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e-COMMERCE: IMPLICATIONS FOR FIRM STRATEGY AND INDUSTRY CONFIGURATION

MARTIN KENNEY AND JAMES CURRY

The 1931 movie, *Cimarron*, had a memorable scene with a panorama of an enormous number of covered wagons lined up to participate in what would later be called the Oklahoma Land Rush.¹ This scene captures the essence of the Internet rush. In 1990 the US National Science Foundation approved the use of the Internet for nonacademic uses, but it was only in 1993 that the technologies were developed making possible the World Wide Web (WWW). The key breakthrough was the release of software able to generate the appropriate data that could be transmitted over the Internet to a user's machine where it would appear as visual images. The result has been nothing less than a global cyber rush, similar to the Oklahoma Land Rush, as individuals and businesses have rushed into cyberspace, a place where anyone can have a site almost by simply claiming it. In this paper we examine some of the initial commercial uses of this new space, while recognizing the very preliminary nature of our findings.

Among all the remarkable aspects of the Internet, the speed of its adoption is, perhaps, the most noteworthy. The growth of Internet users from 5 million in 1993 to 62 million in 1997 and nearly 100 million in 1998, is one of the fastest adoption rates any technology has ever experienced (Caginalp 1998; Department of Commerce 1998: 8).² Traffic on the Internet continues to double every 100 days, according to Uunet Technologies, an Internet backbone provider (Caginalp 1998). Even faster than user adoption rates, the number of domain system names (registered sites) registered has been increasing at an annual rate of 40–50 percent, reaching about 29.7 million at the end of 1997 (Glave 1998). And, most important for this article, the number of commercial names (.com) increased from 27,000 in January 1995 to over 765,000 in July 1997. The US was the leader, and most analysts expected this pace to continue until after the year 2000. Since the movement to Web-based commerce is spreading globally, there eventually may be as many as 550 million users and a far greater number of commercial sites than currently exists.

It is hazardous to guess what the Internet will mean for commerce. Schumpeter's metaphor of new technologies opening new spaces appears particularly appropriate for the Internet insofar as it is a vast new region being colonized by a nearly unlimited variety of activities with no inherent relation to the technology itself. In other words,

1 The authors thank John Zysman and an anonymous referee for helpful comments.

2 For a history of the creation of the ARPANet, the precursor to the Internet see, Hauben and Hauben (1998). For the privatization of the Internet and the creation of the World Wide Web see Reid (1997).

like the telephone it is an enabling technology. In the realm of economic life, there can be little doubt that this is a classic case of the creation of what Schumpeter (1969) termed a "new economic space".

The development of a particular technology certainly does not entirely determine, in the strong sense, the nature of the changes underway. However, as a tool, the Internet will be used in ways that will transform existing relationships such as those between buyers and sellers, workers and owners, and suppliers and assemblers. In the process there will be important changes in institutions such as manufacturing firms, service providers, and retailers. Here we are careful not to claim that technology mandates a particular institutional outcome(s). Our position is rather that drastic changes are already underway and the pace of change will intensify.³

The power of the Internet is its simplicity; it is merely a medium for connections and is able to transmit anything digitized. Unlike prior communication systems, such as telephony, which established a dedicated connection between two (or sometimes more) nodes, the Internet allows the simultaneous exchange of information in digital form among an unlimited number of nodes. The protocols used to transmit data across the Internet are standardized and readable by a multiplicity of computing platforms. To this is added the innovation of hypertext, that is the ability to almost effortlessly move from node to node at a whim. The information content of the Internet is almost completely dephysicalized or dematerialized. It is reduced in its physical essence to the most abstract possible formulation: 1s and 0s carried by laser light, electrons, or electromagnetic waves. Multi-platform accessible standards, hypertext, and dematerialization are forcing and combining with a remarkable increase in the capacity of global telecommunications systems to rapidly reduce the costs of communicating digital data. The extreme flexibility of the Internet allows it to be used for a large number of activities with differing real world manifestations. Activities as diverse as booking airline flights, purchasing items, playing games, viewing pictures, listening to music, or accessing public information, many of which formerly were intermediated by human operators are being transferred to the Internet. The dimensions and plethora of activities related to the Internet are increasingly impossible to fully comprehend and this immensity is emblematic of its power.

This article discusses several different areas in which the Internet will have significant impact on the current organization of economic activity. It begins with a brief discussion of the difficulties contemporary social sciences have in explaining the Internet and its effects. The next three sections consist of a general examination of the development and capabilities of the Internet as they relate to commerce, a more focused discussion of the capabilities of the web for enhancing customer service, and a general examination of the economic and organizational impacts of web-based commerce. This is followed by three sections which examine exemplary areas in which the commercial application of the Internet is leading to new approaches to doing business, or otherwise having a major impact on the way business is already

3 The Internet is having profound effects on social norms and culture (Slouka 1995; Dery 1996; Turkle 1997). It has influenced everything from the way people access government information and manage their bank accounts to the facilitation of conspiracy mongering and teenage gossip.

conducted. These factors underlie the current push for the development of web "portal" sites, the direct marketing model of personal computer assembly and sales, and the use of the Internet to streamline inter-firm transactions. The penultimate section addresses the advantages of being first to exploit a particular niche or opportunity. Finally, in the conclusion, we raise the question as to whether the Internet will lead to the proliferation of numerous niche businesses, or whether certain technological and economic exigencies will lead to domination by a small number of very large content aggregators or product marketers.

THEORIZING THE NEW ECONOMIC SPACE

The Internet is a key aspect of the ongoing transformation of the global economy to a form in which materiality becomes subordinate to information and knowledge creation. More than merely a new communication system, the Internet represents the creation of an entirely novel economic space. By connecting computers the Internet allows direct access to processes and procedures, which were formerly cordoned off in the back offices and data processing centers of government and corporations, while also creating entirely new sources of information. The Internet makes a vast mass of information, images, and opinions accessible to any owner of a connected computer. It is an interactive communications medium through which the user accesses information that would have previously taken much time and physical effort to find. The Web is remarkable because the user has the sensation of travelling, though in reality the user is only electronically reaching out and retrieving data to be visualized on a computer monitor. In this process the costs of information search and retrieval drop dramatically.

