

SUMMARY OF CLASSROOM MATERIAL

ELECTRONIC COMMERCE

ECONOMICS OF ELECTRONIC COMMERCE: SELLING ONLINE IS USUALLY MORE EXPENSIVE

Some people have suggested that the Internet may be a less expensive way to distribute products than traditional “brick-and-mortar” stores. However, in most cases, selling online will probably be *more* costly than selling in traditional stores due to the high costs of processing orders and direct shipping to the customer. Some products may, however, be economically marketed online. Some factors that are relevant in assessing the potential for e-commerce to be an effective way to sell a specific products are:

- *“Value-to-bulk” ratio.* Products that have a lot of value squeezed into a small volume (e.g., high end jewelry and certain electronic products) are often more cost-effective to ship to end-customers than are bulkier products with less value (e.g., low end furniture).
- *Absolute margins.* Some products may have a rather high *percentage* margin—e.g., a scarf bought at wholesale at \$10 and marked up 100% to be sold at \$20. However, the *absolute* margin is only $\$20 - \$10 = \$10$. In contrast, a laptop computer may be bought at \$1,000 and be marked up by only 15%, or \$150, for a total price of \$1,150. Here, however, the absolute margin will be larger—\$150. This allows the merchant to spend money on processing, packaging, and shipping the order. Ten dollars, in contrast, can only cover a small amount of employee time and very limited packaging and shipping. Some online merchants do charge for shipping, but doing so will ultimately make the online merchant less competitive.
- *Extent of customization needed.* Some products need to be customized—e.g., checks have to be personalized and airline tickets have to be issued for a specific departure site, destination time, and travel time. Here, online processing may be useful because the customer can do much of the work.
- *Willingness of customers to pay for convenience.* Some consumers may be willing to pay for the convenience of having products delivered to their door. For example, delivering high bulk, generally low value groceries is generally not efficient. However, for some customers, it may be worthwhile to pay to avoid an inconvenient trip to the grocery store.
- *Geographic dispersal of customers.* Electronic commerce, when value-to-bulk ratios and absolute margins are not favorable, is often not viable when customers are located conveniently close to a retail outlet. However, for some products—e.g., bee keeping equipment—customers are widely geographically dispersed and thus, a centralized distribution center may be more economically viable. Specialty books—e.g., for collectors of vintage automobiles—may not be worthwhile for bookstores to stock, and these may thus be economically sold online.
- *Vulnerability of inventory to loss of value.* Some products—especially high tech products—have a very high effective carrying costs. It has been estimated that because of the rapid technological progress made in the computer field, computer parts may lose as much as 1.5% of their value per week. If shipping directly to the customer can reduce the channel time by five weeks, this potentially “rescues” as much as 7.5% of the product value. In such a situation, then, trying to reach the

customer directly may make sense, even if the direct costs of distribution are higher, because of the inventory value issue.

A [chart](#) distributed with the PowerPoint handout for this topic also discusses these factors. A [handout](#) on collaborative filtering is also included.

At the *firm* level, some will be better able to efficiently and effectively sell on the Internet than others. These are some considerations:

