The Emergence of Electronic Commerce on the Internet

Walt Scacchi, ATRIUM Laboratory, Information and Operations Management Dept., USC School of Business Administration, 949-574-0481, (Wscacchi@rcf.usc.edu).

Also see EC_on_the_Inet.html for an interactive presentation version of this report.

In this article, three questions are addressed. First, what is the Internet and what are its implications for modern businesses or strategic planners? Second, what are the current opportunities for using the Internet in different business activities? Third, what research is being persued in the USC School of Business Administration that can help better answer the preceding two questions?

What is the Internet?

These days, it is becoming increasingly difficult to browse a newspaper, magazine, or business technology news segment on television without seeing some reference to the Internet, and the new information services available on it that offer some sort of access to "cyberspace" or "the information superhighway." Furthermore, it seems that in some cases, these terms are used interchangably describing one in terms of the other. So, what is what, and what if anything does it have to do with business, either now or in the future?

First, the Internet is real. As its now shortened name suggests, an *internetwork* is an open-end network of computer and communication networks that now encircle the globe, with its greatest concentration of networks, computers, and users located in the U.S. It continues to grow through the addition of new networks, computers, and user connections at a rate that far outstrips any previous growth trend associated with modern information technology. Its place is both nowhere and everywhere: there is no single adminstrative authority that owns, controls or manages it, yet its users clearly benefit from access to information resources and services from around the world that can be brought to their desktop computer and fingertips. Commercial information service

providers such as *America OnLine, CompuServe,* and *Prodigy* are all looking at ways for how to offer their subscribers access to the Internet without losing them to its many direct access portals. Further, its financial and economic underpinnings are not well-understood, although ongoing government subsidies, corporate telecommunication budgets, educational overhead line items, user access fees, and telephone usage charges are all somehow involved. Thus, the pending privitization of the Internet may take some time.

Second, the Internet is not the information superhighway or "infobahn." However, it is certainly the closest thing to it that is now widely available for investigation and evaluation. It is perhaps better to think of the Internet as a prototype for the networks of information commerce and exploration that these over-popularized and meaningless terms connote. Thus, the Internet should not be ignored. But rather than sitting on the sidelines and wait for the next technological wave or telecommunications-entertainment industry mega-merger, it might be more profitable and interesting to examine how the Internet might help your business or strategy formulation.

Why do business on the Internet?

It seems that just about every management consultant these days has become an expert or commentator on "business process reengineering" and its implications for your business organization. Most of the stories or strategies these consultants tell focus on how to do BPR the "right" way, and how to avoid the high probability of failure associated with most BPR undertakings. Central to such discourse is the recognition that a successful BPR engagement will lead to a streamlining of business processes that create, manipulate, transfer, or store paper-based information forms or documents. New information systems technologies (ISTs) will often play a central role, as will the commitment and leadership of top management, the participation of workers involved in the processes, and the decent and respectable handling of the people who may be displaced. So what does this all have to do with the Internet? Well, the Internet certainly represents a new IST for a large number of businesses, and many business processes entail dealings and transactions with customers and other businesses that are often distant. Furthermore, your business processes may both respond to and act towards complementary processes in another business. For example, your accounts payable processes and information forms interacts with your customer's accounts receivable processes and forms. Thus, there is a basic argument to be made for examining how something like the Internet can support a streamlined network of business processes that simplify the creation, manipulation, transfer, and storage of information forms or documents between businesses and customers. Similarly, there is a related need for how to address the transition from current business practices and staff assignments to those designed or reengineered around the use of the Internet. These two issues are the focus of the remainder of this article.