Even though there is no certainty about the ultimate configuration of Internet-related commerce at maturity, businesses such as stock trading, bookstores, airlines, and PC firms are already migrating online. Virtual stores are being created with virtual inventories far larger than any physically existing store. Because their available inventory is entirely computerized, the customer rapidly pinpoints the exact product desired by using specially tailored database query software. These products can be drop-shipped from a production or distribution node to anywhere in the world using the various courier services that are also online. The Internet eases many market entry barriers because of minimal startup costs, thereby dramatically accelerating the realization of an idea and allowing successful ventures to grow exponentially.

The Internet represents an extremely powerful dematerialization. It is no longer necessary to disseminate information in the physical medium of paper, floppy disks, or CDs. It can now be communicated through electronic impulses and/or beams of light (fiber optics). Such flexibility and ease of use accelerates information flow and communication, facilitating new knowledge creation and novel forms of social production. These changes have been most pronounced in the software development area. Though the distribution of commercial-class software over the Internet is still only limited, already in existence are vast downloadable stores of freeware and shareware programs, and numerous product demos, service updates, and bug fixes. Many software developers use the Internet to publicize and distribute test versions of innovative software programs such as the Opera browser and The Brain user

interface. The Internet also facilitates the development, distribution, and maintenance of the alternative freeware Linux operating system and Apache web server. These programs are the result of the collaborative efforts of thousands of users/developers for whom the Internet serves as a virtual software development campus. According to the chairman and founder of Netscape, Jim Clark (1995: 70) new business models are possible because:

The Internet is low cost. We proved that by using the Internet to distribute our first product, and we were able to build a customer base of 10 million users in just about nine months. Our only expense was the engineering cost of making the program ... So we see this potential for low cost distribution of any kind of intellectual property—whether software, or pictures, or movies, or compact disks, or anything that can be represented as bits.

An example of the curious economics of the Internet is McAfee Associates, a producer of antiviral software, which adopted the capture “mind share” strategy and pioneered free software distribution through the Internet. McAfee has said “if you give software away and assist people as well, you’re almost bound to make money” (Leon 1997). After providing free software to five million users, McAfee shifted into a marketing mode and started charging for upgrades, add-ons, and new updates. This strategy is becoming quite common; even Microsoft, probably the most aggressive *seller* of software posts trial versions of some programs, such as Money and Outlook 98. Since computers and networks constantly evolve, the customers actually evolve with the software in the form of upgrades. From the perspective of traditional economics, giving products away for free seems foolhardy and even perverse. Recently, however, some economists and business theorists have begun rethinking traditional economic concepts to encompass the value-added from knowledge creation and the “winner-take-all” aspects of capturing or becoming standards in information- and communication-intensive industries (David 1986; Arthur 1994; Shapiro and Varian 1999).

Economic puzzles like these are only the tip-of-the-iceberg, there are other phenomena pressing beyond the boundaries of traditional social sciences. User communities, at a number of web sites online actually become an integral component of the value of the site, as opposed to the consumers in the non-Internet market. The user community creates value in a profoundly social sense. For example, readers’ reviews are posted at Internet bookseller, Amazon.com (Hagel and Armstrong 1997). This goes beyond the ideas of sociologists such as Granovetter (1985) in his discussion of the embeddedness of economic institutions. The social (community) interaction process and its concomitant communication of information and opinion creates the *value* of a web site. The ability to search online for a book and purchase it is reproducible, the online community is not.⁴

The Internet is creating another level of social internetworking. Castells (1998) wrote about the “rise of the networked society”, as if the nature of human society was not inherently networked. The issue is not really the rise of a networked society, but rather the reach of the networks and their increasing bi-directionality. However, the

⁴ The etymological roots of the words “communication” and “community” indicate the relationship between these two words. One’s community is with whom one communicates.

new level of networks will lead to important qualitative changes in the economy and society, though it is somewhat premature to speculate on the social changes. The increased penetration of electronic data transmission networks will surely have an impact. This paper builds upon Castells' observations and initiates an analysis of exactly what these changes in the economic realm might entail.

The creation of online or virtual communities occurs through the medium of virtual places. Worldwide web servers provide Internet surfers with the electronic analog of visiting an address (Batty 1997), although it is really only a software construction on a computer server connected to a telecommunications pipeline through which the user retrieves information (Mitchell 1995). And yet, the metaphor of place in cyberspace is rapidly becoming accepted by most Internet users. However, this was not always the case; as late as 1990 Mitch Kapor and John Perry Barlow (1990) observed that the old concepts of property did not apply well "in a world (that of the Internet) where there can be none". This idea of a virtual place in space is a vexing issue in capitalist economies where space is measured, marked, and owned. Marking and ownership systems, however, are being developed. For example, World Wide Web addresses are becoming valuable property as Compaq can attest when it paid \$3 million for the Altavista web address.

THE INTERNET AND COMMERCE

By the early 1990s the Internet hosted a vast collection of useful information and downloadable software. However, most of the tools for accessing this information were primitive and required a certain amount of expertise and system knowledge on the part of the user. Over time a number of key innovations were developed, reflecting a long tradition of collective development of network technologies, standards, and protocols funded by the Federal government. These were all designed to make the Internet more useful to the academics and computer scientists who were the Internet's main users. The breakthrough came with the World Wide Web (WWW) and Hypertext Mark-up Language (HTML) protocols, which were developed by researchers at the European Laboratory for Particle Physics (CERN) in Switzerland in order to facilitate the exchange of information among physicists. Thereafter the obvious next step was to develop special software, the browser, which made the utilization of these and other protocols invisible to the user. A number of different browsers were developed, some more functional than others, and were distributed freely over the net. One of the early browsers, Mosaic, developed at the National Center for Supercomputing Applications (NCSA) at the University of Illinois Urbana-Champaign became wildly popular with millions of copies downloaded in a few short months after its release. The group that created Mosaic was recruited and moved to California to build the first commercial-grade browser, forming the company named Netscape. Netscape added the final key innovation, building secure transaction capability (Secure Sockets Layer, or SSL) into its browser (Quittner and Slatalla 1998). This enabled Internet users to safely and conveniently exchange money for products to be delivered over the net itself or by the already extant and highly sophisticated delivery systems such as Federal Express, UPS, or the USPS. Once all these pieces of

the puzzle were in place, the success of the Internet as a commercial medium was all but guaranteed.