- *Firm reputation/credibility.* Since the customer is buying a product without the opportunity to inspect it, and since the customer will need to have a certain confidence that the merchandise ordered will actually arrive, firms with stronger reputations will be more likely to receive orders.
- *Volumes sold.* One way to limit the labor costs of online sales is to automate the process as much as possible. For example, rather than having people go around in a warehouse to pick up and assemble different parts of an order, an automatic conveyor belt that will pick up the different products of a customer's order at different "stations" will do much of the work that the customer does in a traditional store. Firms shipping more packages can also negotiate lower shipping costs per unit.
- *Ability to sell multiple items together.* It is useful to be able to spread the costs of packaging and shipping across a number of different items. The more different but complementary items that an online vendor carries, the more likely it is that customer orders will tend to include a number of different items.
- *Synergy with traditional retail store operations* ("bricks-and-clicks"). Well known retail chains—e.g., Staples, Costco, and Nordstrom's—tend to have an established reputation as discussed above and are thus more likely to be trusted. Having retail locations also makes it easier to accept returns, and the combined sales of online and brick-and-mortar outlets make for a greater bargaining power.
- *Location for minimization of sales taxes.* Some states either do not collect sales taxes or have a small population so that sales within the state are modest. The rules of taxation of items sold out-of-state through Internet orders are complex. In general, Congress has put a moratorium on the collection of *new* taxes—that is, states can continue to collect taxes that were in effect before 1998 but cannot impose additional ones. This moratorium was intended to be temporary but has been extended several times. In general, a firm must collect taxes in states where they have a "physical presence"—that is, where they have offices or other operations.
- *Location for low labor and land costs.* With ready access to shippers such as UPS and Federal Express in most of the Continental U.S., there is no significant advantage in being located in a major city. Small towns often have much lower real estate costs. Firms can also locate in areas where wage levels tend to be lower (e.g., because of high levels of unemployment or other economic depressors).
- *Potential for repeat sales to the same customer.* Just as in traditional brick-and-mortar sales, it is often more cost effective to sell to existing customers than constantly trying to reach new ones. This is true online as well. In addition, based on knowing what the customer has bought in the past, it is possible to identify other customers who have bought these same items and identify additional common purchases among these relatively similar individuals. This process, known as *collaborative filtering*, is discussed below.

There are a number of economic realities of online competition:

- As discussed, costs of handling online orders is often higher than that of distributing through traditional stores.
- Even if online selling is more cost effective in some situations, a firm selling online will, in the long run, be competing with other online merchants—not just against

traditional “brick-and-mortar” stores. By the forces of supply and demand, online prices will then be driven down so that the profit from selling online will be no greater than that from traditional retailing. Any reduced costs would then be expected to go to customers.

- Competition will be greater for products that have large markets than for those where markets are smaller and more specialized. Amazon.com, for example, has found it necessary to discount best selling books deeply. Higher prices—closer to the list price—can be charged for specialty books, but for a large part of the market, competition will be intense.
- A new online merchant will face competition from established traditional merchants. These will often have the cash reserves to stay in business for a long time even with temporary competition. The online merchant, if it has no cash reserves other than stockholders’ investment, may run out of cash before it can become profitable.

In comparing the cost of selling online with of selling through the traditional retail structure, it appears to absolute margins and the extent to which the assembly and shipping process are automated are two of the most significant factors. In looking at the structure of costs, we find the following:

Cost	Brick-and Mortar Store	Online sales
Ordering cost (from wholesaler or manufacturer)	✓	✓
Inventory holding	✓	✓
Inventory space	✓	✓
Retail store space	✓	
Stocking	✓	✓
Assembling order		✓
Packaging order		✓
Cost of shipping to customer		✓
Store sales staff (non-checkout)	✓	
Credit card charges or allowance for bad checks, if accepted (assuming no cash payments)	✓	✓
Loss of inventory value over time	Greater	Smaller
Handling of returns	Smaller	Greater

One of the key issues from this table is the cost of non-checkout sales personnel. Analysts have suggested that Best Buy has relatively high costs in part because of the high rents they must pay for many of their retail locations and in part because of the high cost of the “blue shirt” sales people. To the extent that selling online is a way to reduce this labor cost, there might, in principle, be a strong argument for cost savings. However, it should be noted that Wal-Mart and certain other self-service brick-and-mortar retail chains have considerably lower cost here: The customers usually select their own items, put these in their carts, take them to the cash register, and then bring the purchases home. If a retailer needs to have sales people bring out items for a back storage facility, that may, indeed, be inefficient. However, if the sales people help answer customer questions, the question arises as to whether an online site can answer such questions in a way that is equally convenient to customers. A great deal of information can be put in a product description, and other information can be made available in areas such as FAQ sections, but some customers may have more difficulty finding this information.

Collaborative filtering is a process that can be used to identify products that an individual may be interested in buying based on identifying purchases which overlap with

those of specific others. This allows the identification of products “discovered” by other customers to a customer who is statistically likely to find that product of interest. For example, two psychologists—Drs. Jonathan Kellerman and Stephen White—both write murder mystery novels in which the protagonist is a psychologist who helps police find the killers. Very likely, individuals who have read several novels by one of the authors would find those by the other of interest. In the conventional bookstore, novels are typically arranged in alphabetical order, making this similarity difficult to detect. Online vendors such as Amazon.com, however, can rely on “brute force” computations in identifying overlaps of customer purchases. If even 10% of customers who have bought novels by Jonathan Kellerman have also bought books by Stephen White, this is likely to show up as a strong link, triggering a recommendation to individuals who have bought several books by one of the authors. Note that a similar situation exists in the area of music: What exactly makes two artists “similar” to the extent that they may have similar potential fans? This overlap could be driven by “sound”—although it may be difficult to concretely describe the “sound” of different artists—lyrics, or other factors that may be difficult to catalog. Overlap in purchases, however, will identify such apparent similarities.