Making money on the Internet

A direct way to understand how a business might most effectively exploit the Internet is to look at how it is now being used, and to identify any significant or emerging trends that might have implications for your business. The following is a representative sample listed in the relative level of current use. However, it should be noted that most of the activities characterized are small-scale pilot projects or entrpreneurial start-up ventures. There are a growing number of big players, but no big winners are yet recognized, and nearly all of the listings represent endeavors that have only appeared within the past year. Thus, these are the current crop of growth opportunities, and as a wise investor or strategist, you must recognize some of these seeds of growth will land high-and-dry on rocks, or on potentially fertile but undercultivated or undernourished land, or in a pocket of cultivated and well-nourished land that is well-attended and likely to produce a bountiful harvest.

Providing Access to the Internet

There are two kinds of activities here. First, there are a number of start-up firms that are offering "on ramps" onto the Internet. These firms operate multi-user communication systems, often based on powerful personal computers, that are connected directly to other computer networks already on the Internet. Start-up costs can be modest ($5,000 to $50,000), while operating costs and revenue are sustained through selling subscriber connnection services, in a manner similar to cable TV subscription. Many of these first-mover ventures are reminiscent of the first neighborhood videocassette rentals stores of the 1980's, which are now being displaced by national chain retailers. Thus, there is still room for more Internet on-ramp ventures, but long-term opportunities may lean toward national-level firms that can capture established subscriber market share through acquisition, aggressive marketing, or market dominance.

Second, there are a number of individuals who have written popular books about the Internet, and what is accessible through it. The opportunities here seem to primarily be limited to book publishers who already have well-established marketing, distribution, and retailing operations in place. Nonetheless, there will likely be a growing number of book titles on mainstream or esoteric topics that are easily accessed over the Internet. In other words, expect your favorite bookstore to eventually have a separate section of book titles specific to the Internet.

Electronic Publishing and Advertising

This is taking many forms, most of which differ from the book publishing opportunities just noted. For example, the publication of *on-line catalogs* that support *electronic mail-order* are springing up very fast, mostly by new firms who choose not to publish paper-based copies of their catalogs, nor incur their attendant printing, distribution, and postage costs. Although by placing electronic catalogs on the Internet, which seems to offer the potential of global distribution, the challenge remains for how to communicate its existence to potential customers.

On the Internet, users must initially seek out each new catalog, since the cultural tradition on the Internet riles against distribution of unsolicited advertisements. However, reliance on the use of information brokerages, described later, may allow customers to register their interests and preferences and then be forwarded catalogs or product information that meets their needs.

Another form of electronic publication with growing popularity is the offering of *electronic want/sell ads* reminiscent of their counterpart in common newspapers. Commercial offerors of these services are typically also involved in the operation of *electronic bulletin boards*, which do not by themselves require Internet connection. As the success of electronic bulletin board operators seems tied to specific user communities of people with similar life styles or interests, opportunities here would thus seem to depend on knowledge of the want/sell needs of well-defined communities of subscribers.

Two other forms of electronic publishing are also beginning to appear. The first represents the publishing of *electronic journals* or periodicals that are sold via subscriptions, much like their paper-based counterparts. Protection of copyrighted intellectual property remains an issue for the publisher. As such, opportunities here may lie with publishers of high-value but short-lived information. This includes publishers of periodicals which first appear in print, then later as their timeliness dimishes, republish a complete or abridged form of the periodical in an on-line archive accessible over the Internet. These publishers will likely factor "lost revenue" attributed to unaccounted duplication of electronically published issues into the subscription price. The *Internet Business Journal* and the trendy *WIRED* magazine are examples of this kind of publication.

The second category with a small number of ventures is in the area of *information brokerages* or *information distributors* such as the *Global Network Navigator*, that provide free or fee-based services for locating, discovering. or disseminating information as requested. As the volume of information accessible over the Internet is growing at an astronomical rate, it will become increasingly difficult to find information that may be relevant to a user's need. Much like neighborhood travel agencies act as a broker for travel carriers and destination accomodation servers, information brokerages may have the potential to offer services the customers prefer instead of going directly to the source provider. Opportuntities here however may depend on access to advanced information search and retrieval technologies with peculiar names such as "intelligent agents", "knobots", "WWW Worms", "archie, jughead, and veronica" and the like.

