ELECTRONIC COMMERCE: SCOPE AND IMPACT

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by

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Abstract

This project describes e-commerce and assesses its impact on businesses and education. The following will be evaluated 1) at what level of industry is e-commerce successful, 2) the levels of e-commerce education that are offered around the world, and 3) to what level of education should WPI offer the subject.

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1. Introduction

The information age and its technology are transforming our world. A big part of this new and exciting era is the Internet. Internet technology already affects many aspects of our daily lives - work, health care and education just to name a few.

The Internet has had a profound effect on many industries and processes. One such area that has been revolutionized is commerce; also known as electronic commerce or simply e-commerce. Most people regard e-commerce as a buzzword with no concept of what it is or the impact it has and will continue to have on our society.

E-commerce is a method of buying and selling products and services electronically. The primary method of electronic commerce is through the Internet and the World Wide Web. Technically this definition also includes e-mail, fax, and telephone orders as examples of e-commerce, but this paper will focus on e-commerce conducted via the Internet and the web. There are four segments to the e-commerce market: (1) business to consumer (B2C), (2) business to business (B2B), (3) consumer to consumer (C2C), and (4) consumer to business (C2B). What follows immediately is a brief definition of each of these segments. Extensive overviews will follow in later chapters of the report.

Business to Consumer e-commerce is simply the sale of goods and services to traditional consumers via the Internet. When we think of B2C, the first e-tailer that comes to mind is Amazon.com. Amazon has been a pioneer of online selling to consumers, it was one of the first large pure-play e-commerce sites, specializing in the sale of books, music, movies, etc. It has been fairly successful and many people are repeat customers.

At the other end of the spectrum are major business-to-business players. In the computer and the high-technology products industry, these are companies like CDW, Insight Enterprises, and PC Connection. For these e-tailers, B2B means that a company is selling products or services, often in very large quantities, to other businesses across a variety of industries. In this case, businesses are the consumers and ultimate users of the products or services. This definition is very different from the "textbook" definition of business-to-business, which was once considered the sale of products or services to companies for the purpose of using them to manufacture or develop additional products or services. The purchasers in such a situation are not the end-users of the original product or service, but rather the original product or service is used as a component to create a new product or service. By today's standards, B2B is just a subdivision of B2C where the consumer happens to be a business. B2B offers a large market opportunity and potential for rapid growth and adoption.

Consumer-to-Consumer transactions are the oldest form of e-business. They have been there from the beginning, long before there was such a widespread use of the Internet. People would place ads on the Internet or newspaper and others would contact the seller using e-mail, for example. These transactions continue to exist all over the place and can be supported on large and visible websites. This is the case of these "auctions" that are becoming more and more popular. These auctions are, however only one of the many ways to help people deal directly with each other or to buy more conveniently from companies. Most C2C transactions have traditionally occurred offline, including classified advertisements, auctions, garage sales, etc. The highest profile online C2C company, which is also a market share leader, is eBay. EBay is a auction site

in which sellers advertise products, which can be bid upon by anyone, that has an eBay account. Winning bidders pay directly to the seller. Once a sale is made, the seller pays a small fee to eBay for using the site to sell their goods.

Consumer to Business transactions represent a new business model. The theory behind them is customer empowerment. C2B e-commerce companies are designed to make the customer more aware of his/her options. The most important activity in C2B e-commerce is not selling, it is buying because many companies can sell products, but only those companies that have buyers will end up surviving. This does not necessarily mean buying online but, checking, comparing, and analyzing quality and price before buying in traditional stores. Priceline.com is an example of a high profile company in this sector.

This paper will focus on the concept of e-commerce explaining how it began, through its evolution, to what it has become today. It will attempt to explain the novel technologies that support e-commerce. This discussion will raise many questions related to the impact that e-commerce has on society, how diverse businesses utilize e-commerce to augment their business practices, how consumers utilize e-commerce to maximize the effectiveness of their dollars, and the growth and availability of e-commerce education worldwide. To answer these questions both business and educational electronic commerce models will be examined. This study will also attempt to speculate how e-commerce could further benefit society, both the consumer and businesses.

Another objective of this project is to document the varying categories of industries in the e-commerce economy in addition to how businesses and consumers are getting a jump-start on the e-commerce model by formal education. In particular, the paper will target its focus on education programs in e-commerce that are offered in

leading universities throughout the world. The core courses that are offered in these programs will be categorized in an effort to summarize the structure and type of e-commerce education available. Analysis includes the opinion of faculty members from WPI and from the additional universities studied, in an attempt to gather sample opinions of professors around the world, and to determine the level of interest in offering e-commerce education at WPI compared to that of similar schools globally. The results from this research will be made available to the Worcester Polytechnic Institute community.

In summary, the objectives of this project are as follows:

1. Define e-commerce. Research its sectors, history, and the technology that supports it.
2. Research and determine the difference, if any, between e-commerce and e-business.
3. Create a theoretical model of a successful E-Commerce Venture by listing several attributes. This model will be based on the study of profitable E-commerce ventures
4. Categorize e-commerce courses offered at leading universities around the world
5. Determine where the interest in e-commerce education lies at WPI, and to what level is should be offered.
6. Propose the most effective and efficient e-commerce education model to WPI based on existing availability and the level of interest in the subject area at the school.

2. Literature Review

2.1 Defining E-Commerce

2.1.1 Business to Consumer

Business to Consumer is a segment of electronic commerce that, as the name itself suggests, includes the basic retail activities on the web. Examples include Dell's sale of computers on the web, Microsoft's sale of computer software, the sale of books/music/toys by Amazon.com, online stock brokering by E*Trade, and travel sites such as Expedia or Travelocity.com. Given the explosive growth of e-commerce, particularly in the US, this definition of B2C has turned out be rather narrow. Almost simultaneously with the growth of the B2C markets, rapid innovations in this field created two more segments consumer-to-business, or C2B, and consumer-to-consumer, C2C, to fully exploit the power of the Internet. Companies such as Priceline.com created the C2B market, in which passengers could bid for airline tickets, hotel accommodations and car rentals, giving the option to the airline/hotel/car rental company to accept or reject the bid. Similarly, by creating an auction site, eBay blazed a new trail in creating the C2C markets. While several other players have joined the "auction mania", eBay has consistently enjoyed the "first mover advantage". Since there are strong interlinkages, especially in the price discovery/comparison mechanism, B2C, C2B and C2C can be grouped in a class for the purpose of this paper.

The B2C revolution that started almost five years ago was driven largely by two key attributes. First was the ease of price comparison compared to the "Brick and Mortar" world. The web enables users to easily compare prices of products from any browser in the world. Second, there are an extremely substantial amount of options

available to the Internet customer. As the power of the Internet grows and greater innovation takes shape, the growing clutter of "choice" is slowly leading the way into "informed and discerning" choices for the customer.[1]

Leading e-commerce companies are not profitable yet because they are still in the early stages of development and require significant levels of scale to turn the profitability corner. Unlike retail companies that have a higher proportion of variable costs and can turn individual stores profitable before expanding, e-commerce companies are instantly national and require more investments up front. The difference for e-commerce companies is that a higher proportion of the costs are fixed and much of the spending is upfront. This means that once an e-commerce company reaches scale, it can ultimately achieve an equal or better operating margin while using fewer operating assets. This should enable the company to achieve superior return on invested capital.[2]

Many e-commerce companies still lack sufficient customer demand to drive top-line growth, in part because they are only addressing a subset of the available market. According to a study completed by Forester Research in 1999, only 17% of the households in the United States had shopped online. Because Internet access has reached 40% of the households in this country, a common misperception is that online commerce has reached peak acceptance from the mass market. The current trends among e-commerce companies reflect their being in the early stage of the consumer adoption life cycle.[3]

Most e-commerce companies have not reached their long-term targets for three reasons: lack of influence with vendors, promotional price discounting, and promotional free shipping and split shipments. Many e-commerce companies are relatively small and

have a high proportion of products being sourced from middlemen. As companies grow larger, they will be able to source goods directly from manufacturers and will not have to incur middlemen costs. Many new companies need to attract new customers and in order to do so, these companies offered incentives to overcome trial barriers created by a customer's fear of paying for a new service or new product that might not meet expectations. Therefore customers require a "platform of familiarity" to provide either an increased level of credibility or lower cost. E-commerce companies have been very aggressive in providing lower prices and free shipping to drive trial. Many of these companies either absorb the cost of free shipping or have high shipping costs resulting from multiple shipping zones. When companies split shipments and send items of the same order individually, the shipping costs are paid for by the retailer. To control these costs, more companies have reciprocated from offering free shipping to offering it on a promotional basis.

Another problem that many of these B2C e-commerce companies face is that the barriers to entry into the marketplace are very low. The entry barriers are so low that "customer loyalty" is an extremely scarce commodity. A B2C customer, at the first sign of dissatisfaction may switch companies, for example from amazon.com to barnesandnoble.com, without thinking twice.

The competition in the B2C space proved to be so fierce, in practically all segments ranging from books, music, groceries, travel, online stock broking that all e-tailers suffered from negative gross margins. The going was good as far as the venture capital funding was available, and the fancy for such stocks helped the IPOs of such companies to be pushed through. But as the wild investor enthusiasm faded and the

business model, in most cases, failed to make the operations profitable even after three years in the business, (in most cases, including Amazon.com, one of the earliest players in the B2C space) reality begun to sink in and the stage was set for a Nasdaq meltdown.

The hundreds of "dotcoms" turning up bankrupt may be a blessing for the more serious "pure-plays" such as Amazon, etoys, priceline, and the new "Click and Mortars" like Wal-Mart and The Gap, companies which started as traditional merchants and branched out onto the web to use another channel as a means to sell their goods.

If e-tailers were around for the 2000 holiday season, chances are that they are strong companies, "the people that are left are by and large very strong players." Other analysts agree "if e-tailers didn't think they were going to make it through the 2000 holiday season, they gave up early," said Heather Dougherty, a retail analyst with Jupiter Research. "The holidays are the most expensive time for any retailer, if they were still around in November 2000 they probably made it through the holiday season."[4]

There was a difference in the way e-tailers did business for the 2000 holiday season. The more mature e-tailers worked out the kinks such as the late delivery of goods, which disappointed Internet shoppers in 1999. Consumers saw fewer price wars and 'freebies' among e-tailers, who learned that competing on these factors alone was not enough to attract shoppers or to make their businesses profitable. Specialists say fewer discounts ultimately mean better web shopping for most consumers. It is estimated that 96 percent of those who shopped online in 1999 intend to buy online again, even though more than half experienced purchasing problems, according to a poll taken by Boston Consulting Group and Harris Interactive. According to the same poll, the average online

holiday shopper expected to spend 240 dollars on holiday gifts in 2000, up from the expected 170 dollars the previous year.

Delivery problems were such a huge problem in the 1999 holiday season that the Federal Trade Commission, or the FTC, ultimately charged seven large e-tailers with violations of the Mail and Telephone Order Rule and collected 1.5 million dollars in penalties. According to the Boston Consulting Group/Harris Interactive research, 28% of online shoppers wanted to buy an out-of-stock item in1999 and 17% fell victim to delivery problems. The FTC recently notified over 100 e-tailers who claim that in-stock items will be shipped within 24-48 hours of their obligation under that rule. First, if an e-tailer can't ship within the promised time, they must notify the customer of the delay within the original shipment time. Second, if a merchant notifies a customer of a delay, they must explain that the customer has the right to cancel with a full refund. Further, the merchant must provide a revised shipment date.[5]

Enhancements made by e-tailers to their sites will hopefully prevent occurrences such as the 1999 holiday season. New customer oriented sites should acknowledge whether an item is in stock and focus on the customer's expected date of arrival, not the actual shipment date. Many sites have also improved customer support.

Forrester forecasts B2C Internet commerce in the United States will grow about 68% annually to generate 108 billion dollars in 2003 from 8 billion dollars generated in 1998. Widespread consumer adoption of the Internet has fueled demand. Jupiter Communications indicates that the industries that have been the most successful in the B2C include computers, electronics, books, apparel, and music.[6]

2.1.2 Business to Business

In the Business to Business e-commerce sector, several different business models exist. Certain business models may work better for different channel structures. The average age of a B2B e-commerce company is approximately two years. Consequently, most companies are taking their first crack at developing the business model suitable for their target market. For example, some companies may start out with a lead generation model, with hopes of making the transition to an e-trading exchange model. Most companies revise or completely re-engineer their business model multiple times before the correct solution is in place. This section will summarize the current B2B business models: primary and secondary e-trading exchanges, e-supply chains, e-distributors, e-resellers, e-coops, and e-market makers.

E-trading exchanges bring together buyers and sellers on the Internet in a real-time trading environment. It is believed that a large number of e-trading-exchange marketplaces will likely enter the public market over the next couple of years. E-trading exchanges are transaction fee based systems where a B2B company inserts itself between fragmented buyers and sellers to create a marketplace. The e-trading exchange should lower selling costs to sellers and procurement costs to buyers. There are two different types of companies in the e-trading exchange space: primary trading exchanges and secondary trading exchanges.

Primary e-trading exchanges facilitate exchanges for goods that have never been used before. For example, the exchange consists of new products versus pre-owned or used products. Secondary e-trading exchanges facilitate trade for either surplus inventory or used products. Usually there is an urgency to move the stagnant product to quickly

free-up capacity and space for the new product. These exchanges are viewed favorably as they created a market where one either did not exist or was not fully optimized. The majority of manufacturers have been forced to accept low prices to move stale inventory. With the advent of the Internet, suppliers can display excess inventory to a larger captive market of buyers. For example, Liquidation.com provides buyers with access to anything from computer peripherals to sporting goods. The company does not take title of any inventory and earns revenue from transaction fees. The company has no costs associated with warehousing or financing inventory. The exchange simply introduces buyers and sellers while taking a flat commission fee based on the value of the underlying product.

E-supply chains create adaptable online platforms allowing entire industries to do business within a community. Through a single interface, these communities connect the stepping stones of a supply chain (manufacturers, suppliers, importers and exporters, wholesalers, distributors, retailers) to their respective trading partners. By creating secure shared databases and integrating online commerce technologies, e-supply chains can move pricing, product, and promotional information through a supply chain accurately, economically, and efficiently. For example, pcOrder links each member of the personal computer channel from the original equipment manufacturer to retailer. Through shared information, pcOrder enables channel members to quickly configure products and track products.

E-supply chains improve workflow simply by providing correct, current, and consistent information. Typical inefficiencies include delivery delays, out-of-stocks, and inaccurate forecasting. These problems can result in unnecessarily higher distribution costs. Efficient e-supply chains do not insert themselves into a layer of the supply chain.

Instead, they form relationships with all channel members. E-supply chains help lower costs and increase inventory for all channel participants. The e-supply chain model combines software and transaction fees. The e-supply chain stores all of the product data in one central repository. Channel participants pay to access this database and leverage it to lower their overall sales costs.

E-distributor models are typically transaction fee based models with some attributes of a software-licensing model. E-distributors aggregate product directly from suppliers and sell that product to corporate buyers over the web. The successful e-distributor will either cut out the traditional distributor or will create web-based distribution where distribution previously did not exist. An example of an e-distributor is SciQuest. By using the Internet, SciQuest has aggregated numerous suppliers to provide buyers in the life sciences industry with a centralized catalog. Accordingly, SciQuest has created a new distribution channel where, prior to the introduction of the web, it did not exist.

The e-reseller model is often referred to as the catalog model. E-reseller is a more appropriate term because e-resellers are essentially aggregating distributor catalogs and making them available on the web. Chemdex is an e-reseller in the life sciences industry. Chemdex aggregates VWR's (VWR is a distributor) catalog and makes it available on the web.

The E-co-op model typically is initially a software licensing model that eventually evolves into more of a transaction-fee model. E-co-ops are companies that enable a large buying organization to gain efficiencies in their purchases of supplies from outsiders. This model works best in channels where the buyer can afford to install the software and

integrate it into its back office. The solution is appealing to Fortune 500 companies with significant expenditure budgets.