Despite the seemingly obvious commercial applicability of the Internet, no one dominant model of doing business has yet emerged. The Internet has presented itself to business as uncharted territory, forcing firms to blindly grope for strategies that work. Those firms who wish to succeed in Internet commerce have had to confront three unique characteristics. The first is ubiquity. By this we mean that all "places" on the Internet are accessible to the user on what is essentially an unlimited and equal basis. The user can go anywhere on the net with a minimum of effort; there is no inherent technological reason for the user to start at a particular point.

One entry point to the WWW is the proprietary network services predating the rise of the WWW in the mid-1990s, such as America Online (AOL), Prodigy, and CompuServe. But these services had to adjust their business models and, in fact, CompuServe was acquired by AOL. Moreover, most, if not all of the services provided by more delimited systems are available at either free or subscription stand-alone web sites. Thus, commercial content providers must find ways to attract people to their sites, either by providing attractive content for them to consume or some service or product they want to use or buy, or by creating a system for purchasing non-Internet specific products that offers something conventional retail channels do not.⁵

The second important characteristic of the Internet is interactivity. The Internet itself was developed through a remarkable process of interaction by researchers located around the world. Commercial publishers who wish to succeed on the Internet must offer more to customers than that which is ordinarily available in print or from some other media. One of the more successful web publishers has been the *Wall Street Journal*, which has seen steady growth in its paid subscription base since it connected to fees about two years ago. The Journal's site offers not only standard print content, but also a wide range of content and services not found in the print edition. These include articles from other Dow Jones publications, past article search and retrieval, customized stock quotes, job finding information, a database of company background information, interactive discussion of various current news topics, a news audio feed, the ability to customize the web page to the user's interest, and numerous other features. The *Journal* site serves both as a substitute for those with limited access to the print version, such as overseas readers, and as a complement to print subscribers who wish to access additional services such as company and stock tracking from a source they know and trust.

The interactive nature of the Internet also gives rise to new forms of collaborative activity. Some software firms place nearly completed software (*beta releases*) at a

5 Much has been made by "old-line" journalistic sources of the fact that anyone can disseminate information over the Internet, reaching an audience potentially in the millions. A piece presented on "60 Minutes" cited the existence of numerous web sites covering such things as UFO conspiracies, theories about what caused the TWA disaster, and Neo-Nazi beliefs, all of which are not held to any standard of accuracy. What these critics fail to understand is the Internet is a vast collection of sites and that the user generally has to seek out the information he is interested in. Most of these sites will never be seen by most net users. The "market" for crackpot journalism existed prior to the Internet and it is unlikely that the Internet will cause it to grow at any appreciable level. To the contrary, those brands that have a reputation for accuracy and utility will thrive, while marginal sites will stay marginal.

web site and encourage computer aficionados to install the software and test it for bugs, functionality, and features. The aforementioned Linux and Apache software programs have relied on the Internet for both their dissemination and their continuing technological evolution. Consumers actually participate in the knowledge creation process by using a new product and communicating the results back to the company. Netscape, for example, pre-releases unfinished versions of new software products over the Internet for this purpose. This diminishes some of the burdens of in-house testing and decreases the distance between software creators and customers by creating an information feedback loop. Moreover, integrating a subset of customers directly into the product development process also accelerates the creation of demand for the finished product.

The third important characteristic of the commercial Internet is speed (Davis and Meyer 1998; Kenney and Curry 1999). Because the Internet is an ubiquitous, interactive system based on a multipurpose digital computing platform, changes such as system software upgrades, new standards and protocols, and new publications (content) can be developed and disseminated very rapidly. The availability of out-of-the-box network and network server hardware and easily adaptable software applications such as credit card billing systems and searchable databases enables the rapid development of commercial systems at very low cost. Moreover, many Internet-based businesses have been developed as overlays on existing infrastructure, which further reduces startup costs and time of deployment. The rapidity at which businesses can be established on the Internet places a great deal of emphasis on being the first in a particular market category. An interesting case in point is Amazon.com, an Internet bookseller based in Seattle. By relying on existing systems of distribution as a sort of retailing adjunct to them, Amazon was able to start operations quickly and efficiently (Bianco 1997). By purchasing advertising link space for itself on the Internet from frequently visited sites such as Netscape's, Amazon developed a high volume business in a very short time (Southwick 1996). Founded in 1995, Amazon had over \$116 million in net sales during the second quarter of 1998, an increase of 316 percent over net sales of \$27.9 million for the second quarter of 1997 (Amazon.com 1998). Barnes & Noble, an important innovator of large, high variety, bookstores, has only recently recognized and introduced book selling on the Internet as a logical extension of its own large-scale distribution and inventory-tracking system (Marcial 1997). But, being a late entrant in the Internet book sales arena, Barnes & Noble is having great difficulty overtaking Amazon.

Given the assistance of customers, product evolution in Internet software is extremely rapid (Reid 1997). The leading personal computer software company, Microsoft, only saw the potential and danger of the Internet in late 1993, though after that it moved very quickly to exploit the new opportunity to overtake the leader, Netscape. Microsoft's strategy was to rapidly improve its Internet browser and include it in the Windows 95 software package. By the end of 1997, Microsoft was rapidly taking market share from Netscape. A "browser war", as well as a legal war has begun as Microsoft works to cripple Netscape using various stratagems.

The Internet economic space opened quickly and continues to provide many possibly transformative opportunities. Leadership roles in previously stable and even

stagnant activities such as book selling, travel agency, and telephone ticketing are in a state of flux. For the airlines, the Internet made it feasible to create online reservation systems that they could control and use to reduce the power of travel agents. There were also significant savings, because the cost of issuing an e-ticket is only one dollar, whereas a telephone ticket costs eight dollars—spurring changes for the highly competitive airline industry because of these compelling economics.