Similarly, information distributors or forwarding servers seek to establish their ability to rapidly get new product or service information to target audiences by using various forms of information broadcasting, such as "What's New" electronic bulletin boards. For example, when Dell Computer Corporation recently placed an electronic announcement for a new line of portable personal computers on an Internet bulletin board, the first day's posting of the product information was retrieved by more than 16,000 users, according to figures cited in the 10 October 1994 issue of *Computerworld*. Thus, it would appear that there may be opportunities for those

who operate information distribution services that can easily target established or emerging market niches for new product offerings.

Electronic Retailing

This area is something like electronic mail order, but with extensions for capabilities similar to the home shopping networks we have all seen on television. There are a small but growing number of *electronic shopping malls* populated with *virtual storefronts*. These malls are like the home shopping networks (but without the sales promotion people), and the storefront is like the product showcase and marketing segments that fill the channel's broadcast time. However, the electronic malls are "non-linear" meaning you can go from any store to any other on-demand, while the televised home shopping broadcast is presented in only a "linear" what-you-see-now-is-all-that-is-available format. For example, the *Internet Shopping Network* mall allows shoppers to browse through directories of electronic stores, services, or products, and then proceed through the selected store's entry way. Upon entering, you can browse the store's offerings using an electronic catalog or by perusing attention-grabbing multi-media product displays. For products that are completely informational (e.g., electronic books, PC software, and computer games, as well as certain banking and financial transactions, and travel arrangements), then shoppers are often allowed to interactively try out a demonstration version of the product, much like many of us have done in conventional consumer electronics stores. Interested customers can then arrange to purchase and "download" the product from the store over the Internet directly into their computer, or to receive a packaged version of the product via courier or postal delivery. As such, it is still relatively easy to become a developer of virtual real estate and electronic shopping malls, but commercial success will likely depend on which retailers you can sign up to lease space in the malls, and what volume of customer traffic you can generate and sustain. Perhaps both a conventional and electronic marketing campaign will be essential to help promote customer awareness and retailer offerings, together with promotional incentives aimed at Internet user segments. Beyond this, opportunities will likely emerge to make shopping in an electronic mall more of an "entertaining" multi-media user experience, as well as also more like a virtual reality experience, so that users can have fun and be entertained while shopping.

Electronic Customer Channels

Three types of channels that businesses often seek to establish with their Internet customers include *electronic channels for marketing, distribution*, and *service*. Electronic marketing can be used for on-demand dissemination of new product announcements and demonstration of informational products. Electronic distribution can easily support the transfer of informational products from vendors to customers, and may even support remote (vendor-based) product installation, diagnostic, and maintenance services. However, technical and adminstrative issues for remote access, secure transfer, and assurance of intellectual property rights must always be examined and resolved to the trading partners satisfaction. Last, electronic service channels are

being used to enable product customers to communicate via electronic mail with customer service representatives or on-line "help desks" to ask for help or diagnostic assistance regarding the product they have purchased. Customer satisfaction surveys are also an easy add-on the these capabilities. Many of the large PC software and hardware vendors have established or are setting up these kind of service channels that can be accessed over the Internet or through America OnLine, CompuServe, etc.

Electronic Data Interchange

EDI has been on the horizon for almost a decade. The ability of businesses to send and receive *standardized* forms of product data and financial instruments has long been viewed as a key capability for streamlining business to business transactions. However, there is at present very little EDI taking place over the Internet. Why is this? There are many reasons, including the following: First, most current efforts for EDI are based on proprietary computer and communications systems whose network connections are limited to established business partners. Second, there is widespread belief that financial transactions over the Internet are insecure (they are), although the technical and administrative aspects of this are likely to be resolved fairly soon. For example, privacy-assured and secure transaction mechanisms are beginning to appear as products offered by companies such as *Netscape Communications Corporation*. Third, most of the current EDI support systems are "closed systems" that cannot be easily interconnected to either existing or new product or financial data systems. For example, there is a great deal of interest in using systems such as Lotus Notes over proprietary EDI internetworks, but Notes currently lacks the openness needed to easily exchange data with most existing database management, financial, or computer-aided product design and manufacturing systems. Thus, it seems that EDI of the kind being persued to date will not support significant opportunities for new ventures on the Internet. Similarly, investments in current EDI approaches may not have a long period of usefulness in businesses that must expand or turnover their customer base with greater frequency.

