

**BUSINESS STRATEGY IN THE WIRED WORLD: COMPETING FOR
MARKET LEADERSHIP AND MIND SHARE**

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Abstract

This paper examines how firms use the Internet and the emerging "global infostructure" to improve key processes and competitive capabilities. It proposes the widespread diffusion of the emerging "infostructure" will dramatically reduce transaction costs, leading to growth in electronic commerce and productivity while reducing the profit opportunities of inefficient firms. In this wired world characterized by low transaction costs and noisy environments, firms will have to re-focus their strategies to achieve market leadership and capture mind share for competitive advantage. To achieve market leadership firms must seek advantage from economies of scale, scope, or externalities. Alternatively they must differentiate themselves through unique merchandise and innovation or develop specialized customer relations. To capture mind share firms must develop integrated cross media marketing programs. These programs will push products through various online or related promotions or develop strong brand identities for products. Thus this paper identifies competitive issues in a wired world and outlines various foci for strategic responses to the above challenges.

1.0 Introduction

Advances in information technologies and electronics have resulted in two simultaneous shifts: a dramatic expansion of computing hardware and software capabilities and an equally dramatic fall in the unit cost of information technologies. This combined with greater demand for information processing is leading to the widespread adoption of powerful desktop computers, communications equipment and software, creating the building blocks of a global information infrastructure or "infostructure". Today the Internet and its various applications and information services such as those provided by the World Wide Web provides a prototype of the emerging global infostructure.

This paper looks at the implications of this emerging infostructure on business practice and strategy. Specifically I propose that the widespread adoption of the Internet and similar communications infrastructures will dramatically increase electronic commerce and reduce transaction costs. These changes will transform firm strategies and industry structure. This paper identifies strategic responses to a low transaction cost world characterized by widespread electronic commerce. It proposes that managers must refocus on traditional sources of competitive advantage arising from economies of scale, scope, innovation, and specialized relations to achieve market leadership. It also proposes the creation and preservation of brands, are critical to capturing mind share. Managers will have to substantially re-engineer business strategies and practice to respond to the new opportunities and threats presented by this global infostructure.

2.0 The Internet as a Prototype of the Global Infostructure

The Internet is a collection of computer networks that interconnect computers all over the world. Computers on the "Internet" are able to communicate with each other because they use the internet protocol (IP)^a as a common protocol for routing and transferring messages across the network of computers. Internet users have access to a variety of electronic communication, information retrieval and interaction capabilities. These include: electronic mail and news services to send or broadcast messages to

^a See the Appendix for an explanation and glossary of technical terms used in this article.

other users, file transfer to access and retrieve files from remote computers, and the ability to use and connect to remote computers.

As hardware and software technologies advance, new user friendly applications have become available on the Internet. The most important of these services is the World Wide Web (WWW) which allows seamless user access and browsing of multimedia documents distributed across multiple server computers connected to the Internet. WWW services operate in a true client-server model. On the user desktop, a client side browser software such as Mosaic or Netscape provide the users with an easy to use graphical user interface. Using this browser, users can interconnect to various information servers on the Internet that serve multimedia information back to the client. WWW software allows users to activate highlighted hypertext links in the user interface and effortlessly access documents located on servers all around the world. It also allows users to access other Internet functions permitting users to interact socially or undertake commercial transactions. The use of WWW is increasing rapidly due to its easy to use browser software, hypertext capabilities and access to multimedia information. It currently surpasses all other sources of traffic on the Internet ¹. Emergent services on the Internet include video-conferencing, telephony and the distribution of audio. These services are also being integrated in the WWW to provide full real time multimedia capabilities.