E-market makers leverage the Internet to provide efficiency for a pre-existing spot marker. These companies actually take physical possession of inventory to facilitate an efficient market. ZoneTrader, for example, targets the vertically oriented technical equipment market. The company has strategic relationships with a number of large technical equipment manufacturers such as Compaq, Hewlett-Packard, IBM, Sun Microsystems. Zone Trader is a hybrid of a traditional liquidation marketplace and virtual exchange in that they actually purchase the goods, carry it as inventory and then resell the products to a designated buyer.[9]

There are several areas in which B2B e-commerce will differ from B2C e-commerce. Adoption rates, payment platforms, and barriers to entry are all different in both e-commerce sectors. The development of the B2B e-commerce market will be slower and more complex than that of the B2C e-commerce market. Due to complex relationships and narrowly defined industries, B2B companies have significantly higher hurdles to overcome. In the B2C market, a B2C company could use a television advertisement promoting its website, potentially creating a powerful product immediately. B2B companies must rely on relationships and a sales force to create their brand recognition. Because business buying behavior is harder to alter than consumer buying behavior, B2B companies must spend time educating their prospective customers (purchasing officials and senior management) on the efficiencies associated with web-based commerce. This process is time consuming and costly. [10]

Credit cards create a uniform payment platform in the B2C market. The transactional functionality of a consumer website was contingent upon the ability to process credit cards. Consumer website designers could easily integrate the payment platform. The B2B market lacks a standard payment platform creating complex financial and risk management issues. Purchase orders must be written and undergo various internal approvals. If business buyers do not adjust their internal buying process to facilitate online procurement, the time for broad scale adoption will be lengthened. A number of B2B companies offer software solutions for buy-side procurement problems, but the challenge of changing a business buyer's payment process is slow.

Many B2B companies have an up front cost commitment requirement (for example, an up front software license fee investment). As a result, the B2B customer has to make a material up-front cost commitment (such as an up front software license fee investment) when choosing an online procurement solution, thus raising the switching costs. Furthermore, customers of B2B companies must make certain adjustments to their technology back-ends in order to become a part of a marketplace. Since most B2B architectures are not totally web based but more Internet based, there are certain "inside and firewall" adjustments that must be done before a client company can begin to engage in B2B Internet commerce. Accordingly, these factors help to create a barrier to entry for the B2B company in question.

Three variables have the biggest influence on B2B uptake in an industry: product complexity (degree of customization versus commoditization), type of end consumer (is an industry consumer or enterprise focused?), and financial characteristics (fast revenue growth, high margins). Industries that make highly configured products (such as network

router, or an automobile) will need B2B software more than commodity industries such as utilities. This is because the configured products are more information intensive, and B2B software can create savings on input costs. Consumer end user oriented industries will favor B2B over enterprise end consumer industries. Industries with fast revenue growth, and high margins will be the earliest adopters of B2B. Such industries are generally more youthful, and have a more opportunistic business culture, and favorable financial risk/reward profile with regard to B2B adoption. The computer and semiconductor, consumer products, auto, paper, and chemical industries are the biggest B2B adopters thus far. [11]

Investors have shifted a lot of their attention to B2B, in part because of the large market opportunity and potential for rapid adoption, and thus rapid growth potential. Market research firms differ in their definition and sizing of the market, but all estimates point to enormous potential and rapid growth. Some examples include:

- IDC forecasts that B2B commerce in the US will increase to $633 billion in 2003 from $50 billion in 1999. Global B2B Internet commerce is expected to rise to $1.1 trillion in 2003 from $80 million in 1999
- Forrester expects US B2B Internet commerce to grow to $1.3 trillion in 2003 from $109 billion in 1999
- Goldman Sachs estimates that B2B Internet commerce in the US was $39 billion in 1998 and will grow to $1.5 trillion by 2004. [12]

2.1.3 Evolution of Internet Usage

The corporate adoption of Internet technologies is still in its infancy. As with prior technology cycles, multiple phases are likely, and each new cycle will become more complicated and/or sophisticated than the previous one.[13] In the first phase, from about 1993 to 1997, the Internet was primarily used as a marketing tool, to present information

(usually product information) and marketing material. Such applications were not critical to success or failure, and the expertise for services companies was quite low; an understanding of HTML, or hypertext markup language, was sufficient.

During the second phase, running roughly from 1996 to 1998, the focus was on increased corporate interest in using the Internet for marketing and brand building, awareness, and advertising. Websites were viewed as a way to build brand, to provide more information-rich product information, and the beginnings of customer support. Here, the focus seemed to be on B2C commerce, although B2B was beginning to emerge as well. Graphical presentation, online branding, content management, and ease of use became more important. Services companies needed to have expertise in HTML and Java.[14]

In the third phase, which is evolving more and more every day, the focus was, and still is, on creating transaction oriented systems. These are geared at both customers and businesses. (In many cases, the B2B and B2C distinction doesn't really matter.) In this phase, the Internet is starting to be viewed as a new way to reach existing customers and reach out to other customer segments or markets.

Capabilities of the transaction systems include order entry, payment, and more expansive customer service. In most cases these are still fairly simple. Essentially, an e-commerce veneer is constructed which interacts with the IT infrastructure through interfaces (website).[15] For perspective, many e-business front ends that allow consumers to purchase products over the web still have manual steps behind the scenes. An example of this is when an order is received electronically over the Internet, but it is manually reentered into the corporation's ordering system. The key languages for this phase

include C++, HTML, Java, and XML, but the need for greater technological knowledge is becoming more necessary.

In the fourth and latest phase, we are seeing existing corporations and dotcoms start to experiment with next-generation e-business capabilities. These focus on more specialized uses of Web technologies and new, innovative business models that enable greater collaboration between companies and their suppliers, partners, and customers in the B2B, B2C, supply chain areas. This new phase is being propelled by a corporate desire for a competitive advantage by adopting unconventional business models, eliminating e-business veneers, and replacing them with systems that are seamlessly integrated into corporations internal IT infrastructure. These moves should result in a number of advantages; for the customer, it could provide more extensive information and customer service, for a corporation with electronic links to its suppliers and partners, manufacturing and procurement costs could be reduced. These pros are more critical to the success of the company than the previous phases.

Wireless technology is also now entering the e-commerce arena. Wireless access to the Internet is possible with 2-way pagers, personal organizers, or mobile phones. WAP (wireless application protocol) and voice recognition are two of the enabling components. Although technology plays a role in the wireless solution, the technology itself is not terribly complex. What is difficult is helping a financial services company, for example, alter its business strategy now that its customers can interact with the company through a wireless connection.[16] Wireless will probably follow the same developmental trend as original e-commerce. That is, it will probably first be applied to

B2C applications, for instance, consumer banking, news, and travel. It will most likely then start to become incorporated into B2B applications.

2.1.4 Internet Technology Trends and XML

The Internet architecture and the resulting e-business solutions are a hybrid and an extension of the mainframe and client/server architectures. Both previous computing architectures solved important business needs, but they have significant shortcomings for today's requirements. From a functional standpoint, the big difference between Internet applications and mainframe and client/server applications is that the traditional applications have focused on automating and supporting internal processes. These include financial reporting, call center support, and customer pipeline management. From a process perspective, these systems are not really designed to manage the purchasing life cycle, both B2B and B2C, on the Internet.

The mainframe model, first developed in the 1960's is a fully centralized architecture in which a central system performs all of the processing and contains all of the data. Users access this system through character-based terminals that are often referred to as "dumb-terminals" because the user's device does not contain any business logic or processing capabilities.

In early generations of the client/server model, almost all of the business logic was located on the client's side, generally in either a PC or UNIX workstation. Servers performed low-level functions including file retrieval and print processing, and were connected by a local area network, or an LAN, that included a small number of users, usually a department or work group, within a company.

As the Client/Server model evolved, servers took on more of the processing and business logic of the applications. This model has now evolved to where servers are dedicated to running entire processes, including the system's level management functions, transaction-based middleware, and even the user applications.

From an application perspective, the Internet architecture has three tiers: client, application, and data. The client tier is browser based and is described as "thin" because little or no business logic runs on the client. A thin-client tier is important because it enables the application to run on many different, often non-traditional, devices including PDAs, pagers, and mobile phones, in addition to personal computers. A key distinction between the old mainframe analog and the thin Internet client is that the latter allows almost universal access.

Looking at the application tier, applications are written and built to support Internet standards that include XML, HTML, Java, and others. These applications are designed to process information in real time as opposed to in batch, which is at the end of the day. The need for real time processing is in part due to the need to monitor the applications, something that is critical in e-business applications.

The emergence of the Internet has played a key role in the shift to thin-client, host based systems. Applications under the older mainframe and client/server architecture were designed for internal users. In such an environment, the end user's desktop was known and controlled. In the Internet model, this is no longer the case because most users are outside the company. Their hardware configurations are not known, nor would it be feasible to download entire applications (the business logic) to the user's device. From a centralized perspective, the applications must be capable of high reliability and

scalability in a high transaction volume setting. Re-centralization of the application and data tiers improves efficiency, reliability, and management of the system.

In addition to the Internet, extensible markup language, XML, is another key development that has allowed inter-company collaboration to rise to a new, more complex level. XML is based on the same principles of HTML and defines and formats electronic information. IT is used to help businesses communicate electronically with partners and consumers. XML-based software translates internal corporate information, transports it across the Internet, and reconfigures the information into a format that can be understood by the partner's system. XML is important not only because it facilitates e-business, but also because it gives companies leverage to their existing IT systems and applications

2.2 E-commerce Successes and Failures

In the year 2000, 210 Internet firms -- more than half of them e-commerce companies -- ceased operations, according to a report released by merger and acquisitions tracking firm Webmergers.com. The causes of these shutdowns vary and unfortunately it appears that no single company has yet to find the magic formula for e-commerce success.

The few companies that still have a breath of life, yahoo.com, amazon.com, ebay.com, barnesandnobles.com, iQVC.com, and travelocity.com just to name a few, are either currently succeeding or have the potential to do so. In either case, the world of e-commerce is still growing and changing and these companies still have many hurdles and pitfalls to overcome. On the other end of the spectrum, companies such as pets.com, liquor.com, send.com, savvio.com and foodline.com just to name a few, have failed and

are now out of business. This leads to the question, what causes some dot-com companies to fail while others succeed?

According to E-commerce Times, "The bottom line, ultimately, is the bottom line. Internet businesses need to become profitable." No matter how provocative or innovative a business model is, if the model cannot produce a reasonable profit in a realistic period of time, then, according to Tim Miller of Webmergers.com, "by the time the company realizes that they could not survive on their own, their investors will have fled and they will already be facing shutdown."

According to the Wall Street Journal, in order for Internet companies to succeed, their web sites need to be smartly conceived, well managed, continually fine-tuned and appropriate for the businesses sponsoring them. This line of thinking also applies to the business plan. Sadly, Foodline.com, a New York based company that enabled diners to use the Web to make reservations at their favorite restaurants, had a poorly constructed business model. A common question that arose regarding this company was whether it was really necessary; people wondered if picking up the phone and calling the restaurant was actually so difficult. Because of the failure to recognize this, Foodline.com was forced to close down. As *E-commerce Times* stated, "if there's no problem, the solution probably isn't going to fly."

Another reason for the lack of profitability in these online companies is that "it took the U.S. seven or eight years" to learn that Internet sites needed direct revenue from surfers, offered Dewang Mehta, executive director of the National Association of Software and Service Companies, a computer trade group in New Delhi. Most Internet companies rely on banner ads to bring in some if not all of their revenue.

One example of this is AllAdvantage.com. Their business strategy was to pay people to surf the web while other businesses paid AllAdvantage.com for banner ads. According to Keith Regan of *E-commerce Times*, "If carried out with caution and a good strategic plan, giving away money can be a perfectly logical way to make money, especially on the Internet. And especially in the new age of heightened concern about Internet privacy."

Though this model may sound viable, it still deals with the pressures of profitability: How can a company become profitable if they are not given a chance to first lose money. AllAdvantage.com could not begin selling ad space to other firms and could not begin charging a premium for those ads until it built up a strong base of users. In turn, it could not build up a strong base of users unless it initially handed out the monetary incentives. During the four-month period from December of 1999 to March of 1999, AllAdvantage paid out 32.7 million dollars to customers but took in only 9.1 million dollars from businesses. Stating "the advertising and capital markets have changed so fundamentally that it is now impossible to continue our infomediary incentive programs and benefits," AllAdvantage was forced to shutdown.

As AllAdvantage learned, for an e-commerce venture to succeed, you need to achieve profitability very quickly and to do so, banner ads cannot be the only source of income. It helps to get direct revenues from the web surfers as well as other sources. This is the case with Savvio.com. Their business plan was a reverse name-your-price model, which is very similar to Priceline.com's business model. Unfortunately, as *E-Commerce Times* put it, "if you can't build a better mousetrap, why bother building the same one as the other guy, especially if he's already been in business for more than two

years and can't keep his own stock out of the trenches?" Savvio.com lasted four months in the harsh world of e-commerce. It goes to show just how brutal the playing field really is. In the game of e-commerce, the first guy to set up shop is not guaranteed survival. These companies usually have the shortest, simplest and catchiest names but their drawback is believing that success is all in the name.

If any four e-tailers had reason to believe they could succeed by name alone, these four did: Furniture.com, Graden.com, Mortgage.com and Pets.com. All four companies had budding popularity, significant capital investment, and shaky competition, but in the end, none of it mattered. Instead of success, all four companies, within a 16-day span, announced they were shutting down operations. The cause of failure: poor e-commerce business models.

A bad e-commerce business model wasn't all that caused Liquor.com to fail. They seemed poised to be successful. They carried no inventory and were fortunate that the demand for alcohol could possibly never decline. They also had the ability to sell and ship anywhere but in the end, that very ability is what caused them their downfall. Keeping abreast of each state's rules about mailing alcohol "maybe a bit too much work for a startup to handle."[17] The folks at Liquor.com probably thought it was better to start building market share now and let the regulations part take care of itself over time.

As the people at Liquor.com learned, "The e-economy represents a major opportunity and a major threat. For organizations anchored in the economic and business assumptions of the industrial economy, the e-economy is a threat to its business assumptions, business models, value propositions, and sources of competitive advantage."[18]

"New organizations — those whose models are based in the electronic economy — are under pressure to build, scale, and continually innovate without resorting to some of the easy pay-off strategies from the old economics such as acquiring physical assets or competing solely on price. However, organizations that take deliberate action now, armed with an understanding of the new economics and a thoughtful blend of global strategy and skill, can position themselves to reap the new value offered by the e-economy. "[19]. Such e-commerce companies are eBay, Yahoo!, Amazon, iQVC and JCPenny.com. These companies and others like them are looked upon favorably and in most cases share similar attributes. Some of these attributes are:

1. First-to-market Advantage
2. Dominate Market Share
3. Strong Brand Name
4. Strong customer service
5. Secure site

According to the "Powerful Lure" plot in **Figure 2.2.1**, these companies and others like them are shaped to succeed.

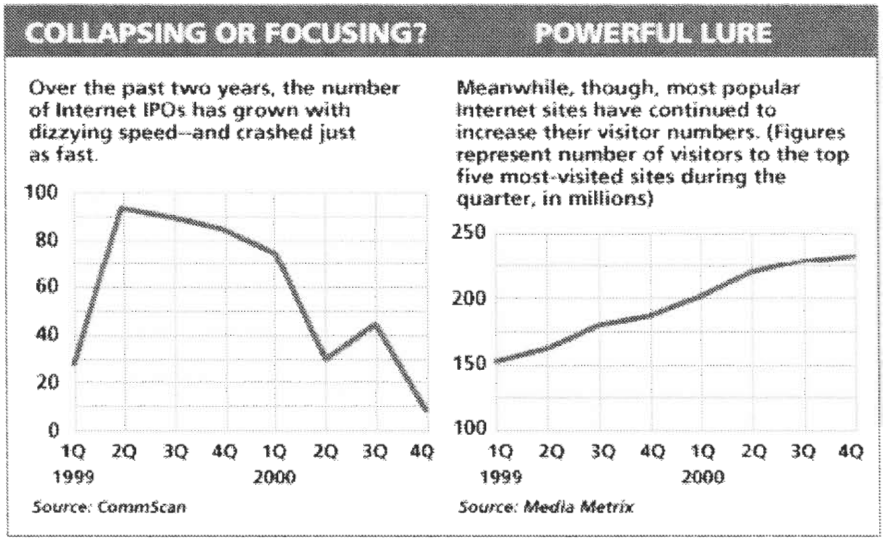

Figure 2.2.1: Internet IPO growth and visitors

The "Collapsing or Focusing" plot in **Figure 2.2.1** shows the decline in the number of new Initial Public Offerings of Internet companies. This decline could indicate a decrease in the number of new Internet ventures, which would greatly benefit the already established Internet companies because there would be declining competition. A decline in competition and an increase in Customer Service by the established internet e-commerce companies may very well give them the nudge they need to become profitable and retain customers.