The Internet could also impact the local newspaper as a material source of information delivery. The initial approach to simply place the newspaper on a web site has failed. What may evolve is that various web sites will replace different components of the newspaper. Already there are entertainment-oriented “lifestyle guides”, such as Microsoft’s Sidewalk sites. There are many sports- and business-oriented web sites that might replace or, alternatively, complement the sports and business sections. Like the *Wall Street Journal*, these sites offer a level of interactively accessible information that would be cumbersome in printed form. The most important impact on newspapers might come from Internet-based classifieds since they are a key source of revenue for newspapers. Inexpensive local classified ad sites are already available on the Internet. It is likely that the classifieds will eventually become interactive, allowing direct responses to ads through e-mail, or even more interactively through a chat program. The variables that will determine the fate of newspapers hinge upon the issue of whether readers appreciate the variety, including national and local news, sports, business, weather, and advertising, etc. in hardcopy. The electronic analog does not appear satisfactory at this moment.

It is still quite early in the development of the Internet and related data communications, so the possibilities of the new medium are only beginning to be explored. Old activities such as making phone calls, sending mail, and ordering goods and services are already migrating to this nearly instantaneous environment. And, as important for this paper, many formerly relatively sedate industries are finding parts of their value chain absorbed and accelerated to computer and Internet time. As a result, some local businesses can go global and experience dramatic growth, while other local businesses will be outflanked by competitors from anywhere on earth and experience decline.

CUSTOMER SERVICE FUNCTIONS

Customer service functions have always been a time-consuming person-to-person activity, however much of this is highly routinized. An important recent step in automating customer service was telephone call processing, but this was a slow system with very low bandwidth. In other words, an excessively long menu of choices leads to consumer disconnection and difficulties in creating user-friendly branching systems. More sophisticated non-human intermediated customer service would have to wait until the consumer had a device able to handle greater amounts of information, i.e. the PC and a computer modem. When the installed base grew and the technology was sufficiently mature it became possible to place information on a server open to customers. This redefined customer service by increasing the level of provision while decreasing the cost. This was possible because most interactions are entirely standard. For example, many customer questions are for routine information

such as store hours and directions. Answers to such questions can be codified, indexed, and stored on a server to be accessed online and downloaded. For simple questions such as directions the Internet can download a map, whereas on the telephone error-prone verbal instructions are necessary.⁶ Essentially, customers can access the information they need to find and create value for themselves from the provider's web site at practically no cost except the initial startup costs.

In addition to seeking routine information, customers are also attracted to sites that provide detailed information about products or services. A potential customer can browse several competitors' sites, as well as third party sites, which discuss the product in question, compare prices and features, gather general information about a particular product or type of product, taking as much time as desired before making a purchase. A recent study at the Fuqua School of Business at Duke University found that consumers were more likely to buy products from sites that provided comprehensive information than from sites that had slightly lower prices but little in the way of useful information (Bransten 1998). The point is that the user can select the desired amount of information, removing the need for the information provider to make decisions based on an "average" consumer.

The types of customer service provided online depend upon the firm's product or service. For example, software companies make available various software patches, add-ons to current products, and/or demos. Increasingly, software programs such as Microsoft Windows or Netscape Communicator have the ability, upon a prompt from the user, to automatically check for updates and then download and install them. Delivery through the Internet is essentially without cost and has the added benefit of developing a connection with the customer. In other cases, service bulletins or product-related information are placed on company web sites for informational purposes. These relatively straightforward applications replace or augment previous product upgrading or information dissemination techniques.

Global logistics firms, such as DHL, UPS, and Federal Express, have taken the potential for customer service much further. Federal Express, one of the aggressive first-movers, has opened the tracking portion of its computer system to Internet users. Federal Express' initial effort on the Internet was a one-way information provision service that customers could use to receive information about the location of the shipment and its arrival time (Lappin 1996; Grant 1997). The success of this initial effort spurred Federal Express to consider other ways to use the Internet. Based on its experience with the tracking service, a web site was developed to permit customers to use the Internet for all their shipping functions. The features now available include scheduling pick-ups, detailed maps of all drop-off locations, rate charts, and other information regarding international customs regulations. Moreover, the site offers free downloadable software that speeds the processing of shipments, allows the user to store addresses in an address book, maintains a shipping history in a log, and creates and prints labels (Federal Express 1998). Many shipping office functions have been transferred onto software and into data communications networks. Human intermediaries and physical documents were replaced by software.

⁶ As more automobiles are transformed into mobile offices, it will be possible through mobile phones to access Internet maps to be downloaded to a notebook computer, or to an onboard travel computer.

Not only is it less expensive than previous methods, but it also provides the mechanism for creating whole new ways for firms and their customers to interact. Most critical, the information provided through the server gives the customer the resources to create value from the site.

e-COMMERCE

The reasons consumers purchase retail items are complicated and, at times, non-rational (we discuss inter-firm purchasing in another section). One reason is plainly utilitarian, but, of course, there are other more emotive motivations. Today, the Internet is establishing an entirely new retailing channel that is already affecting traditional retail industry. As we shall see, building successful Internet retail web sites is significantly more complex than simply moving a catalog online. A web site must create a feeling that it is the place to go to buy something.

The use of Internet retailing will transfer an increment from traditional channels to online. Fred Smith, the founder and CEO of Federal Express, has an apocalyptic (and somewhat self-serving) vision, "The Internet is going to make it very difficult for anybody in a middleman position to stay in business ... the same type of effect that Wal-Mart had in the retailing sector—that's what the Internet is going to do to every business" (Lappin 1996: 286). No previous communications technology has allowed the customer to personally search databases of, for example, books, autos, software, airline schedules, and then complete the purchase without face-to-face interaction. Traditional commercial locations deployed a service worker (or intermediary) that communicated with a customer while interfacing with a computer and performing search and booking procedures. With Internet browser technology it is possible to remove the service worker as a translator between the analog customer and the digital database or to "disintermediate" the relationship. This makes it possible to reconceptualize activities that formerly required human service workers and directly connect customers to firms' computers. With credit card payment the entire process is electronic with the exception of delivery for some goods, such as insurance, stock certificates, and financial instruments, there is nothing but an accounting notation in a computer.