Data Warehousing and Mining

Many large businesses have long had automated transaction processing systems in place to support their ongoing operations. For example, most large retailers now routinely collect purchasing and product inventory data based on point-of-sale transactions. Very large volumes of data have been collected and archived along the way. So what can be done with this data? Two kinds of activities are gaining attention, data warehousing and data mining. *Electronic data warehousing* often seeks to provide a capability for the storage and low frequency access of potentially wide-ranging queries to retrieve data thought to exist somewhere in the transaction records. *Electronic data mining* similarly seeks to extend this capability through use of advanced statistical or hueristic search analyses often using special-purpose computers to discover high-value information nuggets (e.g., targeted customer segment buying trends) buried deep within the

data archive. At present, the Internet has not played much of a role in this arena for mostly technological reasons. First, data transportation bandwidth for high volume data transfer is still fairly limited on the Internet, at least until high-speed networking becomes available. As such, its still easier to transfer large data volumes around on storage media such as magnetic tape, than to ship it via the Internet. Second, it seems likely that businesses will insist on secure data transfer, possibly even requiring high-speed data encryption, before transfer over an open internetwork will be considered. If technical issues such as these can be satisfactorily resolved, then we might expect to see opportunities for data warehousing and mining services appearing on open internetworks. However, if businesses consider their data too valuable to outsource for warehousing or mining, then they must be expected to invest in internal computer systems or proprietary closed networks to support these activities.

Electronic Commerce

The last category to address is grouped under the term, *electronic commerce*. Although this is another catch-all term, there are large-scale experiments and systems that are now using the Internet for this particular purpose. Two efforts are noteworthy, the Enterprise Integration Network (*EINet*) started in Austin, Texas, and the *CommerceNet* based in the Silicon Valley area of Northern California. Large and small businesses are participating in each, although most are using these efforts for exploratory purposes, rather than aggressively investing to generate and capture nascent electronic market share. Both efforts seek to create and demonstrate a *national information infrastructure* necessary to support the range of electronic business activities outlined above. Both are supported through government subsidies and private investments, though funding levels and durations differ for each. Next, both are spearheaded by private ventures that intend to broker and profit from their technical management and accumulated expertise. In addition, both efforts are focussed on initially establishing a regional base of vendors as their customers, so as to thereby facilitate or stimulate electronic commerce between local participating businesses. This may suggest that other domestic or international regions populated with technology-driven businesses may be targeted by those businesses that want to venture into the development of Internet-based information infrastructures.

Overall, one major shortcoming of most discussions of electronic commerce is the primary emphasis and investments being made in technology, rather than into the supporting business processes. Most of the classic lessons of good business management, much like that taught to MBA students, are not as well addressed as are the technical problems and solutions pertaining to the information infrastructure or its ISTs. For example, suppose I have a new business idea that I think can succeed in an electronic marketplace. How do I go about setting up this business on the Internet? Where do I try to locate it so as to get maximum exposure to the targeted customer base? How should I define a product line that can be readily differentiated from competing offers which can be rapidly accessed and demonstrated over the Internet? What sorts of barriers to the entry of competitors or competing products can be rapidly erected and affordably sustained? How

should business processes be redesigned to take advantage of the Internet and electronic commerce? What are representative strategies for achieving or sustaining competitive advantage in open electronic markets that otherwise can quickly be reduced to simple price-based competition? What sorts of "high performance teamwork" and management leadership are relevant to guide the design of networked business process organizations? Last, what kinds of financial controls and performance measurements are needed to manage Internet-based business activity costs? Answers to questions such as these are not likely to be found by merely looking into the technical possibilities outlined above. Nonetheless, questions such as these are being investigated through research projects in the USC SBA.