Customer Service seems to be a big problem for a lot of e-commerce companies. Some companies associate customer service with a "Frequently Asked Questions" page while others use a natural language search engine to help customers find the answers they are looking for. Some e-commerce companies take it a step further by enabling customers to dial a number and speak to a human being.

According to Anthony Hsieh, president and chief executive officer of LoansDirect, Incorporated, which was recently acquired by E*Trade Group Incorporated, "a web site, no matter how good, can not compete with a human being." Applying that

theory to online shopping, no matter how many times you click on that article of clothing, you will only be able to try it on if you go down to a brick-and-mortar store like JCPenny or the Gap. According to *E-commerce Times*, "when you examine the state of e-commerce today, one thing is abundantly clear: traditional brick-and-mortars are making the greatest inroads online." The research firm Media Metrix claims that, six of the top ten gaining retail sites for the past holiday shopping season were traditional off-line brands such as Walmart.com, BestBuy.com and Sears.com. These are your traditional brick-and-mortar stores.

Does this mean that all the web based e-commerce sites are "failures in progress"? Are the "brick-and-mortar" based web sites going to dominate with their large customer base, brand loyalty, and most importantly, a presence in the physical domain? The crucial question here is: what causes some dot companies to fail while others succeed? To answer these questions, many web-based companies are finding it necessary to undergo some sort of formal education. To their advantage, there exist numerous certificate, bachelors and masters programs at various universities throughout the world.

2.3 Electronic Commerce Education

Electronic commerce education courses and degree programs have become more readily available over the last few years. The advance in technology and the huge increase in the use of the Internet are the main causes for this. According to a projection completed by the Board of the Faculty of Business and Economics at Monash University, a leading university in Australia, the number of students enrolled in a Bachelor of Electronic Commerce degree at the university will have increased by

almost 150 students by 2002. **Figure 2.3.1** shows the numbers of those enrolled and the anticipated enrollment at Monash since 1999. (www.monash.edu.au)

Year	Students
1999	36
2000	77
2001	133
2002	174

Figure 2.3.1: E-commerce student enrollment at Monash University – Breakdown of past, present, and predicted future number of e-commerce students enrolled at Monash University.

There are many advantages to offering an education in e-commerce, the main being the tremendous increase in e-commerce itself, another being the increase in the general interest in the subject area and another being the lack of knowledge in the subject area. Electronic commerce uses information technology to buy, sell and manage the supply of goods and services between organizations. Due to the increase in the use of the Internet throughout the world, e-commerce has developed into a necessary aspect of today's economy, especially those economies that are well developed. It is therefore, essential that education on the subject be made readily available and that universities take on a leadership role in teaching and researching the subject area.

A study at Northwestern Oklahoma University concluded that electronic commerce is one of the top fields with high salaries. They found that there are over 843,000 unfilled positions in the United States alone, and that these numbers are only going to increase. It was determined that at this growing rate, there will be over

2,300,000 unfilled positions by the year 2003.[20] After seeing these numbers it is evident that more schools need to take on e-commerce education programs.

Upon researching the degree programs offered around the world, it has been found that both bachelors and masters degree programs are readily available in the United States, Canada, and Australia. Several schools were located in other continents including Asia and Europe, however the programs were most frequently found in North America and Australia. For the purposes of this project several programs offered at universities around the world will be taken into consideration and evaluated. These schools were chosen because of their similarities to WPI. In evaluating several many different, yet quality, universities, a broad overview of the education in e-commerce that is available may be obtained. This overview can be used to create a specific program that fits the standards and level of interest at WPI. The particular universities analyzed include Monash University, Bond University and the University of Western Australia, all located in Australia; Curtin University, a leading school in the South East Asian region; Dublin City University, in Dublin, Ireland; Hong Kong University of Science and Technology in Hong Kong; National University of Singapore in Singapore; Carnegie Mellon University, Clemson University, University of San Diego, and Northwestern Oklahoma State University all located in the United States. Northwestern Oklahoma State University happens to have been the first school in the Unites States to offer a School of Electronic Commerce.

After earning a degree in electronic commerce there are many objectives of the student that should have been met. Upon completion of a degree in electronic commerce

these schools share a common list of these objectives. These schools state that each student should have:

- a sound knowledge and understanding of relevant business principles, processes and practice;
- a general understanding of information technology, including the organization and operational principles of computer hardware and software, databases, data communications and distributed information systems;
- an understanding of the Internet and multimedia technology and applications;
- the ability to analyze user and organizational requirements in relation to inter-organizational and on-line commerce and design appropriate solutions;
- the capacity to work at a professional level within a business environment in which a background in information technology and electronic commerce technologies is required;
- an understanding of the principles and techniques needed to coordinate and manage projects;
- a knowledge of the technologies, standards and protocols underlying electronic commerce systems;
- an understanding of the requirements for electronic commerce systems and transactions, and the techniques and protocols available to meet such requirements
- an understanding that electronic commerce involves the integration of people, processes, and systems via the enabling information technologies;
- an appreciation of social, ethical and legal issues in relation to electronic commerce, and an awareness of the laws and regulations which apply;
- the skills required for logical, independent and critical thinking, including independent learning, innovative and creative thinking, and research skills; and the ability to effectively communicate and cooperate with others, both within and organization and outside of it, and to work within, and contribute to, a team environment.

This list of objectives was mainly completed by the Board of Faculty and Business at Monash University as part of a proposal to add to a degree program in electronic commerce to the schools' curriculum. Most schools share the desire for their

students to complete this list of goals in order to earn a degree in e-commerce with them.

The structure of the programs offered at all of the schools chosen for this study is also quite similar, however there are differences. For example, Northwestern Oklahoma State University requires the completion of a final project where each student must apply the practice of electronic commerce in the design and implementation of an e-commerce venture. Although each school has their own unique practices, the core curriculum at each school is universal. These general requirements include courses such as Introduction to Electronic Commerce, Communications and Networking, Internet Education, Information and Operating Systems, Marketing and Management, Social Aspects of Electronic Commerce, and the Laws and Policies of Electronic Commerce.

One aspect of the program that alternates through these schools chosen for study is the department in which it is offered. This varies between the Business or the Computer or Technical Departments of each school. A common practice was that the program was split between both departments and the courses were offered in both areas of study. Monash University is one of the universities that chose to split the curriculum between the Faculty of Business and Economics and the Faculty of Information Technology. See **Figure 2.3.2** for the breakdown of the curriculum.

Subject Name	Business/ Economics	Information Technology
Technology	10%	90%
Electronic Commerce Fundamentals	50%	50%
Technical and Professional Communication	60%	40%
The Electronic Business Environment	90%	10%
Electronic Commerce Laboratory II	50%	50%
Electronic Commerce Laboratory III	50%	50%
Commercial Aspects of EC	50%	50%
Interorganizational Systems	50%	50%

Figure 2.3.2: Department Involvement at Monash University – Percent of Faculty involved in particular area of study for e-commerce courses.

3. Methodology

3.1 Defining Electronic Commerce

This section will give a concise definition of the term "e-commerce" based on information from the literature review. This definition will be presented in the glossary. In addition, the differences and similarities between e-commerce and e-business will be described. In order to conduct this compare and contrast, articles will be used from various sources.

3.2 Electronic Commerce: Success and Failure

The intention of this study is to develop the best e-commerce model based on the information gathered from all the e-commerce winners. An e-commerce winner is defined as a profitable e-commerce venture.

The first goal is to answer the following questions:

1. How does one start an e-commerce venture?
2. How do businesses utilize e-commerce to augment their business practices?
3. How do consumers utilize e-commerce to maximize the effectiveness of their dollar?

The second goal is to develop a theoretical model of a successful E-Commerce Venture by listing several attributes. This model will be based on the study of profitable E-commerce ventures.

To this end, the following questions will be answered:

4. What can we say about profitable companies? Do they have any common attributes?

Finally the procedure listed below will be followed.

1. Develop a matrix in excel using the attributes listed in Appendix 2 and referring to the survey in Appendix X
2. Sort into two groups (profitable / non-profitable) the companies listed in Appendix 3 and print in Appendix 4
3. Fill in the matrix with data from the profitable companies listed in Appendix 4 and attach as Appendix 5
4. Analyze the data by looking for common attributes amongst the profitable companies. List these in Appendix 6
5. Develop a E-commerce Model based on the analyzed data from the profitable companies
6. Conclude by writing up the findings on the analysis of the profitable companies and from all the profiled companies.

3.3 Electronic Commerce Education

Program content of e-commerce education models available around the world will be analyzed. The objective is to create an education model that complies with the level of interest and the standards that WPI maintains. To do this, several universities located around the world will be taken into consideration. These universities will be chosen based on their similarities and differences to WPI, along with their location, in order to obtain a global perspective. The degree programs will be analyzed, down to the specific course descriptions, and a general model sufficient to WPI criteria will be created. This model will be recommended to WPI for proposed use.

The general analysis is that of any school that offers a degree program in electronic commerce, however specific universities similar to WPI will also be studied. By doing this, a generalization can be made pertaining to how schools that share the same

curriculum are offering education on e-commerce, if at all. The three schools to be evaluated in this aspect, are the Massachusetts Institute of Technology, Virginia Polytechnic Institute and State University, and Georgia Polytechnic Institute.

Opinions of WPI faculty members will be obtained through one-on-one interviews and via the Internet. The faculty response to the questions asked will aid in determining the level of interest the faculty at WPI has in e-commerce. This will provide insight as to whether a looking into offering a degree program at Worcester Polytechnic Institute would be a sensible venture, or simply offering a course or two. The purpose of these interviews is to help determine the intensity of the model that will be recommended.

It is not be necessary to survey current college students or perspective college students about their interest in the subject matter as the field is increasing so very rapidly and research proves that there has been a significant increase in the number of students entering the field in every school that has decided to offer e-commerce education programs.

After researching and analyzing what is being offered around the world, and obtaining the opinions of several WPI professors with interest in e-commerce, options for e-commerce education will be determined. Each of these options will be discussed along with a recommendation as to which model would best suit WPI.

4. E-commerce and E-business

4.1 Defining E-commerce

Based on the information in the literature review, e-commerce can be defined as: The buying and selling of products and services by businesses and consumers over the Internet

4.2 E-commerce vs. E-business

There is noticeable disagreement as to the differences between e-commerce and e-business. There are many different definitions and in some cases, e-business is considered synonymous for e-commerce. Gary Simkin, vice-chairman of Shared Network Services Inc asserts that a lot of people are having trouble describing the difference between e-commerce and e-business. He claims that many businesses don't understand the distinction.

For example , in an article written by flashcommerce.com, the author suggests that e-commerce deals more with the technology that enables online transactions and that e-business focuses on the processes businesses need to implement in order to facilitate e-commerce. In the same article, the author describes another definition that he came across. This second definition suggests that e-commerce was initially used to describe the early commerce transactions that happened on the web. To a large degree, these transactions were focused on business-to-consumer activities. In contrast, e-business referred more to the emerging business-to-business activities, as opposed to the e-commerce, business-to-consumer ones. Finally the author asserts that e-business was a marketing term that IBM coined probably to differentiate their efforts from all of the other e-commerce activities.

There are those that don't see a distinction and consider the two terms synonymous. Walid Mougayar of Computer World states that "some analysts and online businesspeople have decided that E-business is infinitely superior as a moniker to E-commerce. That's misleading and distracts us from the business goals at hand. The effort to separate the E-commerce and E-business concepts appears to have been driven by marketing motives and is dreadfully thin in substance."[21] He claims that e-commerce, e-business or whatever else you may want to call it is a means to an end and that a companies success online isn't dependent on the definition of e-commerce or e-business. Still, others believe that there is a huge distinction. To put it simply, Shahla Aly, vice-president and general manager of e-business and ERP services and solutions at IBM Canada Ltd., had an explanation: E-business is more than e-commerce. E-business includes using online technology not just for selling e-commerce but to change all aspects of the way the business operates by using Internet technology to enable your basic business processes.

In an article written by GCIS, they claim that there is a huge difference between e-commerce and e-business. They start by suggesting that e-commerce is a business transaction (buying or selling) on a secure link over the Internet. They claim that it only entails your company and the ultimate buyer (your customer). They believe that not much else is done in a typical e-commerce transaction. They think that you are simply using the Web and it's resources to effectively conduct and execute a business transaction. They suggest that to engage in e-business means that you will gain the following features and reap the following benefits:

1- Sharply reduced costs of doing business.
2- Better and improved Return-On-Investment
3- Better service to all your customers.
4- Increased visibility among your competition.
5- Better TTM (Timing to Market).
6- Official B2B designation.
7- More options to your buying customers.
8- You can deal more effectively with your suppliers.
9- Better marketing advantage than your competition.

Timothy Faulkner of financial strategies writes that e-commerce is the more specific term which deals with transactions either between businesses (b2b) or business-to-consumer (b2c) and e-business is the more general term which is used much less frequently because essentially everything on the web is e-business.

According to an article written by Patrick King of PriceWaterHouseCoopers, e-business is still confused with its most visible but relatively limited manifestation, electronic commerce. He claims that historically, e-business has been thought of as electronic commerce. He suggests that e-businesses's greatest opportunities are to be found in back office and supply chain systems not in Internet shopping, which is what e-commerce resembles.

The consensus, based on this brief review, appears to be that e-business is the general form of the more specific e-commerce. Though many people may use the two terms interchangeably there does appear to be a distinction.

5. E-commerce Successes and Failures

5.1 Starting an E-Commerce Venture

Starting a new E-Commerce Venture can be as easy as one-stop-shopping by visiting a website like www.verio.com. Though the monetary startup costs associated with registering a new domain name, having someone host the site and paying someone to design your site can be small, the research from this IQP has found that the huge costs associated with a new e-commerce venture is time; the time required to do market and business research. This IQP has found that one cause of e-commerce failures, as seen with "liquor.com" and the many others discussed in the literature review, is due to lack of market and business research that lends itself to poor business plans.

5.2 Utilizing E-Commerce in Business Practices

Businesses utilize e-commerce to gain certain advantages. These advantages enable them to augment their business practices. The following is a list of six advantages that business gain by moving into online selling.

- Electronic processing is cheaper than paper purchase orders
- Online stores can remain open 24/7/365 without the need for proportional resources such as call centers and product support. Also you can reduce head count.
- The turnaround time to complete a sale and receive the revenue from the sale is shortened.
- With more computers handling the processing duties, human error is minimized. This makes online selling cheaper, more convenient and faster.
- An instant global outreach with the potential for a wider customer base.
- No limitation to physical office/retail space.

5.3 E-Commerce and the Consumer

There are a few things that consumers look for when they buy things online:

- Detailed information about the product they want – those who like specs can find a wealth of them very quickly online.
- Price comparisons – this is the beauty of online shopping; you can shop until you find the lowest price for your selection.
- Detailed information about the vendor – find out if the online merchant accepts returns.

The following are some additional reasons why online shopping is advantageous:

- Consumers can shop from anywhere there is an Internet connection, at anytime of the day or night, and in any attire they chose.
- Product comparisons can't get any easier. There is even online help for those who aren't sure about what kinds of information they should be interested in.
- The potential cost savings are there if you know where to look.
- Customers can buy personal and private products while concealing their true identity.
- There is no sales pressure.

5.4 E-Commerce Business Model

Figure 4.1 is the E-commerce Business Model and lists all the attributes that most of the profitable companies listed in **Appendix 4**, had in common. The column to the left indicates how many companies had that particular attribute in common.