There are remarkable benefits for a retailer who can transfer sales activities to the Internet, though they vary by product or service. For many services in which there is no physical component at all it may be quite easy to move the entire process online. A general benefit is that an Internet retailer can hold far lower inventory levels than a conventional retailer who must have the items in stock, thereby tying up capital. The difference can be striking. For example, Amazon.com, the online book-seller, turned its inventory over 42 times in 1997, whereas its largest competitor, retail store-based Barnes & Noble turned over inventory only 2.1 times (Willis 1998). Moreover, a significant portion of Amazon's inventory is held by distributors who ship the items directly to the customer although this is changing as Amazon attempts to develop a system of buying directly from publishers (Bianco 1997). Book retailing could experience even further radical changes as new electronic book devices arrive in the marketplace, such as devices enabling books in digital form to be downloaded by phone or potentially over the Internet. An early example of this is the 400 page

book *Emerging Digital Commerce* published by the US Department of Commerce (1998) using Adobe Acrobat and which can be printed in a book-like format. In another inventory-sensitive market, one of the several automobile retailing web sites, *Auto-By-Tel*, had an annual sales rate of \$6 billion at the end of 1997, up from \$1.8 billion the previous year (Reuters 1998).

Lower inventory reduces risk from market vagaries. Internet-based retailing eliminates the costs of retail branches, thereby lowering initial entry costs and the fixed costs associated with retail stores. Moreover, the use of the Internet for sales combined with delivery firms such as Federal Express and UPS extends the customer base from the relatively local reach of individual stores to anyone anywhere in the world having access to a PC with a modem and a credit card. In addition, because the merchant's server operates constantly, purchases can be made day or night, any day of the year. Distance is dramatically shrunk, while time is extended to its maximum.

Complicated sets of purchasing decisions such as booking travel and hotels can be undertaken online without human intervention. For example, air travel, car rental, and accommodation can be booked at an online travel site. The online travel agent can go far beyond a telephonic travel agent by providing much broader and more detailed information including textual descriptions, images, and even reviews of the various destinations. In effect, huge databases of information can be made available to the customer in such a way as to allow users to "customize" their travel agenda. In essence, the customer produces a uniquely customized product from an entirely standardized set of choices.

The convenience and availability of information are important advantages. However, online travel agencies have yet another advantage, namely, they can post comments from previous travelers, thereby creating interaction and information exchange. This multiplies, simplifies, and makes interactive the "letters to the editor" columns found in newspaper travel sections. The interactive possibilities permit online discussions regarding specific types of travel, such as ecotourism, folk festivals *ad infinitum*. This virtual community adds value to the site and is a mechanism for retaining customers who can change sites at the click of a button. Moreover, the knowledge generated through these discussions could permit the discovery of new market needs, thus giving rise to new products. The community and its interactions add value that the travel agency does not need to compensate.

Compare the economics of an online travel agency with that of a conventional agency. At the conventional agency a person deals directly with the customer in a situation in which the time spent with a customer on a booking is a direct cost. In essence, each interaction with the customer is a cost (Department of Commerce 1988: 28).⁷ In addition, travel agents can make mistakes, however on the Internet the customer bears full responsibility for the reservation. In the case of the conventional travel agency, return business is dependent upon building an interpersonal relationship with the customer. The online travel agency uses the online customer com-

⁷ Traditionally the travel agent retained 10 percent of the ticket cost. In late 1997 the airlines cut the cost to 8 percent or \$50, whichever was smaller.

munity to develop relationships between the customers and with its site in the hopes of encouraging repeat business (Hagel and Armstrong 1997).

The travel agent's experience combined with a personal relationship with the traveler can be seen as a knowledge base that enabled them to make recommendations to improve the traveling experience. The travel agent was a form of expert knowledge. Customers not utilizing the travel agent's knowledge base, in effect subsidized those using the knowledge. In an Internet-based system information on travel habits, previous travel, and other characteristics (i.e. a profile) allows the computer to search its database and match it with similar profiles to be used to offer "personalized" services to a customer.

The success of online travel agencies is apparent (Needle 1998). For example, Microsoft's Expedia site launched in 1996 had more than \$12 million in monthly sales in January 1998 and was growing quickly (Lipton 1998). As important, the US travel industry is being reorganized, not only with new entrants such as Microsoft, but also as the airlines are reducing the fees they pay to travel agents and encouraging customers to buy tickets directly through their web sites. In the process these web sites are being built into virtual places. For those desiring human contact, the offline travel agent will remain available, but increasingly they will be paid for directly by the user, witness the increasing use of service charges by the offline travel agencies (a tactic that will accelerate the movement of customers to the online agencies).

To recapitulate, the technical capacity for online retailing can be understood by seeing the two tendencies that were integrated by the Internet. First, the decreasing cost of long distance telephone service meant many customer transactions had already been centralized into call processing centers especially for the purchase of products such as tickets, software, computers, etc. Second, the development of sophisticated database management software and the use of corporate Intranets serviced by large-scale computer servers meant that the purchasing process had been largely computerized. The service worker using a networked computer to take an order was merely an intermediary between the customer and the corporate database. On the demand side, the increased usage of e-mail, the development of expensive, user-friendly browser, personal computers with faster modems, and more persons attached to high-speed local area networks created a large installed base of potential consumers. The final step was to habituate customers to purchase items through cyberspace. As more and more consumers are online, old retail methods will be eclipsed since consumers have vastly more information at their disposal, not only about the products available, but about their prices as well. Premium list pricing will be more difficult to maintain as consumers can nearly effortlessly find the lowest-priced vendor, or go to a site that aggregates the price information of several vendors.