Collaborative filtering relies on a considerable amount of available information to make high quality recommendations. Thus, one would expect the quality of recommendations made to improve as an individual accumulates a longer purchase record and as more customers are added to the database. The process works very well for Netflix because a large number of individuals have all rented and rated a large number of DVDs over time. For example, although the movie *Hotel Riwanda* never got much interest at the box office, it has become one of the top ten most frequently rented DVDs at Netflix. Note that the collaborative filtering system is improved considerably at Netflix because customers actually rate the movies after viewing them. At Amazon, the system is based mostly on the decision of the customer to buy a book or other item rather than a post-experience evaluation. It is, however, possible at Amazon to respond to recommendations—either by saying that one already owns the item or that it is not actually of interest.

Amazon.com uses a similar method in identifying other products whose sales significantly overlap with the item currently displayed. Several products will be displayed with a message something like “People who bought ____ also bought.” The actual algorithm used to identify these overlaps may be more complex than this, but here the focus is basically on the correlations of this item to others rather than on the entire purchase history of an individual. Thus, the recommendations are likely to be somewhat less tailored to the individual customer. This, however, may be an advantage when this customer starts exploring a new interest. For example, if an individual suddenly takes up gardening, his or her purchases may not give any cue to this, suggesting that books that overlap in sales with one being browsed may be of greater interest.

M-Commerce. People increasingly access the Internet through cellular phones and other portable devices. Today, these can be used two ways. Web sites can be accessed through a browser. In addition, certain firms may make “apps” that make accessing their particular content easier, possibly adding certain security features. For example, a bank may create an app that lets customer access account information and perform transactions. Thus, the design can be made to make the best use of the available screen space. Information service providers such as Yelp may create applications optimized for the display of relevant information that they provide.

M-Commerce tends to be more developed in certain countries—e.g., Japan, Finland, and even India—than in the U.S. In places where fewer people have easy access to computers, accessing the Internet through a smart-phone will tend to be more popular—thus the emphasis on M-Commerce in India, for example. Recent research in the United States has also found that a large proportion of young people from a lower socio-economic background report a cell phone as their primary means of accessing the Internet.

One significant promise of M-Commerce is that this may make micro-payments more cost effective. It is generally very costly and difficult to collect small amounts of money—say, 25 cents to \$2.00 through traditional credit cards. Usually, the bank involved will want a minimum of \$0.30 plus some 1.75-3.5% of the amount charged. The percentage is not as big a problem, but \$0.30 eats a great deal of a 50 cent—or even \$1.00—charge. However, since cell phone service providers already have an established billing relationship with its customers, they may be able to collect these small amounts more easily, keeping costs down.

WEB SITE TRAFFIC GENERATION

The web is now so large that getting traffic to any one site can be difficult. One method is search engine optimization, a topic that will be covered below. Other methods include “viral” campaigns wherein current users are used to spread the word about a site, firm, or service. For example, Hotmail attaches a message to every e-mail sent from its service alerting the recipient that a free e-mail account can be had there. Google offers a free e-mail account with a full gigabyte of storage. This is available only by invitation from others who have such e-mail accounts. Amazon.com at one point invited people, when they had completed a purchase, to automatically e-mail friends whose e-mail addresses they provided with a message about what they had just bought. If the friend bought any of the same items, both the original customer and the friend would get a discount.

Another method of gaining traffic is through online advertising. Sites like Yahoo! are mainly sponsored by advertisers, as are many sites for newspapers and magazines. Individuals who see an ad on these sites can usually click to go to the sponsor’s web site. Occasionally, a firm may advertise their sites in traditional media. Geico, Dell Computer, and Progressive Insurance do this. Overstock.com has also advertised a lot on traditional TV programs. Conventional advertising may also contain a web site address as part of a larger advertising message.