Theoretical Model for a successful E-Commerce Venture	
% Of Commonality	**Model Attribute**
100	Employ In-house Web Site Maintenance
96	Do not accept advertising
96	In a subjective analysis, all but 1 (amp.com) of the companies have domain names that I could guess without actually knowing the correct URL. This accounts for 96%.
88	Use a Hardware Platform from either IBM, Sun Microsystems or an Intel Pentium Based Machine.
84	Employ telecenters (live-human customer service)
88	Advertise on television; Use direct mail; Advertise in business or consumer periodicals
84	Use either a Solaris or Windows NT Operating System
84	Use either the Microsoft IIS or Netscape Enterprise Web Server Software.
84	Use either Microsoft SQL Server or Oracle for the Database Platform.
80	Use a Fixed Pricing Business model.
72	Need to have storefronts established
72	Conduct B2C business
70	If public, trade on the NYSE
60	Use Website Personalization
60	Used a Website Design Consultant
56	Establish a partnership with America Online.

Figure 4.1 – E-Commerce Model

5.5 E-Commerce Model Breakdown

The following section will attempt to understand why the E-commerce Model depicted in Section 4.3 may be successful. Comparisons will be made against the E-commerce Model and those companies mentioned in the Literature review; those that were both unprofitable and have since ceased operations. An explanation of each attribute as well as its importance will also be discussed.

The E-commerce Model can be broken down into 4 major groups: Technology, Revenue Model, Customer Reach, and Other. Figure 4.2 details this grouping.

% Of Commonality	Grouping	Model Attribute
96	Customer Reach	In a subjective analysis, all but 1 (amp.com) of the companies have domain names that I could guess without actually knowing the correct URL. This accounts for 96%.
84	Customer Reach	Employ telecenters (live-human customer service)
72	Customer Reach	Need to have storefronts established
60	Customer Reach	Use Website Personalization
60	Customer Reach	Used a Website Design Consultant
56	Customer Reach	Establish a partnership with America Online.
72	Other	Conduct B2C business
88	Other	Advertise on television; Use direct mail; Advertise in business or consumer periodicals
70	Other	If public, trade on the NYSE
96	Revenue Model	Do not accept advertising
80	Revenue Model	Use a Fixed Pricing Business model.
100	Technology	Employ In-house Web Site Maintenance
88	Technology	Use a Hardware Platform from either IBM, Sun Microsystems or an Intel Pentium Based Machine.
84	Technology	Use either a Solaris or Windows NT Operating System
84	Technology	Use either the Microsoft IIS or Netscape Enterprise Web Server Software.
84	Technology	Use either Microsoft SQL Server or Oracle for the Database Platform.

Figure 4.2 – E-Commerce Model Grouping

As it can be seen in **Figure 4.2,** the ability to attract and retain customers (Customer Reach) coupled with a strong Technology base of E-commerce Hardware and Software (Technology) in addition to a Fixed pricing Business Model (Revenue Model) all contribute to a profitable e-commerce business.

5.5.1 Customer Reach

These profitable e-commerce businesses have found ways to attract and retain customers. Without customers, you can not generate revenue and hence can not achieve profitability. Two of the methods employed by these profitable companies to attract customers include the use of a website design consultant as well as a partnership with America Online.

A website consultant can help you design a fast, robust and flexible website. If your website design is poor, than it is intuitive that your chances of success will diminish. Though it is painfully obvious, studies show that if a website is still loading after many seconds, then customers are turned away and start reaching for the back button. This IQP's recommendation would be to design a robust and flexible site that will allow you to make design and content changes very quickly. Included should be a navigation system that allows your customer to chose a product and get to the checkout counter in as few clicks as possible.

A partnership with America Online is beneficial for many reasons. The major reason is the number of members that AOL has accumulated. This membership is exclusive in the sense that the AOL Community stands alone from the rest of the Internet world. The AOL community is big enough so that its members can shop, chat, email, and surf the web all without leaving the AOL community.

AOL serves more than 29 million members of its flagship AOL service, along with more than 2.8 million CompuServe members, 80 million registered users of ICQ, and more than 34 million registered users of the Netscape.com service. AOL also operates some of the most popular services on the World Wide Web, including

MapQuest, AOL Instant Messenger, AOL Moviefone, Spinner.com and NullSoft's Winamp, and Digital City, Inc. Through its strategic alliance with Sun Microsystems, the Company develops and offers easy-to-deploy, end-to-end e-commerce and enterprise solutions for companies operating in the Net Economy. The AOL International division operates localized online services in 16 countries in 8 different languages

Other methods of attracting customers is the use of a catchy domain name and the ownership of storefronts (otherwise called office space/retail stores). Storefronts give the consumer the assurance that they can always revert back to their traditional method of shopping if the online experience becomes to overwhelming.

In addition to attracting customers, these profitable e-commerce companies use the following methods to retain customers: website personalization and telecenters. Website personalization is the ability to identify a repeat customer and tailor the site to their needs and wants. Recognizing each repeat customer that comes to your online store will allow you to give different prices to the ones who shop the most, click on the most banner ads, refer the most people, etc. This will give your e-commerce business that personal feel. Of the 60% who use personalization, most of them used proprietary software. In addition to personalization, we have telecenters. Telecenters are locations where customer service representatives work. Without customer service, an e-commerce business will not be able to compete with the offline businesses due to the lack of human interaction. 84% of profitable companies in the report seem to agree. It is nice to know that you have a thinking human being on the phone that can help solve your problem.

5.5.2 Technology

To build a profitable, robust and reliable e-commerce venture very quickly and smoothly, these profitable companies have turned to other profitable companies for all their e-commerce hardware and software. These companies seem to think that it makes sense to rely on companies that are profitable especially if they do so by using their own e-commerce hardware and software. For example, according to an Oracle television advertisement, Oracle saved 1 billion dollars in 2000 by using its own e-business software. The technology you build upon, though not initially obvious, may in fact have a big impact in how profitable you e-commerce business can be.

5.5.3 Revenue Model

According to the data collected, the profitable companies don't accept advertising and they use a fixed pricing model in lieu of an auction/negotiated or reverse name-your-price model. This is a property of a successful e-commerce venture that wasn't known when companies like AllAdvantage.com and Savvio.com had started out. As discussed in the literature review, Alladvanteage relied on banner ads for income and Savvio used a reverse name-your-price model. Both have ceased operations and are dead and gone.

5.5.4 The Others

In the Others Group, it appears that most of the profitable companies conduct B2C business. The big advantage of focusing a new e-commerce venture on B2C business is that there are lots of role models to follow and learn from. 72% of the profitable companies conducted some kind of B2C business. Another important attribute is the role of advertising. The profitable companies focused their advertising money on

television and business or consumer periodicals. This makes sense because by using the medium of television and business or consumer periodicals, an e-commerce venture can reach a large number of consumers in many states versus using a local newspaper or local radio broadcast station.

6. Electronic Commerce Education

E-commerce education is available all around the world and at all levels. Leading universities everywhere are adopting a curriculum in the field from offering one course to offering Bachelor and Masters degree programs. Education in electronic commerce is available online, otherwise known as e-learning, and in the classroom. It is evident that the availability of e-commerce education will only continue to rise.

Colleges throughout Asia, Australia, Europe and North America, provide e-commerce education at every level. Hong Kong University of Science and Technology offers a Masters of Science in Electronic Commerce. Bond University in Gold Coast, Australia, offers a Bachelor of Electronic Commerce. The National University of Singapore offers e-commerce as a major concentration. Virginia Polytechnic and State University offers a minor concentration in the field. The availability of e-commerce education at these schools, among a few others, was researched in efforts to summarize what is available at a global level.

Particular attention was paid to schools sharing the same overall curriculum as WPI. This means that an effort was made to analyze engineering and technical schools. A main consideration, however, is that the schools that were considered "comparable" to WPI are much larger with a much more broad curriculum. Although the majority of the schools analyzed could be called technical schools, the funds and resources available at WPI are not competitive with a school such as MIT.

There are an overwhelming number of universities now offering degree programs in the subject area. This curriculum includes a full four years of education in e-commerce. These schools teach material focusing on the fundamentals of electronic

commerce, the electronic business environment, management and marketing, computer science and technology, and ethics and economics of business.

6.1 A Global Perspective

The following is a list of fifteen schools located around the world. Each of these leading universities offers some level of involvement in e-commerce education. These schools were chosen due to location, curriculum, and availability of learning about e-commerce. The schools include:

Bond University; Australia
Carnegie Mellon University; Pennsylvania, United States
Clemson University; South Carolina, United States
Curtin University; South East Asian Region
Dublin City University, Ireland
Georgia Tech; Georgia, United States
Hong Kong University of Science and Technology; Hong Kong
Massachusetts Institute of Technology; Massachusetts, United States
Monash University, Australia
National University of Singapore; Singapore
Northwestern Oklahoma University; Oklahoma, United States
University of San Diego; California, United States
University of Western Australia; Australia
Virginia Polytechnic Institute and State University; Virginia, United States
Worcester Polytechnic Institute; Massachusetts, United States

The programs offered at each school are different. The departments through which the programs are offered vary. The course and program structure and material remains consistent throughout, although there is a complete range in the level to which the material is offered.

The following table, Figure 5.1, illustrates the level of e-commerce education that is being offered at the fifteen schools analyzed.

University	**Master**	**Bachelor**	**Concentration**	**Courses**
Bond University	X	X		X
Carnegie Mellon University	X			X
Clemson University	X			X
Curtin University	X	X		X
Dublin City University	X			X
Georgia Tech				X
Hong Kong University	X			X
MIT				X
Monash University		X		X
N. U. Singapore			Major	X
N. W. Oklahoma State		X		X
San Diego University	X			X
Western Australia University			Major	X
Virginia Tech			Minor	X
WPI				

Figure 5.1: Level of education offered at schools analyzed – A breakdown of the fifteen schools analyzed, including the level of education to which each offers electronic commerce.

Bond University, located in Gold Coast, Australia, offers both a Bachelor and a Master of Electronic Commerce. At Bond, e-commerce is considered a multi-disciplinary field that cuts across traditional functional boundaries. Teachers of e-commerce must posses both depth of knowledge in their specialty area as well as a breadth of understanding about the multiple dimensions of e-commerce. Both degrees are designed to equip professionals "in the disciplines of marketing, business information systems and information technology." (www.bond.edu.au) Both degrees are offered through the School of Information Technology.

Carnegie Mellon University, located in Pennsylvania, offers a Master of Science in Electronic Commerce. The purpose of their masters program is to educate a new generation of managers, planners, analysts, and programmers, on the realities and potential for electronic commerce. This program is offered jointly through Graduate School of Industrial Administration and the School of Computer Science. Carnegie Mellon includes an e-commerce practicum as a requirement for program completion. This is a project, which allows hands on experience in the field, similar to that of the MQP at WPI. The school does not offer a major in the field due to the fact that "too many students desire background," Carnegie Mellon could not accommodate so many interested students. (www.cmu.edu)

Clemson University, located in South Carolina, offers a Master of Science in Electronic Commerce, requiring a number of graduate level semester hours beyond the foundation business and computer science prerequisites. Students must have undergraduate courses in finance, marketing, or computer science, and those who do not

must complete them as co-requisites. Clemson's program is offered through the Department of Electronic Commerce.

Curtin University of Technology, the leading university of the South East Asian region offers a Bachelor of Commerce in Marketing and Electronic Commerce. The school also offers a Master of Business in Electronic Commerce, which is considered by the University as a specialized professional degree. Both degree programs are offered through the School of Information Systems.

Dublin City University, located in Dublin, Ireland, offers a Master of Science in Electronic Commerce with two distinct concentrations of Business or Technology. Dublin City University Business School and the School of Computer Applications launched this degree program in the fall of 2000. This program is unique in that there is a distinct interaction between the technical and the business aspects of e-commerce created by the program structure.

Georgia Tech, located in Alabama, Georgia, offers courses in electronic commerce. These courses are offered through the Department of Information Systems Management and are limited to solely introductory courses which examine business and technical issues related to e-commerce applications such as the Internet, WWW, EDI and electronic linkages between trading partners. This is the extent of e-commerce education provided by Georgia Tech.

Hong Kong University of Science and Technology offers a Master of Science in Electronic Commerce Management, however one must posses a Master of Business Administration to be admitted into the program. This program is offered through the Department of Information Systems Management.

At Massachusetts Institute of Technology, in Boston, Massachusetts, the MIT Sloan School of Management has created the Center for e-Business@MIT to provide leadership for faculty, students, and industry interested in Internet-enabled business. The mission of this program is to be the leading academic source of innovation in management theory and practice for e-Business. They have established a large-scale research program, which is being funded by industry support, and an e-business executive education program, among other things. The school offers introductory courses in e-commerce, however that is the extent of college credit one may obtain in the field at MIT. Monash University, is a leading University in Australia, with five campuses located throughout the area. The school recently adopted a Bachelor of Electronic Commerce, which is offered jointly through the Department of Business and Economics and the Department of Information Technology. For a breakdown of the Faculty involvement in through the program, see Figure 2.3.2.

The National University of Singapore offers of a Bachelor of Computing in Electronic Commerce. This program seeks to produce graduates with "a deep understanding and command of the theories and practice of information technology, a broad understanding of business, and a thorough understanding of consumer behavior, organizational demands, and investment economics and analysis of e-commerce." (www.nsu.edu) The University also offers e-business courses, which are core features of the Bachelor of Business Administration curriculum.

Northwestern Oklahoma State University, otherwise called E-Commerce University, was the first school of e-commerce. The University offers a Bachelor of Electronic Commerce through their School of Electronic Commerce. All courses were

designed from the ground up with e-commerce theory and practice as the principal criteria. An Internet incubator facility on the campus allows students, faculty and the community to obtain hands on experience with operating and managing e-commerce business.

The University of San Diego, located in San Diego, California, offers a joint degree program. Students earn a Master of Business Administration along with earning a Master of Science in Electronic Commerce. This program was designed to allow students the ability to work on two business degrees at the same time. The Electronic Commerce aspect requires students to complete ten courses, which includes four elements, a one course introduction element, a four course tools element, a four course breadth element, and a one course capstone element.

The University of Western Australia, began offering Electronic Commerce as a major within the Bachelor of Commerce degree in the fall of 2000. The program is offered through the Department of Information Management and Marketing.

Virginia Polytechnic Institute and State University offers a minor concentration in e-commerce along with short seminars and training courses. The latter were not offered for course credit. The school also offers a Master of Science in Electronic Commerce. The schools involvement in the topic goes further, as Virginia Tech has started a program called, The Center for Global Electronic Commerce. Virginia Tech hopes to be an academic leader in electronic commerce research and education of practical relevance.

The basic structure and degree requirements remain the same throughout the universities. Each school has its own unique characteristic, which is to be expected. The departments or schools through which the programs are offered are also similar. The departments

responsible for the courses in e-commerce basically include Business, Marketing, and Management on one side, and Computer Science and Information Technology on the other.

The following table, Figure 5.2, is an overview of the faculty and departments responsible for the curriculum offered at the previously stated fifteen schools:

University	**Department**
Bond University	**School of Information Technology**
Carnegie Mellon University	Graduate School of Industrial Administration and the School of Computer Science
Clemson University	Department of Electronic Commerce
Curtin University	School of Information Systems
Dublin City University	School of Business Administration and the School of Computer Applications
Georgia Tech	Department of Information Systems Management
Hong Kong University	Department of Information Systems Management
MIT	Marketing and Management Department
Monash University	Department of Business and Economics and the Department of Information Technology
N. U. Singapore	School of Computing
N. W. Oklahoma State	School of Electronic Commerce
San Diego University	School of Business Administration
Western Australia University	Department of Information Management and Marketing
Virginia Tech	
WPI	

Figure 5.2: Department of education responsible for curriculum – The table above lists the school or department responsible for the education in e-commerce offered at each university.

6.2 In the Classroom

The general introductory courses offered in these degree programs provide a grounding in electronic commerce technologies and applications, electronic commerce business models, HTML, website development and management. More advanced courses in electronic commerce cover the advanced emerging e-commerce issues such as, electronic markets, electronic auctions, applications of agent technology in electronic commerce, e-commerce payment mechanisms, and security.