Since 1993 the Internet has grown at an exponential rate. The number of host computers connected to the Internet increased from 1.3 million to 6.6 million between January 1993 and July 1995 spanning over 150 countries. Corporate use of the Internet has increased to 100,000 domain registrations in October 1995. Drivers of rapid Internet growth include: customer demand for inexpensive communications, the availability of interesting content, the lowering of technology costs, and the availability of useful software for Internet publishing such as WWW servers and browsers. The decentralized nature of the Internet also supports its growth. No one firm owns or controls the Internet -- all firms who are connected to the Internet pay for their own connections to the Internet and share in the capitalization of the overall

network and costs of their own portion of the network^b. This way no one firm needs to raise all the capital required to organize, implement and manage the network centrally. The Internet also has an open standards process that benefits both users and providers of Internet software and services. This decentralized planning and funding model for a telecommunications infrastructure distributes investment risks and is radically different from traditional centralized models of telecommunications planning and proprietary investments of telephone companies. Distributed planning and investments permit the Internet to grow quickly to meet user needs.

The Nielsen/CommerceNet survey³ of Internet demographics estimated 37 million people over the age of sixteen in USA and Canada had access to the Internet. About 18 million had access to the WWW. These numbers are changing rapidly as the various on-line services purchase Internet providers and upgrade their services to provide full Internet access. Both the Nielsen and Hermes⁴ project surveys found Internet users are well educated and affluent, making them an ideal target for marketing. These surveys also showed users of the Internet were primarily men with a large number of international users. Respondents to the various surveys also said that they gathered purchase related information over the network, stating that convenience was more important than price for many purchase decisions. The Nielsen survey also noted that 2.5 million WWW users have already purchased products over the Internet. In addition, users stated that their gathering of purchase related information on the Internet surpassed the use and effectiveness of direct mail.

With the rapid global growth in corporate and consumer uses of the Internet, it has become the largest common interactive marketing infrastructure in the world. As a worldwide interconnected and interactive network of multimedia information it also constitutes the prototype of the emerging "global infostructure". Even if the Internet evolves to combine with television or other media, the key features of the "infostructure" will remain the same:

^b See Varian² for a discussion of the economics of the Internet.

- Interconnected networks which allow global communication and distribution of multimedia information
- Interactive and greater user control over access and communication of information
- Decentralized control over networks, publishing and information servers
- Open standards for interconnection of hardware or software applications.

The business use of this emerging global infostructure will dramatically alter business practice and competition. Below I examine current patterns in business use, and the likely consequences of this infrastructure on business practice and strategy.

3.0 Business Use of the Internet: Current Practices

Our research examined a number of companies using the Internet and interviewed managers deploying Internet technologies and services. We identified six categories of Internet use to gain competitive or cost advantages. These are:

- To redesign enterprise wide information systems and internal business processes
- To improve product support and customer service
- To bypass traditional intermediaries and create and participate in new virtual market spaces
- To become information brokers and provide value added information services
- To market segment and reach consumers through differentiated media channels
- To leverage worldwide resources (talent, markets, etc.) unconstrained by geography or distribution mechanisms.

Below I provide illustrative case examples of the above strategies and consider the broader implications of these strategies for business practice, strategy, and industry structure.

3.1 Redesigning Enterprise Wide Information Systems And Internal Processes

Many firms are using the Internet and Internet technologies for implementing enterprise wide communications and firm specific applications. For example, at Morgan Stanley Inc., a major New York based investment bank, information technology managers are using the WWW and related technologies to design the electronic office. An early application of the WWW at Morgan Stanley is to access routine information or to replace the routing of key paper reports delivered to multiple people. Analysis of paper broadcasting processes in the firm revealed that the company could realize between \$300,000 and \$700,000 annually in savings per single process. In the first eighteen months of using the WWW, the company has already realized over \$1 million in documented annual savings, and over 5000 of the company's 10,000 employees access the company's web server on a weekly basis. Managers at Morgan Stanley recognize that timely access to relevant information and knowledge is a critical source of advantage in the industry.

An emerging focus of the electronic office group is to use the new WWW technologies for distributing new software applications across the firm. A critical problem faced by the information technology group is the update and reconfiguration of systems. Systems developers at Morgan Stanley are working to address this problem by using Java, a new programming language from Sun Microsystems. This language enables construction and distribution of new software applications that run on the client side of WWW applications. In effect Java permits users to interact with and run applets (or programs written in Java) on the client side of the WWW client/server software regardless of the hardware platform.