Viral marketing is more suitable for some products than for others. To get others involved in spreading the word, the product usually must be interesting and unique. It must also be simple enough so that it can be explained briefly. It is most useful when switching or trial costs are low. It is more difficult, for example, getting people to sign up for a satellite system or cellular phone service where equipment has to be bought up front and/or a long term contract is required makes viral marketing more difficult. Viral marketing does raise some problems about control of the campaign. For example, if a service is aimed at higher income countries and residents there spread the word to consumers in lower income

countries, people attracted may be unprofitable. For Google's one gigabyte e-mail account, for example, there are large costs that may be covered by advertising revenues from ads aimed at people who can afford to buy products and services. Advertisers, however, may not be willing to pay for targets who cannot afford their products. It is also difficult to control "word of mouth" (or "word of keyboard"). Measuring the effectiveness of a campaign may be difficult. When a viral campaign relies on e-mail, messages received may be considered spam by some recipients, leading to potential brand damage and loss of goodwill.

Online promotions. One way to generate traffic is promotions. Many sites often offer new customers discounts or free gifts. This can be expensive, but sometimes, the gifts can be ones that have a low marginal cost. For example, once the firm pays for the development of a game, the cost of letting new users download it is modest. The U.S. army uses this approach in making a game available. To be allowed to use some of the "cooler" features, the user has to go through various stages of "basic training."

SEARCH ENGINE RANKINGS AND OPTIMIZATION

Many Internet users find desired information and sites through search engines such as Google. Research shows that a large proportion of the traffic goes to the first three sites listed, and few people go to sites that appear beyond the first "page" or screen. On Google, the default screen size is ten sites, so being in the top ten is essential.

Because of the importance of search engines, getting a good ranking or coming up early on the list for important keywords is vitally important. Many consultants offer, for large fees, to help improve a site's ranking.

There are several types of sites that are similar to search engines. Directories involve sites that index information based on human analysis. Yahoo! started out that way, but now most of the information is accessed through search engine features. The Open Directory Project at <http://www.dmoz.org> indexes sites by volunteer human analysts. Some sites contain link collections as part of their sites—e.g., business magazines may have links to business information sites.

Several issues in search engines and directories are important. Some search engines, such as Google, base rankings strictly on merit (although sites are allowed to get preferred paid listings on the right side of the screen). Other search engines allow sites to "bid" to get listed first. Some sites may end up paying as much as a dollar for each surfer who clicks through. If a potential customer is valuable enough, it may be worth paying for enhanced listings. Often, however, it is better to be listed as number two or three since only more serious searchers are likely to go beyond the first site. The first listed site may attract a number of people who click through without much serious inspection of the site.

Some search engines are more specific than others. The goal of Google, Yahoo! and MSN is to contain as many sites as possible. Others may specialize in sites of a specific type to reduce the amount of irrelevant information that may come up.

Search engines often have different types of strategies. Google is very much technology oriented while Yahoo! appears to be more market oriented. Another major goal of Google is speed. Some sites may contain more content of one type than another. For example, AltaVista appears to have more images, as opposed to text pages, indexed.

Search engine rankings. The order in which different sites are listed for a given term is determined by a secret **algorithm** developed by the search engine. An algorithm is a collection of rules put together to identify the most relevant sites. The specific

algorithms are highly guarded trade secrets, but most tend to heavily weigh the number of links from other sites to a site and the keywords involved. More credit is given for a link from a highly rated site—thus, having a link from CNN.com would count much more than one from the site of the *Imperial Valley Press*. On any given page, the weight given from a link will depend on the total number of links on that page. Having one of one hundred links will count less than being the only one. One source reports that the weight appears to be proportional so that one out of one hundred links would carry one percent of the weight of being the sole link, but that may change and/or vary among search engines.