The marketing and management courses are half the main component of e-commerce degree requirements. The business process courses analyze systems analysis and design techniques, process design tools and methods, and cover information modeling techniques. Network management courses take a management perspective of databases and communications technology.

Computers and information technology comprise the other half of the major subject area. The subject area of information systems concerns the management of information and information systems resources. The topics covered include strategic IS planning, intranets, IT outsourcing, ERP systems, and the use and development of IS in support of the marketing function. Topics in international information systems are also examined, including the use of IT in a global environment, EDI, and national information infrastructure and policy. Computer modeling for businesses further develops students' abilities in defining system requirements and translating them into technical specifications.

These topics cover the core curriculum content summarized through the range of schools used for this analysis. These basic topics are spread out to form a variety of elective courses, which also remain consistent around the globe. The topics in these elective courses ranges from advanced material in the topics previously discussed, to ethics of electronic business, to courses devoted to evaluating research such as Survey Design for Applied Social Research, offered at Clemson University. This course is an elective an e-commerce student has the option of choosing out of ten others. The topics covered in this class include survey research and design principles, procedures and techniques used in applied sociology, instrumentation, data collection and management and interpretation.

Core course requirements remain consistent throughout each university. There are a few minor differences in the electives, as some schools offer more of a selection in e-commerce and the impact on society in social science and humanities courses than others. The basic business and technical background provided at each university was almost identical. Figure 5.3 below summarizes topics covered in the courses offered according to type.

Figure 5.3: Topics in E-Commerce Courses – Summarization of the topics included in the courses offered through the degree programs at the universities researched.

E-Commerce Business	**Technical E-Commerce**
Introduction/Advanced Technical and Managerial E-Commerce	
Advertising and Promotion on the Internet	
Internet Marketing	
Web Site Management	
Accounting	Global Information Systems
Marketing Fundamentals	Internet Technology
Managerial Economics	WWW Technology
Competitive Business Strategies	Data Communications and Networking
Finance Management	Web Design
Business Process Innovation	Data Base Management Systems
Organization and Management in the Networked Era	Operating Systems
Other Courses/Topics	
E-Commerce Law, Policy and Regulations	
Social Changes and the Internet	
Ethics of Electronic Business	

6.2.1 Topics of the Introductory Course

The topics covered in the introductory e-commerce courses currently being offered at the schools that were analyzed for this project remained consistent. The

courses were mainly broken down into business/marketing and technology and how each relates to or is affected by the Internet.

Carnegie Mellon University has actually broken the introductory class into two courses, E-Commerce Management and E-Commerce Technology. The first course is designed to build the managerial foundation for electronic commerce and the accompanying course provides the technological foundation.

Topics in the e-commerce management sector of the introductory courses include:

- Basic principals of management as the relate to e-commerce
- Learning e-commerce applications
- Developing an understanding of role of the Internet and WWW in the commercial world.
- Business-to-business commerce
- E-commerce strategies

Topics in the e-commerce technology sector of the introductory courses include:

- Defining e-commerce enabling technologies, tools, and processes
- E-commerce infrastructure
- Financial markets and payment systems
- Mass personalization and customization
- Wireless technologies

These topics were summarized from the course syllabus of five introductory e-commerce classes currently being offered at four of the universities researched. The courses include E-commerce Management and E-Commerce Technology, being taught at Carnegie Mellon University, Introduction to Electronic Commerce being offered at

Monash University, Electronic Commerce and Marketing from MIT, and E-Commerce I being offered at Bond University. See Appendix 1 for copies of each syllabus.

Carnegie Mellon also offers Intellectual Property and E-commerce, which covers the basics of doing business on the Internet with emphasis on e-commerce issues including intellectual property, cyber-squatting, and commercial transactions. This course has more emphasis on some of the topics covered in the introductory courses.

Although a course syllabus was not available online for the courses offered at Northwestern Oklahoma State University, a detailed course summary was available. The course, Introduction to E-Commerce, was designed to provide an "introduction to computers, Internet and business transactions. Emphasis of this course is on the Internet. Also discussed are applications of e-commerce and mobile computing." (www.nwosu.edu) Georgia Tech offers a course entitled simply E-Commerce, which also examines the business and technical issues related to e-commerce applications, such as the Internet and WWW.

6.3 Existing at WPI

There is a Computer and Information Technology Thrust Area at Worcester Polytechnic Institute that encompasses all disciplines and sub-disciplines that focus on the acquisition, analysis, management, and communication of information and the hardware and software technologies that enable this to happen. One of the four major focus areas within the C&IT Thrust Area is electronic commerce on the Web. WPI feels that this area is promising because national recognition and research progress is possible due to the faculties' interest and strengths within the area.

The C&IT Thrust Area has determined that the faculty has strengths related to e-commerce at three levels,

"At the lowest levels of infrastructure, [WPI] has strengths in networks, performance evaluation, security, and scalability. At the middle level of content and enabling technologies, [WPI] has strengths in web interface design, global systems, and personalizing of systems. At the upper level of business models, [WPI] has strengths in globalization of business, marketing, and information systems." (www.wpi.edu)

6.3.1 Opinions of the Faculty

Several interviews were conducted with WPI faculty members who have interest in electronic commerce, whether it be in research or teaching. The same basic questions were used for each interview and, for the most part, the opinions were similar. The interviews were conducted with the following list of six basic questions:

1. How would you define e-commerce, or electronic commerce?
2. How important do you feel e-commerce education is? What do you think about the availability of e-commerce education?
3. What criteria do you think are most important in an e-commerce degree program? Specifically, in an introductory e-commerce course?
4. Do you think that the principles of e-commerce that are applied in industry could be successfully taught in the classroom? Which principles?
5. To what level of education on e-commerce do you feel WPI should offer?
6. Where do you see e-commerce in the next five years, particularly the educational aspect?

The individual responses given by each professor are summarized as follows:

Professor Christof Paar; Assistant Professor, Electrical and Computer Engineering, WPI

His feelings on the importance of e-commerce education depend on how the term "special education" is defined. He "doesn't think that e-commerce warrants a special degree program, etc. However, a few tailored college courses could be a good idea."

When asked about the criteria for defining e-commerce courses Professor Paar responded, "there are two aspects, business courses and technical courses. Technically, one would need basic understanding of the Internet, how the web works, and some details on issues such as data bases, IT security, etc. As for the business side, which Professor Paar noted that he was not too familiar with, he suggested courses on "commerce marketing and business models."

As far as e-business principles being applied to the classroom Professor Paar was not too optimistic. He stated, "I believe that live interaction with a teacher is very important for ones learning experience (perhaps because we were trained this way in k-12, perhaps because that's how humans learn the best). Distance learning can probably grab a small chunk of the education market, but I doubt it will ever become a major player."

He was a little more optimistic about e-commerce in five years, "it looks as though e-commerce will be augmenting traditional businesses. It is hard to predict which segments of e-commerce will be taking off big time."

Professor Michael Ciaraldi, Professor of Practice, Computer Science Department, WPI

On defining e-commerce, "short for 'electronic commerce': conducting business electronically, especially transactions, i.e. buying and selling. It can include B2B, B2C, etc."

On the importance of e-commerce education, "technologically, it would include networking, databases, human-computer interaction, and security. From a business perspective, it includes any of the areas related to any kind of commerce. However, I see it more as an example and motivator for other study, not necessarily a separate discipline or area of study."

When asked about the criteria of an e-commerce education model for WPI, Professor Ciaraldi suggested, "real-world practicality with a strong component of theory and principles behind it. This fits well with WPI's 'Two Towers' philosophy."

On applying principles of e-business to the classroom, "we are already doing distance learning, myWPI, etc. Perhaps we could use e-commerce technology to provide an even more individualized education for each student."

On when asked where he saw e-commerce in the next five years, he replied, "Everywhere! On the Web, wireless, phones, broadbands, interactive TV. Paper catalogs will greatly decrease. Much more information will be available to customers. Businesses will be able to compete more freely, target more accurately, and be more efficient in production and distribution."

Professor Michael Elmes, Associate Professor, Management, WPI

Professor Elmes had the least background in the field. In defining e-commerce, "I would call it commerce that is conducted over or through the Internet. It is important to note, however, that I know very little actually about e-commerce."

On the importance of e-commerce education, "I don't have a clear sense of this actually. I think that it is very important if for no other reason than companies see potential cost savings in using the Internet rather than traditional ways of doing business. I think that more and more schools are developing programs, courses, or at least course content on e-commerce. It is a huge growth area."

On applying the principles of e-business to the classroom, he was not sure, along with the areas that should be included in an e-commerce degree program. "I don't really know. I can speak to the behavioral issues. Any e-commerce course has to have coursework related to interpersonal and behavioral issues in conducting business electronically. Whether that is coursework on virtual teams or the challenges of communicating electronically, I think that it is essential." And more particularly, on the level of e-commerce of education that should be offered at WPI, "I think that it should be integrated into our undergraduate and graduate management courses. I don't know about offering an entire degree program, especially given how strapped we are for resources."

On e-commerce in the next five years, Professor Elmes was also optimistic but unsure. "I think that more and more schools will be developing e-commerce courses. How dotcoms do in the next 5 years and how many established businesses turn to the Internet to do business (or do more business) will determine, I think, how many courses are offered.

Personally, I think that e-commerce will continue to grow as a way of doing business although perhaps not as fast as everyone thought it would."

Professor Michael Gennert, Associate Professor, Computer Science, WPI

Professor Gennert shared in the opinion that e-commerce education on a certain level was "not particularly that important, especially at the undergraduate level. There is little conceptual material that is unique to e-commerce. Most of the ideas are already in the curriculum of Computer Science or Management." He did comment on the fact that teaching e-commerce was an excellent way to introduce students studying in one field to the concepts in another field. He explained that, "it shows the interconnectedness of material in these areas."

In effort to determine which topics he considered important in an introductory e-commerce course, Professor Gennert broke the subject into two areas, as previously discussed, Computer Science and Management. On the Computer Science end, he suggested; Programming, Databases, Networking, Distributed Systems, Client-Server Architecture, Data Mining, Performance Analysis, Human-Computer Interaction, and Computer Security. On the Management end, he suggested; Organizational Science, Planning, Marketing, Sales, Telecommunications, Accounting, Data Management, and other MIS-related areas. He also suggested the option of discussing ethical and legal issues in computing and management. He suggested these topics include; security, privacy, auditing, contract law. He did comment, however that "any course in e-commerce will necessarily be limited in what it can cover. If the course is at an

introductory level, then it will have to deal with these issues at a suitably shallow level." This is the case for any introductory course, these types of courses are created to give a broad overview of a variety of topics in a specifically defined subject.

As far as applying principals of e-business to the classroom, Professor Gennert suggested they be used for case studies, take for example, their use in this project.

When considering e-commerce at WPI, Professor Gennert's main concern was the quantity of material. The material ranging from Computer Science to Management would essentially require an entire CS or MG program. This statement can be backed by the research of schools that do offer degree programs in the field, all of which have one or both of these departments. Professor Gennert proposed that e-commerce at WPI should be offered as an interdisciplinary concentration within one of these departments, "similar to the Medicinal Chemistry concentration within the Department of Chemistry and Biochemistry." He also suggested the option of offering a graduate program in e-commerce, possibly as a certificate or even as a complete degree program. More specifically for WPI, however he commented that the students that would be interested in an undergraduate concentration in e-commerce through the CS or MG Department would be students already interested in WPI. The upside that he saw was in offering a graduate program in the field, which would attract students that would not otherwise consider WPI. "That would be a big plus!"

E-commerce will obviously continue to grow in the future. Professor Gennert thought no differently, "I think it is clear that e-commerce will continue to rise in importance over the next 5 years, and beyond. No doubt more universities will offer courses and programs focusing on e-commerce."

Professor Eleanor Loiacono, Assistant Professor, Management, WPI

Professor Loiacono agreed on the concept that e-commerce needed to start with basic business fundamentals that included commerce with the addition of technological pieces that lead to e-commerce. She commented that, "first and foremost it is important to realize that e-commerce is still commerce and the fundamentals of commerce should be learned first." Her emphasis was on the fact that many institutes have hyped their e-commerce curriculum. She feels that the fundamental are what matter, yet many universities are focusing on the more "glitzy" material, which needs to be learned in addition to the basics.

With the importance of learning the basic fundamentals established, Professor Loiacono commented on the importance of education on both the socio and technical side of e-commerce. Specific topics or questions to be learned in an introductory e-commerce course should include

How does the technology help improve the business process?

What is the affect on the people with this new technology?

Does it make life easier or more difficult?

What are the financial implications of the use of this technology?

How can technology be used to facilitate a greater bond between stakeholders—suppliers, buyers, customers, etc.?

When considering e-commerce education, Professor Loiacono feels that it should be a part of the general business and technology curriculum. Her opinion is that it should not be separated into a private degree, however a component of most of the courses offered, particularly at WPI where technology and business are an issue in most classes. She feels that e-commerce should simply be a part of these courses, not necessarily a separate subject area. She compared e-commerce to international business and the fact that all business is international. This is the way business is perceived in Europe, and Professor Loiacono feels that this is how e-commerce education should be handled here at WPI.

As for e-commerce education in the next five years, Professor Loiacono believes that it will gradually integrate itself into all courses and not be singled out and taught differently. She believes that people are beginning to realize that "e-commerce is a part of all business processes" and should be taught as such.

A second attempt to gather response from the Faculty was made, using a shorter version of the original interview questions. Out of twenty professors contacted in the Computer Science and Management Departments, eight demonstrated interest and knowledge in e-commerce. Four professors commented that they were not all that familiar with the topic and the remaining nine did not respond. Following is a summary of the questions that were asked of the twenty professors:

Rate yourself, 1 – 10, on your knowledge of the following, 10 being high:

- E-commerce

Rate, 1 – 10, the importance/necessity of the following in your opinion, 10 being high:

- Teaching/learning e-commerce

- Undergraduate degree program in e-commerce

- Graduate degree program in e-commerce

- Undergraduate degree program in e-commerce at WPI

- Graduate degree program in e-commerce at WPI

The professors who responded were from both the Management and Computer Science Departments:

McRae A. Banks, Associate Professor, Management

David C. Brown, Professor, Computer Science

Kathryn Fisler, Assistant Professor, Computer Science

David Finkel, Professor, Computer Science

Elke A. Rundensteiner, Associate Professor, Computer Science

Their responses are summarized in the following, Figure 5.4.

	Level of Importance (10 = highest)				
Professor	Teaching/ Learning	Under-Graduate Degree	Graduate Degree	Undergraduate Degree at WPI	Graduate Degree at WPI
Banks	10	1	1	1	1
Brown	1	2	2	2	2
Finkel	8	2	2	2	2
Rundensteiner	10	1	1	1	1
Fisler	7	2	2	2	2

Although this method is not as elaborate, it strongly emphasizes the opinion the faculty has on offering a degree program specified for e-commerce. Professor Rundensteiner went on to comment that a degree program in e-commerce was completely unnecessary.

Professor McRae Banks of the Management Department also included the following comment,

"What we have learned is that there are two parts to e-commerce. One is technical and relates to hardware of coding. The other is business/management. The technical side should be integrated into existing programs, such as ECE and CS through one or two specialized courses in each area. The business/management side should be as we have addressed it - in courses that look at e-commerce within particular areas (we chose Marketing, Telecommunications, and Supply Chain (Management). The bottom line is that good business is good business, whether it is click or brick. The basics are the same and without them, it doesn't matter how good the idea or the technology, it will not work."

Professor Karen Fisler, an Assistant Professor in the Computer Science Department also made additional comments, stating that,

"[Teaching e-commerce] depends on what a student wants to do with his career. If there were a lot of student interest, teaching a course on this material would make sense. However, I think [a degree program] would be a bad idea. It would be better to know one aspect that touches on e-commerce (CS, management, math/crypto) in detail with a collection of courses related to e-commerce. This makes an education more applicable to other areas. I'm also not yet convinced that there is enough content in e-commerce to sustain an entire degree program."

In summary, It was agreed upon that electronic commerce was defined as the conducting of business electronically, mainly transactions, meaning buying and selling.

This would include EDI, the Web, email and other business interaction and communication conducted electronically.