Netscape, the most popular client browser already runs Java applications. Client side applications enabled by Java will reduce server side loads. Java is also important as it allows client applications to be developed and run across different hardware and system software platforms, while providing users with a consistent user interface through the WWW. Indeed WWW client programs are beginning to provide the graphical user interface, programming environment and other capabilities previously only offered by personal computer operating systems such as Windows95.

For Morgan Stanley, the shift to WWW applications and Java will enable seamless distribution of information and client side applications. Users can also access the wealth of information on the Internet that exists external to the firm. Firewalls and other technologies protect Morgan Stanley's internal internet from external security threats. The shift to WWW reduces the costs of key corporate processes, installation costs of new software, and training costs by providing a consistent interface across platforms. In addition applications can run independent of hardware and operating system platforms. Thus large information sensitive firms are using Internet technologies to redesign their internal computing platforms and architecture to realize large savings from the dissemination of internal information, as well as greater independence from hardware and software providers.

3.2 Improved Product And Customer Support

A number of firms are using the Internet as a way to redefine customer relations and support.

For example General Electric's plastics division provides its industrial customers with the GE Select diskette that automatically dials the customer to GE Plastics WWW server. Alternatively if users have worldwide web access they can use the Internet to connect to the GE server directly. Once connected to the web server, customers can find out about the various plastics products of GE, the processes that can be applied to these products, and detailed technical specifications. Previously technical support staff mailed this information to the customers or alternatively provided help over telephones. Another way the GE site enhances customer value is by hosting a tech tip of the week contest. Users of the web system can use electronic mail to send any discoveries in the use of GE Plastics' products to the Tech Tip of the Week contest. The Tech Tip contest provides GE with new ideas to share with its customers in the use of its products. These tips also enable GE sales representatives to illustrate new uses of products to prospective clients. On-line surveys of the site suggest 70 percent of users are affiliated with the plastics industry. While GE cannot yet quantify cost savings, more and more customers are using this facility. Increasingly calls to 1-800 numbers for customer inquiries and product support are referred to this site on the Web.

User surveys show many users of the WWW site initially learned about the facility after calling the 1-800-numbers.

The General Electric site is instructive in three ways. First, it represents a way in which customers can receive direct and detailed information from the company, virtually any time and anywhere at low cost. Second, it represents some displacement in the cost of customer support directly to the customer who now searches through the web site at their discretion to solve problems. Third it represents a way in which GE can learn new and interesting facts about its products and leverage the knowledge of its customers to further add value to customer support. By displacing routine customer information provision services to the Internet, firms are focusing their efforts on providing more value added services to customers. Many other firms are providing similar customer support information including information update or even software upgrades over the Internet.

3.3 Disintermediation: The Bypass of Traditional Intermediaries and Creation of New Market Spaces

The ability to communicate at low cost through the Internet allows firms to completely disintermediate various intermediary roles in transacting or connecting to suppliers and customers⁵.

For example Virtual Vineyards is a small California based wine retailer that sells wine from 40 smaller specialty California vineyards on its WWW site. This company has no real storefront except on the World Wide Web. Its electronic store is implemented through partnerships with Wells Fargo Bank, different vineyards, a third party warehouse and Federal Express for transportation. At the Virtual Vineyards WWW site, a customer can browse through information about wines from different vineyards and get expert recommendations on selections. Using an online order form the user can order the wines, then pay with a credit card, or Cybercash instantly in a secure manner. Alternatively payment information can be faxed or conveyed by phone to the company. Once an order is completed the wine can be shipped using ground transportation, two days or even next morning air delivery.

In contrast to the traditional liquor store Virtual Vineyards is able to provide rich value added information about food and wines to their customers. Their electronic mailing list informs subscribed users of new prices and products. Their frequently asked questions sections respond to customer questions received over electronic mail. These include suggestions for selecting wine. As Peter Granoff, the co-founder of Virtual Vineyards notes "the Internet allows users to receive information, otherwise lost in different stages of traditional distribution networks".

Virtual Vineyards incurs virtually no inventory costs, and has low fixed costs. Only a small inventory of wine is stored at the company's warehouse to fulfill fast orders. The remainder is delivered to the warehouse in almost a just in time basis based on orders. Orders have been received from all over the world, and the largest single order was for 18 bottles (\$780) from Johannesburg, South Africa. While California accounts for 25% of sales, half the sales orders are from the East Coast, and 10% is international and growing (especially Japan).