PORTALS

The chaotic unplanned topology of the Internet creates difficulties for customers in finding vendors (Watson *et al.* 1998). Because of the ease in establishing a web site and the inability to see the actual product, there is a heightened possibility of fraud, so an element of risk is injected in the purchasing decision. This makes the brand

name of the web site extremely important. Some of the initial attempts at aggregating commercial web sites operated on the metaphor of the shopping mall (*Economist* 1997). Here, a number of vendors would create virtual stores at a single web site, the e-mall. The idea here was for the vendors to pay rent for a site at the e-mall. The more creative of these actually generated small buildings that the customer could click on to enter. This business model built on the suburban shopping mall seemed entirely plausible. However, the difficulties became obvious rather quickly. The shopping mall provides a centralized place for consumers, who had moved away from traditional downtown shopping districts to the suburbs. Prior to the automobile, the downtown had been served by public transit such as streetcars and subways, so commerce clustered at its nodes. The fatal flaw in the e-malls was that there were no reasons such as convenience, less traffic, or crime that would impel "shoppers" to visit the mall rather than go "downtown". In a sense, the whole World Wide Web itself is the mall, or the shopping district (Cairncross 1997). Moreover, the shopping mall provides an analog social experience, whereas thus far Internet buying is much more utilitarian, despite the effort to create an online community.⁸

Another problem related to the relatively slow acceptance of the e-mall idea is advertising. Many commercially oriented sites rely on advertising as either a full or partial source of revenue. The proprietary online services such as Prodigy, MSN, or AOL serve as excellent advertising vehicles since their users are forced to start with their proprietary interfaces. AOL has been particularly successful with users who can, if they wish, access the Internet directly, but who feel more comfortable using AOL's preselected content (information, news, announcements, etc., and advertising) as their "home base" on the Internet. The rise of the ubiquitous Web however, has challenged the proprietary online service models since users with "direct" Internet connections can essentially start wherever they want. This presents a problem for those companies who seek revenue from advertising and/or linking partnerships with online vendors. Like any other medium, the more viewers you attract, the more you can charge for advertising. Thus, with the viewer free to roam, the focus shifts from getting people online, to getting people who are online to go to your site.

This has led to the recent idea of developing content aggregation sites, or as they are more commonly known, web portal sites. The idea behind portals is to create sites which have a great deal of general utility to users, so that users will visit them frequently, or set them as their default start sites. So, for example, users go to Yahoo to access not only its categorization and search capabilities, but also to access additional proprietary or linked content such as e-mail, chat, news and weather, telephone directories, games, maps, etc. The enormous traffic thus attracted provides Yahoo with the opportunity to sell lots of click-through advertising at profitable rates. Additionally, sites such as Yahoo are able to sell more profitable targeted advertising. If a user searches "computers" for instance, the site will return a page with a computer-related banner advertisement; search "autos" and a car company advertise-

8 This experiential aspect of the shopping mall, or other types of shopping experiences, makes it unlikely that Internet shopping will replace malls, although it is possible that it could erode some mall sales. This is especially the case in that movie multiplexes have emerged as important mall anchoring tenants. The Internet will never be able to provide the same social and entertainment experiences as malls.

ment may appear. Rather than the failed suburban shopping mall metaphor, the subway stop and/or node might better approximate the new model. For example, in Japan or in Europe fixed rail transportation nodes such as Shinjuku or Victoria Station (in the US, Grand Central Station has some of these characteristics) are also commercial nodes where shops, department stores, and other commercial activities are clustered. These establishments feed off the traffic volume flowing through the stations. Moreover, travelers may occasionally arrange their journeys to include stops at these heavily commercial nodes, or plan trips whose sole purpose is to visit these nodes. With the Internet the potential traffic is infinitely greater and since potential customers know they can find what they want they are attracted to the location. Moreover, the portal site, because of the interactive and hyperlinked nature of the Internet, potentially becomes something entirely novel, a hypermall. Shopping in a hypermall is context sensitive instead of place sensitive. Search "travel" in Yahoo for example, and along with the usual categories of travel related sites (both commercial and otherwise) is provided with a link to Yahoo's own travel booking service. Search "literary criticism" or some other book-related topic, and Yahoo will provide a link directly to the particular topic area at Amazon.com (a Yahoo partner).

The one caveat to the viability of this scenario is that after visiting the vendors' site, the user may bookmark the vendor and not return again through the portal. Whereas, at the subway station they will continue to return on their way to other sites. However, if the portal continues to be useful in other ways, and advertisers continue to see value in portal associations, the approach could be stable. Hyperlinking is also problematic in another way; at one time a specific portal site might have enormous traffic, but due to the virtual nature of the landscape the "transportation" links can be quickly and easily rearranged by users and traffic can evaporate quickly. For example, Netscape's and Microsoft's web sites (including MSN) are among the top 10 most visited sites largely because they are the default setting on Netscape's and Microsoft's browsers (*RelevantKnowledge* 1998). Part of the current mania for portals is due to the realization on the part of Netscape and Microsoft that these default links give their sites a large revenue generation potential.⁹ It is for this reason that Microsoft's operating system browser integration is seen as a major threat to Netscape. Should Microsoft successfully replace Netscape's browser, will NetCenter lose its potential as a portal?¹⁰

PC ASSEMBLY AND SALES

The PC is, of course, the user's vehicle for accessing the Internet. Also, it has become one of the most popular products to sell on the Internet. The mail order and internet-based retailers have adopted a system by which they have few, if any, computers in inventory. For example, Insight, a mail order computer products distributor in Tempe, Arizona, provides customers with a catalog (or web page) of products. They then handle the order and payment and simply arrange for a main

9 It is an easy matter to change the default home page setting on browsers but most users either do not know how or do not care to.

10 A new twist in this saga is America Online's proposed purchase of Netscape in December 1998.

distributor or manufacturer to ship the product directly to the customer. In fact, companies like Federal Express and UPS could eventually provide the final assembly of the computers as part of their services (see Lappin 1996). Still another variant of moving assembly temporally closer to the customer are the unrelated decisions by Ingram Micro and Fujitsu to move their PC assembly to Memphis, Tennessee as it is Federal Express's hub. This will speed their reception of parts and delivery to retailers or final customers.