With the subject area defined, opinions on the importance of it were determined. The WPI faculty members agreed that knowing e-commerce is important, however the subject area does not necessarily warrant a special degree program. It was suggested that e-commerce be an "example and motivator for other study," (Ciaraldi) instead of being a separate discipline or area of study.

The Faculty agreed that e-commerce education at the undergraduate level was not necessary. E-commerce should be integrated into any technical or business curriculum. Studying e-commerce at the graduate level, however, is more sensible. The faculty agreed that it is important to learn the fundamentals of commerce, these including that of e-commerce, in any course related to the topic. One may then continue his education in a specialty area, which would further analyze e-commerce specifically. Professor Gennert stated, "There is little material that is unique to e-commerce," which is primarily why e-commerce education at the undergraduate level is hardly necessary.

Another opinion of the Faculty, which corresponds with the research completed, was the importance of two main aspects in e-commerce education. The business and technical aspects of the subject are crucial in defining course material. In fact business and technology are the two main components of the curriculum. See Figure 2.3 in Chapter 2 for the breakdown of the faculty involvement in the undergraduate degree program in e-commerce at Monash University in Australia.

In determining the most important criteria, "technically one would need a basic understanding of the Internet, how the web works, and some details on issues such as

data bases, IT security, etc." (Paar) From a management perspective, there is "Organizational Science, Planning, Marketing, Sales, Telecommunications, Accounting, Data Management, and other MIS-related areas." These suggestions correspond with the topics covered in the courses offered at all of the universities researched for this project.

It was a consensus that the principles of e-commerce, mainly referring to the fact that e-businesses is electronic business, therefore conducted via computer, that are applied in industry could not be successfully used in a classroom. In some cases, distance learning is appropriate and useful, however it was stated that interaction with a teacher is very important for a complete learning experience. Professor Ciaraldi added "perhaps e-commerce technology could be used to provide a more individualized education for each student." (Ciaraldi) Professor Gennert commented that e-business could be used as interesting case studies. For the most part, those interviewed related e-business principals to online interaction, and agreed that teacher-to-student interaction was too important to be overcome by distance education. Although e-learning is growing rapidly, it may not be as successful as learning in the classroom.

The general opinion of the professors interviewed was that, although e-commerce education is important, a degree program, specifically a Bachelors degree program, is not necessary, particularly at WPI. It was determined that WPI should offer e-commerce education in the classes that are being taught which relate to it. Courses specifically related to e-commerce may not be particularly beneficial, as e-commerce is simply an aspect of commerce, and should be considered as such. Their opinion was that a degree program in e-commerce would only be sensible at the graduate level, as it is such a specialized area of study.

Although there were a small number of professors used for this analysis, these are the professors with interest in the field. Questioning professors with no knowledge of the topic would not be beneficial to this research. Under these circumstances, exactly 50% of the Faculties opinions were obtained.

6.4 Program Alternatives for WPI

Upon analyzing courses and programs at each of the previously stated fifteen schools and learning the opinions of WPI faculty members, several options for e-commerce education were created. These suggestions range from the addition of an introductory e-commerce course, to the addition of a graduate program in the field.

The first option is the addition of and undergraduate degree program. Although the program could be offered through the existing Computer Science and Management Departments, it is the agreed opinion of faculty members and the comparison to schools with similar curriculum that suggests this program is not necessary, nor would it be beneficial to WPI. The three schools with similar curriculum, Virginia Tech, Georgia Tech, or MIT, do not offer e-commerce education at this level, all of which are larger schools. The faculty all agreed that e-commerce at the undergraduate level was completely not necessary. Professor Gennert went on to comment that the implementation of such a program would not attract additional students to the school.

The suggested program and distribution requirements for a Bachelor of Science in Electronic Commerce at WPI would be a combination of the currently offered computer science, technology, and management courses with the addition of specified courses in electronic commerce. Following are the suggested program and distribution requirements for the Electronic Commerce Bachelors Degree:

Requirements:	Minimum Units
1. Humanities/Arts and Sufficiency	2
2. Economics and Social Science	5/3
3. Basic Mathematical and Science Requirements	2
4. Electronic Commerce Topics (Including the MQP) (Note 1)	18/3
5. IQP	1
6. Free Electives	1
7. Physical Education	1/3

NOTE:

1. Electronic Commerce Topics must include courses in the following two topic areas.
    a. 3 units of business management courses.
    b. 3 units of information technology courses.

This model corresponds with the basic educational requirements for a degree at WPI, including the IQP, Humanities and Arts, Physical Education, Basic Math and Science, and Free Electives. The additional subject matter lies in the specified subject area. WPI currently offers several management courses and courses in computer science that would be beneficial. An addition would have to be made to the WPI curriculum that included a variety of courses in specified in e-commerce, from introductory classes to the more finely defined lab courses.

The options for courses that could be provided are endless. As far as Social Sciences and Humanities are concerned, courses dealing with the ethics of e-business would be relevant, such as Ethics and Law for Online Organizations, a course offered at the University of San Diego. Courses in e-commerce law and the digital economy would also be appropriate. An example is Managerial Economics, which is offered at Carnegie Mellon University.

As far as the information technology aspect is concerned, WPI has a decent foundation to work with. Courses in this field could include Operating Systems, Data Base Management Systems, Online Systems, Web Design, and Technical E-commerce. Courses covering web site design, networks, and the Internet must also be offered. This is a collective group of courses being offered at several of the schools previously stated.

An extended curriculum electronic business management would be necessary. Examples include Marketing on the Internet and Organization and Management in the Network Era both being offered at Dublin City University and Bond University, among other schools. Courses such as Introduction to Electronic Commerce, Foundations of E-Commerce, and Advanced Electronic Commerce would also be a necessity. For an overview of the topics covered in these courses see Section 5.2.1.

The second option would be to offer a graduate degree or certificate program. This was suggested by Professor Gennert and is also offered at many of the schools studied, including Carnegie Mellon University and Virginia Tech. These schools share a similar to curriculum to that of WPI, as far as being technical schools, however both of these schools are much larger in size and offer a much broader education. This program could also be offered jointly through the Computer Science and Management

Departments, but again, the implementation of several specified courses in e-commerce would be necessary.

A third option would be to offer e-commerce as a major or minor concentration within another area of study. The schools that are doing this, however, offer a Bachelor of Commerce Degree, which is not being offered at WPI. Therefore, it would be necessary to look into another degree program. This is cohesive to Professor Loiacono's opinions on e-commerce being simply a piece of commerce and her suggestions that it should be taught as such. Considering this, it may be best to implement a degree program in commerce, with e-commerce being a major area of study within the field.

The final option is to simply offer courses in e-commerce. The addition of introductory e-commerce courses to the WPI curriculum is the first step in e-commerce education. Considering the growth and affect e-commerce has had and will continue to have in society, it seems almost necessary to offer some level of education in the field. It has been stated that the topic should be included in all related courses, as it has become a major aspect of most technology and business, however specified courses in the subject would also be beneficial.

7. Conclusions

Following are the six main objectives of this project. The following chapter will summarize the findings and results of the analysis and research completed in efforts to meet these objectives.

1. Define e-commerce. Research its sectors, history, and the technology that supports it.
2. Research and determine the difference, if any, between e-commerce and e-business
3. Create a theoretical model of a successful E-Commerce Venture by listing several attributes. This model will be based on the study of profitable E-commerce ventures
4. Categorize e-commerce courses offered at leading universities around the world
5. Determine where the interest in e-commerce education lies at WPI, and to what level is should be offered.
6. Propose the most effective and efficient e-commerce education model to WPI based on existing availability and the level of interest in the subject area at the school.

For this project, e-commerce is defined as a method of buying and selling products and services electronically. The primary method of electronic commerce is through the Internet and the World Wide Web. There are four segments that make up the e-commerce market: B2C, B2C, C2C, C2B, but this project focuses mainly on the B2C and B2B segments largely because these segments have been developed greater than the other two. E-commerce is still in its infancy, the last two years have provided us with insight on how e-businesses can fail or survive.

While neither of the two segments have matured, B2C has seen the most growth. Within the past two years, hundreds of B2C companies have sprung up, hoping to make

money by way of selling goods and services via the Internet. Many thought the scheme was as easy as it sounded and were unaware that some products would not sell, competition was fierce, and that it really was difficult to become a profitable e-commerce company. Hundreds of these original "start-ups" have gone bankrupt, and the companies that still remain are much stronger companies.

The B2B segment has not matured nearly as much as the B2C segment. There are several different business models that B2B companies are using. B2B has not been around long enough to see which type of business model yields the most revenue. The B2B segment has enormous growth potential, right now it is in a very young stage.

The technology of e-commerce is becoming more and more important to e-commerce technology. Early e-commerce companies relied on HTML to create a website to advertise products, now websites are becoming more and more complex, ordering systems need to be implemented that automate the entire process of buying/selling items for the companies involved. Companies need to take advantage of the latest technologies to gain competitive advantage over their competition.

One competitive advantage is to become an e-business company. This IQP found that though there are many disagreements as to the distinctions between e-commerce and e-business, the consensus was that e-commerce is a small part of the bigger e-business picture. This IQP also found that by implementing e-business, your company may reap many benefits; most noticeably, cost savings. Based on the research conducted by this IQP, those e-commerce businesses that originated "offline" ("brick-and-mortar") have the best chance or e-commerce profitability if they use e-commerce to augment their existing

offline business. The other e-commerce businesses that originated "online", as according to the e-commerce model, have one less element necessary for profitability.

E-commerce *failure* for a company that originated "offline", if they use e-commerce to augment their business, won't hurt the bottom line. E-commerce in this case allows the consumer more flexibility and convenience because now they are not tied down to store hours. It also provides the business owners the ability to downsize their "offline" operations and in turn save money.

E-commerce *failure* for a company that originated "online' usually means sudden death. The big question posed by this IQP was: what causes e-commerce death. The simple answer, based on the research discussed in the literature review, is one of two things: the inability to show a profit in a short amount of time and a lack of business/market research which leads to poor business plans. E-commerce businesses that originated "offline" have already dodged the hurdles and avoided the pitfalls of business failure. This can be said because aside from eBay Inc. and NetB@nk, all the profiled, profitable companies were founded earlier than 1989; this accounts for 92%. Based on the literature review, "offline" originators aren't given many chances by public/private investors to turn a profit. This is the potential pitfall of starting an "online" originated e-commerce venture; in order to stay in the good graces of investors and secure additional funds, the venture needs to become profitable very quickly, in most cases quicker than a traditional offline business. The dilemma is that most young businesses need to lose money before they can make money. This very paradox coupled by a bad business plan and even worse in a bad economy is the cause of death of many e-commerce ventures.

It seems as though e-commerce is taking over traditional business and has formed a significant place in college education programs. Leading universities around the world have taken the initiative to offer degree programs in the subject area in order to provide proper education to those who fill e-commerce positions in the future. Electronic commerce will grow into an accepted and customary form of business, and the education available in the field will continue to grow.

The e-commerce courses being offered around the world can be divided into two main groups; Business and Technology. Subjects in these courses range from international marketing and management to operating systems and computer sciences. Each degree program used for this analysis required a near equal amount of courses in each of the two areas.

When considering WPI as one of the universities to offer a degree program in e-commerce however, it suggested that WPI not devote an entire undergraduate degree program to the topic. The faculty along with the level of e-commerce education offered at the schools researched supports this decision. It was the general opinion of the WPI Faculty members that e-commerce does not necessarily warrant its own degree program, particularly at the undergraduate level. Through analyzing the curriculum at the universities who are offering a bachelor of e-commerce, it is evident that WPI does not currently have the faculty to add such a program. The schools and departments responsible for educating these e-commerce students included a school of e-commerce and department of information technology.

When considering the level of education currently being offered at those schools with a curriculum most similar to that of WPI, it was found that these schools offered

courses in e-commerce. Virginia Tech offers e-commerce as a minor, however it must be noted that these schools are much larger than WPI in almost every fashion. An option for WPI would be to offer seminars or online courses in e-commerce to stimulate and determine the level of interest in the researching, teaching, and learning the subject.

When combining the results from analyzing the degree programs available and taking into account the opinions of the professors interviewed, it has been concluded that the best option for WPI as far as implementing e-commerce education would be to offer additional courses to the field. The option of implementing a graduate program in e-commerce would also not be a bad idea, as it would attract additional students, broaden the curriculum, and bring the school to date with other leading universities currently implementing programs in the subject area.

This graduate program would be best offered through the existing Management and Computer Science Departments. It would be necessary for additional courses to be added to the schools curriculum, including introductory e-commerce courses reviewing the material discussed in Chapter 5.2.1 of this report. It would also be necessary for advanced courses in such topics be made available. A graduate program in e-commerce at WPI would be built from an undergraduate degree in marketing and management or computer technology, with a concrete background in the other. With this foundation made, students would then focus on the specifics of electronic commerce in these more focused courses. The necessary background is essentially an existing piece of the curriculum at WPI, as stated, e-commerce is simply a division of commerce. To become educated in e-commerce one must first learn the background and fundamentals of

commerce. This general background is already available at WPI and could be used as the foundation for a graduate program in e-commerce.

APPENDICES

APPENDIX 1: Course Syllabi from Five Selected Introductory Courses

Carnegie Mellon University, Pennsylvania (www.cmu.ecu)

E-COMMERCE MANAGEMENT

[46-870]

COURSE DETAILS

Instructor: Prof. Tridas Mukhopadhyay, tridas@andrew.cmu.edu

Office: Posner Hall 385B, X2307

Teaching Assistant: Anindya Ghose, aghose@andrew.cmu.edu

COURSE OBJECTIVES

This course builds the managerial foundation for the Master of Science program in Electronic Commerce. An accompanying course, E-Commerce Technology (20-751) provides the technological foundation. The main objective of this course is to understand the basic principles of management as they relate to this new and evolving field of study. Additional goals include learning 1) E-Commerce Applications, and 2) Impact of the Internet on Business Management.

HIGHLIGHTS

The modern civilization has seen successive revolutions unfold over time. Roughly ten thousand years back, mankind took to organized farming and livestock raising, thus beginning permanent human settlements. The industrial revolution triggered by internal combustion engines changed our societies forever only couple hundred years back. The industrial era is finally giving way to the information era since the birth of the Web. Although computers and networks began this process several years ago, it is the exponential growth of the Internet and Web in the past few years that makes the transformation process now a real phenomenon.

Any business in any sector today is affected to its core due to the digital revolution. At minimum, businesses now have a new medium that did not exist a few years back. More realistically, industry after industry are undergoing fundamental changes right now. A plethora of dot-coms arrived in the last two years like a wave of locusts ready to devour existing enterprises overnight. Many of them are now dead, under the weight of their ill-conceived business models. But some are still alive. More are yet to emerge. And what did the incumbents do? They first panicked, and then rushed headlong to grab a piece of the Internet gold rush. Now some are breathing easy, and even thinking the whole nightmare is over. Others are ever so quietly arming themselves with the Internet, ready to pounce on their unsuspecting rivals or to drive the stake through the heart of any new Web entrant.

Who will win in this dynamic and ever changing competitive arena? How can managers prepare to deal with the new economy? In this course, we address these issues. We begin a strategic analysis of what has changed at the industry level. Then we consider how marketing and service would look like in this new era. Next we consider business-to-business commerce and supply chain management. Finally, we complete this course by examining Internet strategies of today and tomorrow.

COURSE READINGS

Recommended Text: "Electronic Commerce: A Managerial Perspective," E. Turban, J. Lee, D. King and H. M. Chung, Prentice Hall, 2000.