The Virtual Vineyards case is instructive in three ways. First like mail order firms Virtual Vineyards is able to bypass traditional distribution intermediaries and to avoid storefront rental and labor costs. Second, the firm is able to access both the domestic United States and international markets at far lower costs than prior models of business and provides users with otherwise difficult to access products. Third unlike mail order catalogs, through electronic mail and other mechanisms, Virtual Vineyards is able to establish a better and more inter-active relationship with its customer base at low cost. The owners can respond to user concerns. Given the growth in mail order services, and Internet services like Virtual Vineyards, traditional retail outlets to upscale consumers can be expected to experience substantial bypass and earnings pressure.

New electronic markets like Virtual Vineyards permit suppliers and buyers to interact, discover and transact for product and services. Industry.Net is another example of an on-line marketplace. Established in 1991 to provide

electronic methods to automate the buying and selling process for the manufacturing industry, it was a dial-up service in Pittsburgh until October 1994 when it launched a web site. Industry.Net provides regional buying guides which includes over 180,000 manufacturers and suppliers of virtually every product used by different industries. It charges manufacturers and suppliers a fee to maintain an electronic storefront on its site, and it does not charge customers a fee. The guides contain information on the latest products and services, who manufactures them, where they can be acquired, and contact information. Each manufacturer and supplier is then charged \$3000-\$8000 to maintain an on-line storefront per year. In addition there are on-line forums where suppliers and buyers can interact. In July 1995, Industry.Net launched a WWW catalog service for which companies pay between \$8000 and \$500,000 per year. Since 1994, Industry.Net has generated over \$20 million dollars in revenue in web business and expects to earn an additional \$8 million by the end of 1995.

Electronic markets like Industry.Net allow buyers to compare prices, increasing inter-industry competition and economic efficiency of transactions. This increasingly shifts surplus from producers to consumers. Both Virtual Vineyards and Industry.Net both illustrate how traditional product retailers, wholesalers and information intermediaries will increasingly be bypassed as customers and suppliers join new electronic market spaces on the emerging infostructure.

3.4 Value Added Information Services: Information Brokerage

As the Internet grows as a infostructure, numerous companies have emerged as information brokers who solely provide value added information on the Internet. For example Yahoo and Infoseek both provide search and directory services on the Internet. Yahoo currently contains over 40,000 entries of interesting sites, sorted by different subject categories. These services reduce the search costs of Internet users who wants to discover a piece of information. Advertising revenues fund the Yahoo server and rates vary from \$25,000 a month for advertisements on major pages to \$750 a week for those on subsidiary pages. Infoseek allows users to enter keywords in WWW form, and it will identify sites where the keyword appears in order of relevance. It also generates revenue from advertising at \$7500 a month.

Infoseek also provides a \$9.95 per month plus ten cents per search subscription service for heavy users of the service who require more detailed searches or frequent and reliable access to the system.

These examples illustrate the emergence of new businesses to provide value added information services in the infostructure. The primary revenue models are advertising, and subscriptions at very low prices. As payments and settlement systems such as Netbill advance to reduce transaction costs to a fraction of a cent, information providers will increasingly price on a per use basis.

3.5 Market Segmentation and Channel Management

As the user base of the Internet and emerging infostructure increases, it also becomes more diverse. In this new environment where users can traverse this infostructure at great speeds, the attention of users to specific information sources is the critical scarce resource. Over time users will select specific sites that best meet their information and other interests. Thus this new marketplace can segment along gender, ethnicity, lifestyles, interest, age, income, professional and other categories. The Internet makes it increasingly easy and inexpensive to communicate up to date information targeted and tailored to the interests of specific user groups. For example, since August 1995, the three largest long distance companies in the United States have implemented WWW sites targeted specifically to the Asian Indian community in America. These sites provide calendars of Indian community events, and select news stories from Indian magazines. The sites help communicate specific product and promotion campaigns targeted to this affluent constituency. Indians in America have the second highest average family incomes in the United States following the Japanese and they also make a lot of long distance calls to their home country.