Perhaps the most significant point to be made about the use of the Internet by the PC industry lies in how it integrates the production process with the distribution process. Direct marketing firms such as Dell Computer and Gateway not only demonstrate the Internet's potential as a sales tool, but its potential to radically transform the way production and distribution are organized. In its original conception, Dell's system was not predicated on the Internet—orders were handled by phone, fax, or by mail. Using the Internet to take orders is a logical extension of the direct marketing logic, providing a richer alternative to the previous methods of taking orders. More important, however, this kind of e-commerce has the potential to transform what is a multi-tiered, disjunctive process into one that is seamless and continuous. This is because the PC is a general-purpose device assembled from a series of separate components linked through a common set of architectural standards. Each PC can be directly customized to the buyer's preferences leading to increased customer satisfaction without the risks inherent in trying to perfectly forecast demand (Curry and Kenney 1998). In the case of Dell and Gateway the customer goes to the web site, chooses a base configuration, and then chooses such things as the amount of memory, the size/type of disk drive, the type of graphics or sound, and add-ons such as a modem or network card. Once the computer is configured and payment is approved, the order is sent directly to manufacturing and the PC is assembled, tested, and shipped (see McWilliams 1997; Serwer 1998).

This takes the use of the Internet as a selling medium to an entirely new level. Rather than simply creating a store to sell finished products (for instance, books in the case of Amazon.com), companies like Dell can create a system in which demand nearly exactly matches supply. Manufacturing, distribution, and consumption increasingly become inseparable abstract moments in a continuous process. From the consumer's point of view all products are totally customizable; the customer can order their custom specifications. From the manufacturer's point of view the problem of demand forecasting is minimized and managerial focus shifts to streamlining production throughput.¹¹

11 It should be pointed out that the PC direct marketing does have its limits. Dell and Gateway's main market consists of corporate, government, and education accounts. This customer base is somewhat experienced and sophisticated about ordering computers from a distance. Many individual consumers, however, are less comfortable ordering a PC over the phone or the Internet and past attempts to broaden the customer base appear to have been only marginally successful at best. Despite both the amount and quality of information available on retail web sites, some customers prefer to see and touch the potential purchase. Moreover, many potential first-time PC buyers do not yet have Internet access. Gateway is currently attempting to broaden its customer base by establishing a chain of retail "stores", located in shopping malls and other high traffic locations, at which customers can view Gateway computers first hand and then submit their order at the store or later from home (Bigelow 1998).

The reason the PC industry has been the leader in direct retailing is due to the modular nature of its product. At the time of writing, few, if any, other products are manufactured or marketed in the same manner. Whether other products could become like PCs is both a technological and an economic question. However, it is possible to conceive of some ways that this could change. For example, as knowledge of the PC direct marketing experience becomes more widespread, some firms may develop similar approaches with products that are already somewhat modular, or are in some other way amenable to Internet-based customization or distribution. Networking hardware producer Cisco Systems already has an extensive online ordering system. Software is another product that could be developed and distributed in a more modular manner. Object-oriented operating systems like Unix are already highly modular. Java was designed as a system in which small functional applets are downloaded and run (and then discarded) only when needed by the user. Even the design of popular office applications like Microsoft Word and Excel makes them highly customizable by the user. It is possible that such programs' features could be marketed separately to consumers who could buy a base system with only those add-ins and features that they expect to use.¹² Later they could simply purchase and download another component if they decide they need it.

Another possibility is that manufacturing and distribution systems for products which are semi-modular, or otherwise highly amenable to customization could be redesigned to integrate the Internet. For example, automobiles are sold with added "options" which are installed at the factory or at the dealer. An Internet system could make this process much more efficient for both the automobile firms and the consumer. Other technologically complex goods could be reengineered to be more modular and customizable, and the ordering system directly linked to production. Moreover, entirely new approaches to product design could take advantage of Internet-based e-commerce. But whatever the future possibilities at the product end of the process, it is clear that the Internet has immense implications for both the manufacturing process, the final distribution process, and supply chain relations between firms.

INTER-FIRM TRANSACTIONS

In any economy the total sales in the value chain preceding the consumer far exceed final sales, so even small efficiencies generated in inter-firm trade can have a massive impact on the macroeconomy. The introduction of a powerful new communication system such as the Internet creates many opportunities for innovation. In effect, the Internet has the potential to dramatically lower transaction costs and develop new ways to manage the supplier chain. The opportunities for cost savings are enormous. The costs of inter-firm transactions in the US alone are estimated to be approximately \$250 billion or close to 5% of total GDP, and much of that is simply the overhead associated with the processing of paper documents (Kerschner and Geraghty 1997).

12 Software producers such as Microsoft would prefer that consumers simply buy all the available add-ins and features in one complete package, even though many users will never utilize all of them.

The effort to move inter-firm billing and production logistics to electronic media did not begin with the Internet. However, earlier efforts were idiosyncratic to particular firms and industries. The generalization of the Internet and its various protocols creates the possibility of developing one language for all inter-firm data communications. Some firms are already developing what they term e-forms to standardize and facilitate online inter-firm transactions. This is a logical step because the paper documentation is simply the physical embodiment of information to be transferred from one computer to another. With the computerization of the entire logistics and distribution functions of an increasing number of firms, the stage is set to use the Internet to interconnect firms and eliminate the human and paper intermediates. Moreover, these systems can be interconnected with marketing and retail functions making the production system highly responsive to fluctuations in demand. This is underway today and its completion will create the base upon which to build even more sophisticated systems.

A web site need not be simply for sales information provision, it can also be used to solicit bids for supplies. This works especially well for goods that are highly standardized or can be described in great detail through online specifications. General Electric is the leader in transferring standardized purchases to the Internet. By early 1998 it was purchasing \$5 billion of supplies per year through an online bidding process. The immediate savings from transferring the entire purchasing process online are substantial, but not fully quantifiable. However, an important indicator is the fact that it typically costs \$50 to process a paper purchase order but only \$5 in electronic form (Smart 1996). Another benefit is that posting the requests for proposals allows suppliers not previously having relations with GE or with relations to other GE divisions to respond. For both GE and the supplier there is a significant reduction in information search costs. The benefit to GE is now it can secure lower-cost goods. The routine purchase of standardized goods is often largely price-based (given that quality is the same) and thus the parameters of variation are minimal making them ideal for purchase through the Internet. Naturally GE's success in using the Internet is encouraging (forcing) competitors to follow suit and is an example to firms in other industries.