Porter, M. E. "Strategy and the Internet," HBR March 2001

Davenport, T. H. "Reengineering a Business Process," HBS 1995

Christensen, C. M. and M. Overdorf, "Meeting the Challenge of Disruptive Change," HBR March 2000

Egghead to Egghead.com (A) Case, HBS 2000

Shapiro, C. and H. R. Varian, "Versioning: The Smart Way to Sell Information," HBR November 1998

eBay, Inc. Case, HBS 1999

Kaplan, S. and M. Sawhney, "E-Hubs: The New B2B Marketplaces" HBR May 2000

Chemdex.com Case, HBS 1999

Fisher, M. "What is the Right Supply Chain for Your Product?" HBR March 1997

Dell Online Case, HBS 1998

Ghosh, S. "Making Business Sense of the Internet," HBR March 1998

COURSE GRADING

Item	Points	Remarks
Two Exercises (Ex)	20	Individual Assignment
Three Case Reports One Case Report	30 10	Group (4-5 students) Individual
Class Participation	10	Class / Case Discussions, Exercises
Team Presentation	10	Group Sample Presentation
Final Exam	20	Open Book

- **Submit your work via email to Anindya Ghose <aghose@andrew.cmu.edu>, *not to the instructor*. Exercise 1 and 2 are due on May 24 and June 14 respectively (before class starts). You will incur a 50% penalty if you are one day late. Any assignment submitted beyond that time will not be graded.**

- **Each Case Report is due before the case is discussed in class. No late submission is allowed. Submit your work via email to Anindya Ghose <aghose@andrew.cmu.edu>, *not to the instructor*.**

- **Each team will be designated to provide feedback on another team's presentation. Failure to do so within five days will cost each member five points.**

- **Each team will be designated to identify two Internet resource for a specific topic. Failure to do so within a week will cost each member five points.**

TENTATIVE SCHEDULE

N.B. A red exclamation mark (!) beside a link indicates the content at the link has been revised.

Date	Topics	Work Due
5/08!	Introduction	Chapter 1
5/10!	Strategy Fundamentals	Chapter 9
5/15	Strategic Analysis	Porter
5/17	Strategy Implementation	Davenport; Christensen
5/22	Egghead Case	Case Analysis
5/24	Digital Products	Shapiro; Ex 1; Team 1
5/29	e-Marketing	Chapter 2-3; Team 2
5/31	e-Service	Chapter 4-5; Team 3
6/05	eBay Case	Case Analysis; Team 4
6/07	B2B E-Commerce	Kaplan; Chapter 6; Team 5
6/12	Chemdex Case	Case Analysis; Team 6
6/14	Supply Chain	Fisher; Ex 2; Team 7
6/19	Dell Case	Case Analysis
6/21	E-Commerce Strategies	Ch 12; Ghosh

Carnegie Mellon University, Pennsylvania (www.cmu.ecu)

Ecommerce Technology (20-751)

OFFICIAL COURSE WEB PAGE

MSEC Mini 1, 2001

NEW: CHECK AND MAKE APPOINTMENTS. PLEASE CHECK THE APPOINTMENTS PAGE FOR YOUR APPOINTMENT DATE AND TIME.

NEW: PHOTOS FROM PRACTICUM FAIR MAY 9, 2001.

NEW: PHOTOS FROM REED SMITH RECEPTION MAY 10, 2001 BY PHOTOGRAPHER MICHAEL GOLEBIEWSKI

NEW: NO CLASS MAY 18, JUNE 4 OR JUNE 8 (MISSING CLASSES WILL BE MADE UP)

NEW: PHOTOS FROM ORIENTATION DINNER

NEW: SEE SAUMITRA'S PAGE FOR SUPPLEMENTARY COURSE MATERIAL

Administrative Information

For course policies and information about textbooks and how to contact the instructor and teaching assistant, please see the Administrative Page. For background material, refer to the ECOMMERCE TECHNOLOGY LINKS PAGE.

Note: Assignments are to be read BEFORE the associated class.

Course Syllabus

Lecture 1 - **OVERVIEW** (Friday, May 11, 2001) – Course summary and objectives. Survey of ecommerce technology. Essentially a preview of each of the remaining lectures in the course. **Objective:** familiarity with the fundamental technologies underlying eCommerce. View SLIDES.

Note: viewing the course slides is easiest using Internet Explorer. If you use Netscape, you will have to configure it to use PowerPoint when it sees a file with the extension .ppt. Internet Explorer knows this already.

Readings: Rajput Ch. 1.

Lecture 2 - **ECOMMERCE INFRASTRUCTURE** (Monday, May 14, 2001) – The Internet: backbone structure, packet switching, network addressing, routing, TCP/IP. Servers, components of web systems, n-tier architecture. **Objective:** understand how the Internet works and why it is the fundamental eCommerce technology. Homework 1 available. View SLIDES.

Readings: Rajput Ch. 2. Also How Web Servers and the Internet Work (howstuffworks.com), Client-Server Software Architectures (SEI)

NO CLASS FRIDAY MAY 18 BECAUSE OF INTERNATIONAL STUDENT ORIENTATION

Lecture 3 - **WIRELESS TECHNOLOGIES** (Monday, May 21, 2001) – Differences between wired and wireless communications. Radio spectrum. Cellular systems: GSM, UMTS. Satellite communications. Wireless LAN, Bluetooth. WAP, iMode. Global Positioning System (GPS). **Objective:** appreciate the difficulties in implementing wireless eCommerce. Homework 1 due.

Readings: Rajput Ch. 3. Also Mobile Networking Through Mobile IP (Charles Perkins), Internet Protocol/Intelligent Network Integration Tutorial (IEC), The Global Positioning System (Aerospace Corp. 11-page pdf file).

Lecture 4 - **SEARCH ENGINES** (Friday, May 25, 2001) – Document indexing, spiders and crawlers, query specification, importance metrics, hit ranking, link popularity. Robot exclusion, spamdexing. Document clustering. Search engine performance. **Objective:** appreciate the role of search engines at the starting point of eCommerce; understand how sophisticated the engines are and why they behave so differently. Homework 2 available.

Readings: Search engine links. Also: Search Engine Features for Webmasters (searchenginewatch.com), How Search Engines Rank Documents (van Eylen)

Lecture 5 - **ACCESS SECURITY** (Friday, June 1, 2001) – Web security concerns. Firewalls and proxy servers. Authentication methods. Biometric systems and their risks: false acceptance, forgery, replay attacks. Denial of service (DOS) attacks and countermeasures. Viruses and worms. Intrusion detection. **Objective:** understand a variety of threats to network security and methods of defending against them; appreciate the possibilities and limits of biometric technology. Homework 2 due. Homework 3 available.

Readings: Rajput Ch. 8-8.3.3. Also Biometric Verification/Identification (IDEX), Biometric Scanning (Woodward), Virus History and Technical Overview (Symantec), State of the Practice of Intrusion Detection Technologies (SEI).

NO CLASS JUNE 4 OR JUNE 8

Lecture 6 - **DATA INTERCHANGE** (Date to be announced) – Exchanging data over the Internet. XML, style sheets, document type definition (DTD). ASN.1 and the Basic Encoding Rules. The UDDI standard. **Objective:** understand how systems can exchange data without prior agreement on formats. Homework 1 returned.

Readings: XML: Structuring Data for the Web: An Introduction (Sall). See also the ASN.1 links on the Ecommerce Technology page. UDDI Technical White Paper (uddi.org); Why UDDI Will Succeed (Stencil Group).

Lecture 7 - **PUBLIC-KEY CRYPTOGRAPHY** (Date to be announced) – Encryption, symmetric v. asymmetric systems, public-key cryptosystems, the RSA algorithm. The natures of signatures and digital signatiures. The nature of identity documents and digital certificates. The public key infrastructure. Application: virtual private networks. **Objective:** understand the capabilities and limitations of digital signatures and certificates.

Readings: Rajput Ch. 8.4-8.6.3. Also Cryptography A-2-Z (SSH Communications Security Ltd.), Identity Authentication and E-Commerce (M.D. Ford), Digital Money Online (inter://trader).

Lecture 8 - **ELECTRONIC PAYMENT SYSTEMS** (Date to be announced) – Categories of electronic payments. Credit cards: the SSL and SET protocols. The automated clearing house (ACH). PayPal. Micropayment systems. Online banking; EBPP (electronic bill presentment and payment). **Objective:** understand the difficulties in merging the Internet with the world's banking systems. Homework 2 returned. Homework 3 due. Homework 4 available.

Readings: Rajput Ch. 7. Also Digital Money Online (inter://trader), Token and Notational Money in Electronic Commerce (Camp, Sirbu, Tygar)

Lecture 9 - **WEB CONTENT DELIVERY** (Date to be announced) – Types of web content: images, audio, video. Data compression, streaming. Delivery infrastructure, peer-to-peer systems. Quality of Service (QoS), multicasting. **Objective:** understand the nature of web content and its distribution.

Readings: Rajput Ch. 4.

Lecture 10 - **INTELLIGENT AGENTS** (Date to be announced) – Introduction to bots, agents, brokers and avatars. Agent architectures, rule-based inference, fuzzy logic. Mobile agents, multi-agent systems. Agent programming systems. **Objective:** understand how automated agents function. Homework 3 returned. Homework 4 due.

Readings: Software Agents Take the Internet as a Shortcut to Enter Society (Dirk Wagner). Also sample the Ecommerce Bot page.

Lecture 11 - **DATA MINING** (Date to be announced) – Data mining objectives and techniques. Classification, clustering, link analysis, predictive modeling, text analysis, visualization systems. Data mining applications. **Objective:** understand how large quantities of data can be processed to reveal previously unknown relationships and phenomena.

Readings: Data mining links, An Introduction to Data Mining and Advanced DSS Technology (Kurt Thearling), A New Generation of Data Mining Technologies (ANGOSS)

Lecture 12 - **MASS PERSONALIZATION** (June 22, 2001) – Automation of the customer relationship. Use of data to customize the web experience. Cookies and their risks: DoubleClick. Obtaining and using personal information. Rule-based filtering, implicit profiling, collaborative filtering. **Objective:** learn how to acquire information about customers to influence their behavior in real-time. Homework 4 returned.

MIT, Massachusetts (www.mit.edu)

Electronic Commerce and Marketing

Course description

This seminar examines the progress and potential of the Internet, World Wide Web, and related technologies for the marketing, selling, and distribution of goods and services. Much has happened in this arena and new developments occur at a high rate. We shall do a scan of the environment with the help of student projects, guest speakers, readings, and lectures. The goal will be to cover a selection of important material rather than be encyclopedic.

Topics will include

- Technology issues, including basic infrastructure, security, and agents
- Shopping and search and their implications for market strategies and structures
- Pricing, packaging and distribution of information goods
- Business-to-business commerce
- Customization and personalization
- Online communities
- Financial markets and payment systems

Readings

Readings packets will be available from the Copy Technology Center, E52-045. Occasional additional readings will be handed out in class and via the web. Please note that some of the web-based readings require a PDF (Portable Document Format) viewer, which is available for a number of different platforms from Adobe Systems Incorporated; look under the heading Adobe Acrobat.
http://www.adobe.com/Acrobat/Acrobat0.html
Books for the course are: (These books will be on reserve at Dewey Library.)

Required	Kalakota, Ravi & Whinston,Andrew ***Electronic Commerce: A Managers Guide*** Addison-Wesley1997
Recommended	1. Shapiro, Carl and Varian, Hal, ***Competitive Strategy for the Information Economy*** ,Harvard Business School Press, Due in Mid-1998, Selected Chapters in course pack 2. Hagel, John & Armstrong, Arthur, ***Net Gain*** ,Harvard Business School Press, 1997 3. Choi, Soon-Yang; Stahl, Dale. & Whinston Andrew, ***Economics of Electronic Commerce*** ,MacMillan Technical Publishing 1997 4. Schwartz, Evan, ***Webonomics: Nine essential principles for growing your business on the WWW,*** Broadway Books, 1997

Assignments and other course activities

Team projects

The main student assignments will be two team projects, undertaken in groups of approximately four people.

The first project is a ***research briefing***. Its purpose is to develop up-to-date information on a relevant aspect of electronic commerce and to share it with the rest of the class and others. In effect, the collection of research briefings by the class will be part of the text materials for the course. Since the field is changing fast, such a collection can provide the latest information for everyone. The briefings will be disseminated via oral presentation, web posting, and hard copy. The written reports are due the week before spring break and the collection will come out as a second course packet when classes resume. Short oral presentations on the briefings will be worked into the class sessions throughout the semester. The appendix to the syllabus has a sample list of possible briefing projects and the course website contains the briefings developed in the seminar last year.
The second project is a ***case study*** built around an existing or proposed activity in electronic commerce or marketing. Typically, the project might analyze a specific site in depth, describing its underlying business model and strategy, indicating what was working, what was not, and how the site or strategy might be improved. Alternatives might include analyzing a group of sites, an industry or a prospective business opportunity. The second project will be reported orally and in writing at the end of the term.

Commercenet

Class preparation and participation
The readings provide preparation for the outside speakers and classroom discussion. In addition to doing the readings, students should access and contribute to class discussions on the course web site.
Personal web pages
It is desirable for each student in the course to have at least some hands on experience with the technology of web pages. Many students will already have their own home page, but those who do not are required to bring one up. Please note that you should not post on your web page any personal information about yourself that you feel uncomfortable revealing to the outside world. A lab session will be arranged for those who would like instruction.
Informal dinners with speakers
Many of the outside speakers have been invited to go to dinner with a small group of students after class and several have accepted. The plan is to invite 3-4 students on a sign-up basis. Priority will be first-come-first-serve except that individuals doing projects for which a speaker has special relevance will be given extra preference.

Credit and grading

This is a 9 unit course (3-0-6 Level grad credits). Grades will be assigned on the following basis:

Class participation (including web page)	1/3
Research briefing	1/3
Case study	1/3

SCHEDULE

Feb 5 Electronic commerce and marketing: an overview

Readings

- Kalakota & Whinston: ch 1, 3,
- Hal Varian, The Information Economy, Scientific American, September, 1995, pages 200-201.
  This is a short piece (in HTML) on problems facing the development of the information economy.
- Lecture 1 slide (MIT only)

Optional Background Reading:

- Kalakota & Whinston ch. 2
- Choi, Stahl and Whinston, ch. 2
- Negroponte, Nicholas, (1995), Part One, Being Digital, Knopf, pp. 3-85

- Ward Hanson, (1996), "The Original WWW: Business Model Lessons from the Early Days of Radio" (Available in pdf form). This paper looks at another runaway success - radio in the 1920s. A bit of historical perspective is useful in understanding an industry as dynamic as the Web - and its impact on Marketing.

Feb 12 Internet Technology

Readings

- Kalakota & Whinston: ch 4
- Note on the Internet, Stanford GSB, 1996
- Lecture 2 slide (MIT only)

Optional Background Reading

- Choi, Stahl and Whinston, ch. 3

URLs

- **Internet Engineering Task Force**
- **W3 consortium**
- **The Internet Society**

Guest speaker

David Clark, Internet Engineering Task Force, Senior Research Scientist, MIT Laboratory for Computer Science

Assignment

Submit names of team members and tentative topic for first project to TA before class

Optional exercise

Ward Hanson has put together a nice exercise that shows you how to trace a packet as it travels across the Internet

Feb 19 Pricing Information Goods

Readings

- Kalakota & Whinston: ch 9
- Shapiro & Varian, ch. 2
- Evan Schwartz, It's! Not! Retail!
- Evan Schwartz, How Middleman Can Come Out On Top

Optional Background Reading

- Bakos, J.Y. and Brynjolfsson, E. Bundling Information Goods: Pricing, Profits and Efficiency, Working Paper, Sloan School of Management, Massachusetts Institute of Technology.
- Hal Varian, Buying, Renting and Sharing Information Goods
  This paper outlines various circumstances under which such sharing may increase or decrease producer profits. If a rental market is present, more copies will be sold at a lower price. This can be more or less profitable than a sales-only market.
- Shapiro & Varian, ch. 3

- Bakos, J.Y. and Brynjolfsson, E. Aggregation and Disaggregation of Information Implications for Bundling, Site Licensing and Micropayment SystemsGoods:," in Internet Publishing and Beyond: The Economics of Digital Information and Intellectual Property. D. Hurley, B. Kahin, and H. Varian, eds., MIT Press. In press.

URLs

- Wall Street Journal Interactive Edition
- New York Times
- Electric library

Guest speaker
Neil Budde, Editor, Wall Street Journal Interactive Edition
Evan Schwartz, Author of WEBONOMICS

Assignment

Submit personal URL to TA.