For Google, some of the main ranking factors appear to be:

1. Number and quality of links to the site, as discussed above. **This is by far the most significant factor.**
2. Relevant keywords. Note that the ranking algorithm tests for “spam.” Reckless repeating keywords may actually count *against* the rating of the site.
3. The “click-through” share of the site. Since late 2006 or early 2007, Google reportedly fine-tunes rankings by observing the percentage of the time that a particular site is chosen for a given set of search terms. Sites that are selected more frequently may improve in rank and those less frequently selected—despite their merits presumed from the other factors—may move down.
4. Location. This is a new factor that has recently begun to affect items. A user’s geographic location can usually be identified based on his or her “IP address,” a way of identifying a particular computer. If one were to search for “Chinese restaurants” on a computer located at USC, many of the results would be generally, discussing issues relevant to Chinese restaurants overall without any necessary reference to any specific ones. However, certain prominent Los Angeles area Chinese restaurants may also be listed. In Portland, OR, the list would thus be different, possibly including some local establishments there.

Types of search engines. Some engines, such as Google, are general purpose search engines. Some are specialized. Some are hybrids, containing some directory structure in addition to search engine capabilities. Some sites are aggregator sites—they do not have their own databases but instead combine the results from simultaneous searches on other search engines. In 2009, Microsoft released the Bing, the “decision engine,” which is intended to provide more “intuitive” results. Rather than identifying a number of airlines offering a fare between two cities, for example, is intended to actually show these fares. Yahoo has signed an agreement to use Bing as its search engine source.

Text optimization. It is important to repeat important words as much as possible subject to credibility. Search engines today are increasingly sophisticated in identifying “spamming” through frivolous repetition of the same words or early use of words that are not relevant to the main content of the site. Words that appear early in the text and on the index page will tend to be weighted more heavily. For some search engines, it may be useful to include common misspellings of a word so that the site will come up when that spelling is used. For aesthetic reasons, many firms may object to having much text on the front page, but text may be put below the graphic elements—e.g., see <http://www.LarsPerner.com> . Some web site owners have attempted to include hidden text so that a search engine would find the desired words while the visitor would see something else. Some web designers, for example, would hide text behind a graphic, make the text in a very small font, and/or make the font color the same, or nearly the same, as the background. Other web site designers have made a “legitimate” site, only to have a command to move the visitor to another site when they go to the searched site. Search engines today are increasingly able to detect this type of abuse, and sites may be penalized as a result.

Early search engines relied heavily on “meta tags” where the web site creator specified what he or she believed to be appropriate keywords, content descriptions, and titles. Because these tags are subject to a lot of abuse, these no longer appear to be significant.

Link optimization. Many web sites engage in “link exchanges”—that is, complementary sites will agree to feature links to each other. It may be useful for a webmaster to ask firms whose content does not compete for a link. Sites should register with the Open Directory Project at <http://www.dmoz.org> since, if a site is classified favorably, this may help rankings.

The bottom line on Google. Today, the most significant factor in search engine rankings appears to be the “value” of the links that reach a site. Links from “low value” sites (those that are not rated highly, and especially those considered to be “spam”) count for very little. Links from highly rated sites on the relevant keywords count for literally thousands—sometimes tens and hundreds of thousands—times as much as less important sites. In the past, the presence of important key terms on a site was the main driver of rankings, subject to some rudimentary safeguards against obvious “spamming” sites which used the words as a way to gain rankings without providing relevant information. Now, the effect of keywords is secondary except for searches that involve a very unique key term. Within the last year, it appears that Google has incorporated the frequency of “click-through” for a site when it is listed in search (“organic”) results. That is, if a relatively high proportion of searchers go to the site, its ranking is likely to decrease. However, if relatively few searchers actually end up going to a highly ranked site when it shows up in search listings, that site is likely to lose rank. Search engines cannot usually measure the amount of traffic that goes to a site.¹ Traditionally, then, the traffic of a site was not directly incorporated into the ranking system. Today, however, Google is reported to weigh the percentage that a site is chosen for click-through when the site comes up in a search. That is, if a site is initially highly ranked, if a small proportion of searchers actually choose to go to that site, this site is likely to have its rank reduced.

¹ Google now offers a set of “Analytics” tools, including a set of web traffic statistics. Webmasters can sign up voluntarily to participate in this by placing certain “meta tag” code in their web pages. (This code is invisible to people viewing the respective web page in its regular display mode). Therefore, for such sites, Google does, in principle, have access to traffic information from all sources, including other search engines or links from other sites. It is not clear whether Google actually uses this information, however.