The Internet will have significant impacts on the nature of inter-firm relations. As an increasing number of inputs are purchased through the Internet, there should be a reduction in the role of corporate purchasing agents, as the bidding will be conducted electronically. The costs of searching for suppliers and customers are being dramatically decreased, thus lowering transaction costs. Automation of purchasing and other inter-firm links is only at its earliest stages. Thus far changes have centered on lowering costs, as the infrastructure and familiarity grow, yet other applications will emerge.

FIRST-MOVER ADVANTAGE

Competitiveness in Internet commerce appears at this time to have many of the characteristics described by the new institutional economists, such as David (1986), Nelson and Winter (1982), and Arthur (1994) of being path dependent, evolutionary, and having increasing returns. One outcome of these characteristics is that first-mover

advantages are enormous and the occupation of a niche is critical. Conversely, the capture of "mind share" provides a powerful advantage and it is difficult to dislodge an entrenched competitor using the same business model. There are exceptions to this rule. For example, Microsoft has been able to dislodge Netscape's lock on browser software through the use of its control of the PC operating system (Cusumano and Yoffie 1998).

Amazon developed powerful first-mover advantages in book sales over the Internet, when it quickly occupied this space and gained mind share making it difficult to dislodge. Establishing a web site address in users' minds and delivering excellent service can dramatically insulate the first mover from competition. A critical feature of competition is the speed of "Internet time", which compresses years of building brand name and distribution networks into months. On the Internet a six-month lead is an extremely powerful advantage.

The establishment of a powerful web site presence can be used either as a portal to other sites or as in the case of Amazon, which is using its dominance of online book sales to enter music CD sales with positive results even though there are entrenched rivals. The impact of Amazon's entry is not yet clear, but what is apparent is that it would have been difficult for a startup to enter the online music CD sales segment. Alternatively, it might be possible for a firm with powerful complementary assets to enter and either capture the Amazon.com market space or create a new market space in the larger market. Here, the new entrant should have sustainable advantages such as special knowledge, technology, or some other leverage permitting it to outflank or avoid entrenched firms.

The global aspects of the Internet are obvious, but books have the national linguistic dimension that forms a barrier to a unified global bookseller. Amazon.com has recognized this and purchased the UK's Bookpages (www.bookpages.co.uk) and Germany's Telebuch (www.telebuch.de), both of which are online book retailers. These startups provide Amazon with an entrée into these large markets and allow Amazon to take its lists global. This should help Amazon consolidate its control over the entire book category. Amazon also purchased the UK-based Internet Movie Database (www.imdb.com) increasing its power in the video marketplace. In effect, Amazon's greater size, access to capital, and global first-mover advantages allowed it to purchase entrée into these markets. Notice, that the entrepreneurs who began these businesses were rewarded for their work as the total size of the deals was \$55 million, while Amazon ensured that it would have a presence in Europe and gain the local knowledge necessary to succeed in those markets (Amazon.com 1998).

The Internet is global in reach. This means that first-mover firms occupying a commercial niche in one nation such as online book retailing will have important advantages in the global economy because the Internet suffers no cost penalty for distance. The establishment of global freight delivery firms simplifies logistics dramatically, again decreasing temporal and cost distance. As a result, late movers wherever they are located may be excluded from not only the global market, but even their domestic market, by the global first mover. Still, despite the fact that the Internet has a tendency to dissolve international boundaries, it still might be feasible, for example, to establish online book sales web sites in non-English speaking countries. However,

it is also likely these will have difficulties in long-term competition with larger sites such as Amazon, though if there is a shakeout, it might occur through mergers rather than failure. In such a case the entrepreneurs would be rewarded for their establishment of the web site. In effect, the local first mover would be rewarded by the global first mover.

CONCLUDING REMARKS

We have shown that in economic terms the Internet is more than just another technological tool. By enabling certain types of activities, the Internet will impact consumer behavior, firm behavior, and industrial organization. The final configuration caused by the Internet is difficult to predict. This is because the basic impacts of the Internet interact in problematic and contradictory ways. The most problematic question related to the economic impacts of the Internet regards market niche and firm formation. Will the Internet encourage the development of a vast collection of business types, marketing strategies, and market niches? Or will it lead to a small collection of mega marketers (such as portals), each dominating a particular product or service? There are arguments to be made in favor of both possibilities.

At the most abstract level, the Internet can be conceptualized as a giant machine for reducing transaction costs. As we have seen the Internet is being used in a myriad of ways to speed, simplify, and enhance relations between consumers and firms. The Internet reduces physical and bureaucratic drag by drastically reducing the importance of location and the number of procedural steps requiring the direct intervention of firm operatives. For example, on the retail side the external costs associated with opening, maintaining, and staffing actual physical stores is reduced, and on the production/distribution side the time-related costs of generating and circulating paper is reduced. Startup costs are also greatly reduced in that all anyone really needs to begin selling things over the Internet is a connected server, or space on someone else's server. This has led to a proliferation of individuals and firms attempting to use the Web for commercial purposes.

The ease with which someone can have a presence on the Internet, or access the Internet, has led to a vexatious paradox. The Internet replaces physical space with a virtual space within which all places are essentially the same. There are no permanently situated, highly trafficked intersections or malls with thousands of potential customers constantly passing by. To the customer the Web is a million places, all in the same place. To the merchant, it is a cacophony within which being noticed is increasingly difficult. While it is supremely easy to set up a web site, whether anyone actually visits it is another question altogether. Thus it is likely that the number of small merchants using the web to market specialized goods and services will continue to proliferate, and that this proliferation will lead to many successes, but even more failures. Yet it is also equally plausible to assume that at least in the mass-market sphere, a small number of firms, either new first movers, or already established brand names, will dominate their respective product markets both nationally and, in all likelihood, globally as well.

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