 3, 1998, pg. 42
- [37] Unknown; "Cyber Shopping" Will Become \$200 Billion Business, *Direct Marketing*, vol. 59 no. 10, Feb 1997, pp. 11-12

About the Author

Dr. Brad Morantz is currently a Senior Scientist with Science Applications International in Tucson. He wrote this when he was a doctoral candidate in Decision Sciences at Georgia State University. He holds a BS in CIS/EE from Cleveland State University and a MS and PhD in Decision Science with a minor in Computer Science from Georgia State University. He has also taken many courses in Computational BioScience as well as industry coursework in imaging and project management.