What is USC SBA doing in this area?

The USC SBA is aggressively expanding its presence and expertise with business problems related to the Internet. Among other activities, the SBA has begun to move some of its informational services and products onto the Internet. These include publication of electronic documents such as the SBA's mission statement, academic departments and programs, research centers, course listings, faculty biographies, case readings, and pointers to other business resources accessible over the Internet. Soon to follow will be access to faculty research publications and *USC Business*. Perhaps we can speculate that an *Electronic SBA Learning Mall* and *SBA Alumni Net* will soon follow. But back to the present, the SBA has established a new research laboratory to further explore problems and opportunities relating to business processes and IST, including those outlined above.

The ATRIUM Laboratory

Founded in late 1993, the ATRIUM is the first research laboratory in the SBA focused exclusively on the problems and opportunities of using advanced ISTs in modern businesses with redesigned business processes. Its facilities include a rapidly reconfigurable workspace of multi-media computer workstations interconnected to a local-area network, the SBA-wide network, the USC campus network, and to the Internet. In addition, the workstations are connected to an overhead video projector and stereo sound system in support of interactive multi-media presentations, group demonstrations, and multi-media conferencing over the Internet. As such, the Laboratory serves as a center for experimentation with new ISTs that can be applied or evaluated for use in modern businesses.

At present, there are a number of companies that are sponsoring research projects in the ATRIUM Laboratory including the CalREN Foundation (Pacific Bell), IBM Canada Ltd., McKesson Water Products Company (MWPC), Office of Naval Research (ONR), Sun Microsystems Computer Corporation, and Virtual Management Incorporated. The projects examine issues relating to the use of advanced IST in the analysis, design, or reengineering of

complex business processes, or in the use of Internet capabilities for advanced business activities. For example, the MWPC project is investigating the development of a new financial operations process architecture that seeks to increase the efficiency and effectiveness of traditional corporate financial processes, such as those pertaining to accounts payable, periodic book closings, etc. With support from ONR and the collaboration from the Naval Air Warfare Center in Ridgecrest, Ca, another project is examining how to analyze and redesign a multi-billion dollar military procurement process so as to provide more effective service through an electronic commerce infrastructure that must operate in the presence of shrinking budgets. Overall, projects such as these help to highlight the value of advanced SBA research to address contemporary business problems, as well as how the ATRIUM Laboratory can serve as a center for experimentation with leading edge tools, techniques, and technologies in addressing these problems.

The Bottom Line

Experience continually reminds us that the solution to most business problems is rarely found simply in the acquisition and use of new technologies. The Internet and the emergence of a regional or global information instructure are no different in this regard. A balanced perspective must always be persued, as must a willingness to experiment with new ways and means to accomplish the mission and goals of the modern business enterprise. The Internet seems to hold great promise for the future, but expectations for its payoffs or payback from opportunistic investments must also be framed into the future. Nonetheless, there are exciting opportunities for how businesses might utilize or position themselves as the Internet or its successors emerge to become a ever more viable medium for the new forms and processes of electronic commerce. Research in the USC SBA is positioned to nuture and capitalize on these opportunities as they appear, as well as to help show participating business enterprises how they might take advantage of them.

Biography

Walt Scacchi was a Associate Research Professor in the Information and Operations Management Department, and the Center for Operations Management, Education, and Research (COMER) in the USC SBA. He is also the director of the ATRIUM Laboratory. He has been on the faculty at USC since 1981, and has directed more than two dozen externally funded research projects at USC. He has authored more that 80 research publications, and many have been republished in various books. He is also an active industry consultant with a number of high technology firms in the computer, telecommunications, and international consulting industries.