Feb 26 Shopping and Search

Readings

- Kalakota & Whinston: ch 8
- Alba, et al., "Home Shopping and the Retail Industry"
- Richmond, Alice (1996) "Entrcing Online Shoppers to Buy--A Human Behavior Study"
- Yannis Bakos's slide (MIT only, PDF format)

Optional Background Reading

- Gates, (1996), "Chapter 8: "Friction Free Capitalism", pp. 180-207.
- Choi, Stahl and Whinston, ch. 7

URLs

- HomeRuns
- Peapod
- Bargainfinder
- Pricewatch
- Computer ESP
- Onsale

Guest speakers:
Prof. Yannis Bakos, University of California, Irvine
Tom Furber, VP Hannaford Bros., Manager, HomeRuns

Mar 5 Business-to-Business E-commerce

Readings

- Kalakota & Whinston: ch 10.
- Cronin, Mary, Business Secrets of the Billion-Dollar Website, Fortune, February 2, 1998, p. 142.

- Marty Tennenbaum's slide (MIT only)

URLs:

- Netmarket
- NECX
- Commercenet
- Draft 02 of the eCo White Paper at Commerncenet

Guest speakers:

- Henry Bertolon, NECX
- Marty Tennenbaum, President, Commercenet; Chairman, CN Group

Mar 12 Business-to-Business E-commerce(Cont.)

Readings:

- Kalakota & Whinston: ch 5

Optional Background Reading:

- Kalakota & Whinston: ch 11

Guest speaker
Nirmal Pal, Director, Network Computing, IBM

Assignment

Project #1 written report due.

Mar 19 No Sloan classes

Assignment
Project #1 website due.

Mar 26 Spring break

Apr 2 Business Strategies on the Internet

Readings

- Firefly Case
- Discussion questions for Firefly case
- Shapiro & Varian, ch. 6

Optional Background Reading

- Shapiro & Varian, ch. 7, 8

Assignment
Prepare Firefly Case for Discussion

Apr 9 Advertising as a Business Model; Intelligent Agents

Readings

- Kalakota & Whinston: ch 5, 6.
- Cheng, Judy (1996) "NewMarket Ventures, Inc and cartalk.com"
- Resnick, Paul. Filtering Information on the Internet. Scientific American, March 1997, pp. 106-108.
- Hal Varian, Mechanism Design for Computerized Agents

URLs:

- Cartalk web site
- The Dolans web site
- newmarket.net
- PICS
- W3C Technology and Society Group

Guest speakers:
Tom Lix, CEO, New Market Ventures, Inc.
Prof. Paul Resnick, University of Michigan, Chair of W3C Platform for Internet Content Selection (PICS)

Apr 16 Online Community

Readings

- R. Guttman, A. Moukas, P. Maes "Agent-mediated Electronic Commerce: A. Survey". To appear, Knowledge Engineering Review Journal
- Urban, G. Trust-Based Marketing (To be distributed in class)

Optional Background Reading

- A. Chavez and P. Maes, "Kasbah: An Agent Marketplace for Buying and Selling Goods ", Proceedings of the First International Conference on the Practical Appication of Intelligent Agents and Multi-Agent Technology, London, UK April 1996.
- Armstrong, A. J. Hagel III, "The Real Value of Online Communities", Harvard Business Review, May-June, 1996, ppp. 134-141.

URLs:

- Slides of Pattie Maes's guest lecture

Guest speakers
Prof. Pattie Maes, MIT Media Lab, Director, Agents Group
Prof. Glen Urban, Dean, MIT Sloan School

Apr 23 Banking and the Internet

Readings

- Kalakota & Whinston: ch 7
- Sirbu, Marvin, Credits and Debits on the Internet IEEE Spectrum, February, 1997

Optional Background Reading

Choi, Stahl and Whinston, ch. 7

Guest speakers

Dan Schutzer,Vice President & Director of External Organizations, Standards and Advanced Technology, Citibank ;President of the Financial Services Technology Consortium

Professor Marvin Sirbu, Carnegie Mellon University

Apr 30 No Classes

May 7 Team project presentations

Readings

- Wired Article about E*trade
- Hoover's Business Information Go to the registered users section and request a full company report.

May 14 No Classes

Assignment

Team project #2 (Case study and analysis): Final written report due

Appendix: Sample Research Briefing Topics

Below are a number aspects of electronic commerce and marketing on the internet that might make interesting topics for the research briefing that comprises the first project. A number of the topics were investigated last year but have had new developments occur since then. The list is by no means exhaustive and teams are welcome to suggest other topics or modify these

- The evolving options for local access
- Search engines, agents, and filters
- Electronic payment systems
- Privacy
- Disintermediation
- Brokers
- Auctions on the web
- Intranets
- Internet advertising
- Direct marketing on the internet
- Security
- Business to business marketing
- Pricing strategies for information goods
- Successful retailing models
- EDI on the web
- Measuring advertising
- Publishing on the web

Monash University, Australia (www.monash.edu.au)

BEW1601 Introduction to Electronic Commerce

Subject Aims

On completion of the subject you should be able to:

- Discuss what is meant by Electronic Commerce enabling technologies, tools and processes.
- Consider the implications of these technologies for the business community.
- Understand the issues that must be considered by a business deciding whether or not to implement EC enabling technologies.
- Develop an understanding of the role of the Internet and the World Wide Web (WWW, the Web) in the commercial world.
- Appreciate the nature of communications and be able to describe the way communications have changed over time.
- Understand the social impact of major changes in communications.
- Understand the additional considerations EC brings to traditional rules of business.
- Explain the impact of information systems within commercial organizations.
- Explain the issues associated with data security.
- Understand the specific issues that EC brings to audit requirements.
- Understand the importance of integrated technology within a business structure.
- Explain the implications of Information Technology for global business strategy.
- Explain the implications of Electronic Commerce for government regulation policy and revenue strategies.

Subject Structure

This subject is structured into four Modules, each with a set of Topics. The suggested study program below will help you to cover all the topics during the semester. Within each module there are suggested Activities and reflective Study Questions that should be completed. By completing these, you will ensure that you have covered all the major areas addressed by this subject.

Module 1: 'Electronic Business', 'Electronic Commerce' and Factors Affecting E-Commerce Uptake

This module includes

- Defining Electronic Business and Electronic Commerce, and the main classification-types of EB and EC.
- Drivers for EC uptake, and forces fueling EC. EC tools/processes, and how they support typical business functions.
- E-commerce business models. The external business climate, and other external factors. Key questions for business managers.

Module 2: The Internet and Other Enabling Technologies and Tools

Module 3 and 4: Title and content to be advised

Bond University, Gold Coast, Australia (www.bond.edu.au)
Electronic Commerce 1

Prerequisites

CORE11-110 Information Technology 1 (for students not enrolled in the School of IT)

CORE11-111 Information Technology 2 (for students enrolled in the School of IT)
CORE11-130 Management or CORE11-131 Entrepreneurship

Aims and Objectives

The subject provides an introduction to electronic commerce, both for I.T. and non-I.T. students. It includes a balanced coverage of technical and business topics. It reviews problems and solutions to business activities being conducted electronically. Security issues, transaction integrity and electronic payment systems are considered. Implementation strategies are analysed, using examples of both successful and unsuccessful implementations.

The course begins with an explanation of the economic foundations of electronic commerce. This sets the stage for the descriptions of electronic commerce infrastructure. The main technologies that are used to implement online business activities are explained. After students have gained an understanding of the foundations and technological implementation issues, a number of different business strategies that companies are using for electronic commerce are reviewed. By studying the business strategies, students can see how the economic framework and the specific technologies come together in actual business applications. Of course, these business applications must operate in the global environment of business, so the course also includes overview discussions of international, legal, ethical, and tax issues that can arise in the conduct of electronic commerce. The course also covers how project planning and management techniques can help make online business initiatives successful.

Case studies and plentiful business examples complement conceptual coverage to provide a real-world context.

Prescribed Text

Schneider, G and Perry, J., ***Electronic Commerce***, McGraw-Hill, 2000, ISBN 0-7600-1179-6

Recommended Reading

Greenstein, M. and Feinman, T.M., ***Electronic Commerce***, McGraw-Hill, 2000, ISBN 0-07-22928-9

Lawrence, E., Corbitt, B., Tidwell, A., Fisher, J. and Lawrence, J., ***Internet Commerce***, John Wiley & Sons, 1998, ISBN 0-471-34027-8

Kalkota, R. and Whinston, A., ***Electronic Commerce – A Manager's Guide***, Addison Wesley, 1997, ISBN 0-201-88067-9

Course Schedule

Week 1	Introduction and Concepts
Week 2	Internet and the Web: Infrastructure for EC
Week 3	Web-Based Tools for EC
Week 4	EC Software
Week 5	Security Issues in EC
Week 6	Implementing Security for EC
Week 7	Electronic Payment Systems Midterm Examination
Week 8	Strategies for Marketing, Sales and Promotion
Week 9	Strategies for Purchasing, Logistics and Support
Week 10	Electronic Markets and Communities
Week 11	Legal and Ethical Issues
Week 12	Business Plans for Implementing EC
Week 13	Revision
Week 14	Final Examination

APPENDIX 2: Attributes Studied

General
Company
Unique visitors (March 2000)
Reach
Rank

Organization
Sector
Founded
Employees
Storefronts
Catalogs mailed
Number of facilities
Telecasters
Ownership (NYSE, NASDAQ)
Symbol
Traded on
Stockholder Equity

Website Overview
Name
Site launch
Site type
Business model
Business model 2
Site size (products sold)
Language
Language 2
Accepts advertising

Marketing
Number of partnerships
America Online Partnership?
Number of affiliates
Top commission rate

Internet Infrastructure
Design consultants
Site maintenance
Hosting arrangement
Access provider
Access provider 2
Access provider 3
Hardware Platform
Hardware platform 2
Hardware platform 3
Operation system
Operation system 2
Web Sever Software
Web Server Software 2
Commerce Platform
Web Server
Web Server 2
Total Web Servers
Database Platform
Database Servers
Database Servers 2
Personalization
Affiliate Management
Payment Processing

Operating Benchmarks (1999)
Total Revenue
Net Revenue
International Sales
Sales to Repeat Customers
Marketing Expenditures
Development Expenditures
Total Customers (end of period)

APPENDIX 3: Profiled Companies

1. Amazon.com
2. Ameritrade
3. AMP Electronic Commerce
4. Art.com Inc.
5. Ashford.com, Inc.
6. autobytel.com inc.
7. autoweb.com.
8. BabyCenter Inc.
9. BarnesandNoble.com Inc.
10. Beyond.com Corp.
11. Biztravel.com, Inc
12. Bluefly, Inc.
13. Bolt, Inc.
14. BUY.COM, Inc
15. CarsDirect.com Inc.
16. CDnow, Inc.
17. CDW Computer Centers, Inc.
18. CompUSA Inc.
19. Crutchfield New Media LLC
20. Dell Online
21. drugstore.com, inc.
22. eBay Inc.
23. Eddie Bauer, Inc.
24. Egghead.com, Inc.
25. 800.com Inc.
26. E-LOAN Inc.
27. eToys Inc.
28. E*TRADE Group, Inc.
29. Expedia, Inc.
30. FastParts.com
31. FirstAuction
32. Fogdog Inc.
33. Food.com Inc.
34. FTD.com
35. Furniture.com Inc.
36. Gap Inc. Direct
37. Garden.com, Inc
38. Gateway, Inc.
39. Grainger.com
40. HomeGrocer.com, Inc
41. HomePoint Corp.
42. IMX Exchange
43. Ingram Micro Inc.
44. InsWeb Corp
45. International Business Machines
46. iOwn
47. iPrint.com, inc
48. iQVC
49. J. Crew Group Inc.
50. JCP Internet Commerce Solutions, Inc.
51. KBkids.com LLC
52. Lands' End, Inc
53. L.L. Bean, Inc.
54. Merisel, Inc.
55. MVP.com, Inc.
56. NetB@nk
57. NetGrocer Inc
58. NextCard, Inc.
59. OfficeDepot.com
60. OfficeMax.com
61. 1-800-FLOWERS, Inc.
62. OneCore.com
63. Outpost.com
64. Peapod, Inc
65. Pets.com, Inc.
66. PETsMART.com, Inc.
67. PlanetRx.com Inc.
68. Priceline.com Inc.
69. Quicken Loans Inc.
70. Recreational Equipment Inc.
71. Reel.com, Inc.
72. Charles Schwab & Co. Inc.
73. Sharper Image Corp.
74. SportsLine.com, Inc.
75. Staples.com
76. Tower Records
77. Toysrus.com, Inc
78. Travelocity.com Inc.
79. Wal-Mart.com Inc.
80. Webvan Group, Inc.
81. Wells Fargo & Company
82. Wine.com

APPENDIX 4: Profiled Profitable Companies

1. AMP Electronic Commerce
2. CDW Computer Centers, Inc.
3. Crutchfield New Media LLC
4. Dell Online
5. eBay Inc.
6. Eddie Bauer, Inc.
7. Gap Inc. Direct
8. Gateway, Inc.
9. Grainger.com
10. Ingram Micro Inc.
11. International Business Machines
12. IQVC
13. JCP Internet Commerce Solutions, Inc.
14. Lands' End, Inc.
15. L.L. Bean, Inc.
16. NetB@nk
17. OfficeDepot.com
18. OfficeMax.com
19. Quicken Mortgage
20. Recreational Equipment Inc.
21. Charles Schwab & Co. Inc.
22. Sharper Image Corp.
23. Toysrus.com, Inc.
24. Wal-Mart.com Inc.
25. Wells Fargo & Company

APPENDIX 5: Completed Matrix

tag_along.xls

Clicking on the above link will open the E-Commerce Almanac which profiles the 82 companies used in this report.

APPENDIX 6: Common Attributes of Profitable Companies

1. The profiled companies exist in approximately 15 different sectors

2. Aside from eBay Inc. and NetB@nk, all the profiled, profitable companies were founded earlier than 1989; this accounts for 92% of the companies.

3. 72% of the companies have storefronts.

4. 84% have telecenters

5. 68% are public; of those that are public, 70% are traded on the NYSE.

6. In an subjective analysis, all but 1 (amp.com) of the companies have domain names that I could guess without actually knowing the correct URL. This accounts for 96%.

7. 72% conducted B2C business. 28% conducted both B2C and B2B business.

8. 80% of the companies used a Fixed Pricing Business model. Other business models are Fee Based, commission based and Auction Pricing.

9. 96% do not accept advertising. Only quicken.com accepts advertising.

10. 84% advertise on television; 56% advertise on the radio; 76% use direct mail; 88% use business or consumer periodicals

11. 56% have some sort of partnership with America Online.

12. Nearly 100% of the companies do In-house Web Site Maintenance; 60% have exclusive On-site Servers compared to the 32% who have co-located servers.

13. 88% have as a Hardware Platform either an IBM Machine, Sun Microsystems Machine or an Intel Pentium Based Machine.

14. 84% use Solaris or Windows NT as their Operating System

15. 84% use either the Microsoft IIS or Netscape Enterprise Web Server Software.

16. 84% use either Microsoft SQL Server or Oracle for their Database Platform.

17. 60% use website personalization

18. 60% used a Website Design Consultant

APPENDIX 7: E-Commerce Almanac


ecafile1.doc


ecafile2.doc

Clicking on the above two links will open the E-Commerce Almanac which profiles the 82 companies used in this report.

Glossary

brick-and-mortar: This term refers to traditional retailers and businesses that weren't born on the Internet. For example, though JCPenny has an online component, it is still a brick-and-mortar company. Pure Internet based companies don't have a presence in the physical world.

Cookie: A collection of information, usually including a username and the current date and time, stored on the local computer of a person using the World Wide Web, used chiefly by Web sites to identify users who have previously registered or visited the site

E-commerce: The buying and selling of products and services by businesses and consumers over the Internet

E-economy: The system or range of economic activity throughout the Internet community.

E-tailers: An Internet based shop that sells goods or commodities in small quantities directly to consumers.

FAQ: Frequently Asked Questions

IPO: Initial Public Offering – when a private company starts selling shares of its stock to the public sector.

Latent Requirement: Meeting customer needs before customers are aware of those needs. If a company can find the latent requirement of the market, it may achieve a monopoly for a little while. The company can ask a higher price, which can be very profitable.

Paradox: An assertion that is essentially self-contradictory; (e.g. in order to turn a profit, you might need to lose money first; if you lose money your investors might pull their funds)

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