Thus inexpensive Internet publishing lowers the cost of market segmentation strategies and advertising promotions to target communities. Electronic publishing bypasses traditional print media which is expensive to distribute. While firms will use the emerging infostructure to tailor their messages to different communities, managers must be careful to construct appropriate and consistent messages across media channels.

3.6 Leverage Worldwide Resources: The Small Business Advantage

The low costs of user or publisher participation in the emerging infostructure enable small firms to access expertise, information and markets worldwide at low costs. In 1995 it costs less than \$3000 for hardware and software and as low as \$250/month for a 56 kilobit per second leased line to connect to the Internet in New York City. This is a sufficiently low cost for small business and many individuals to set up shop on the Internet. Thus the Internet effectively lowers barriers to small firms like Virtual Vineyards to distribute information and product to the global market place.

Other firms are able to gather information and competitive intelligence across the Internet. For example Japonica Partners a small investment firm has created the Japonica Interactive Network. This network allows users to share company analyses and reports with institutional networks, as well as communicate with customers of key companies to support corporate research. Using the Internet for interaction through electronic mail and WWW facilities, Japonica can leverage the expertise of many institutional investors and analysts and identify potential firms for take-overs, re-structuring or investment ⁶.

Individuals and other small businesses also have access to a tremendous amount of free and useful information over the Internet. Securities and Exchange Commission's (SEC) EDGAR filings of corporate disclosures are available for free over the Internet. These documents provide Internet users with detailed information on public companies, ranging from corporate financial statements, executive pay, directors and on events that are likely to affect the performance of the firm. Many different types of users use the SEC data for research and educational purposes. Small businesses and individuals use the data for marketing purposes, to identify prospects or to track investments. Company managers used the data to track competitors. Other groups such as unions or public interest groups, use data from the proxy statements to track executive compensation or actions on the environment.

In summary, the current use of the Internet illustrates emerging applications of the global infostructure. These include the transformation and creation of

new: corporate information processes and systems, relations with suppliers and customers, electronic markets and global markets for products. Both small and large companies can utilize this infrastructure to support their strategies. It lowers the cost of access, publication and dissemination of information and the costs of coordination in the global marketplace. While early uses primarily focus on information access and publishing, the true potential of this infostructure lies in enabling the widespread exchange of goods and services between customers and suppliers. Below we examine the requirements and consequences of advancing this infostructure to support high value transactions.

4.0 Advancing the Infostructure to Support Business Transactions

Advances in five key infrastructures are required for firms to realize substantial savings or revenue growth from expanded business transactions on the emerging infostructure. These infrastructure requirements are: improved user interfaces and network access, software agent technologies, low cost settlement and payment processes, transaction templates, and security and trust mechanisms. These infrastructures are discussed below.

Today key bottlenecks in the business use of the Internet, are the poor multimedia capabilities and poor network access facilities of users. High speed network access and multimedia capabilities are an imperative for firms to present their advertising or other information in a compelling way to customers. Improvements in network infrastructures announced by the major network providers, combined with improvements in desktop personal computers, monitors and software for displaying multimedia will substantially ameliorate this problem by the end of 1996.

Software agents are programs that users can customize to perform an information search or processing function. Software agent technologies will allow customers to search for goods and find the lowest price on a specific good. Agent technologies can also determine the best fit of a product to consumer preferences. Agent technologies can also enable users to search for alternative suppliers at very low costs. While agent technologies in a distributed computer network are still in the infancy, complex software agents are currently being created which allow users to surf the WWW

automatically and retrieve objects of importance to them. For example Arthur Andersen has already deployed an experimental software agent to support music shopping over the Internet. The agent finds the lowest price on the music product across multiple stores. Agent technologies will advance considerably in the coming year.

Efficient paper-less payment and settlement systems are the third key infrastructure necessary for extensive direct transactions. Various systems currently exist such as Netbill, Digital Cash, First Virtual, etc. Current electronic payment and settlement systems charge merchants or users at a comparable rate to credit cards. The transaction fees are expected to drop substantially in the next two years. Fees will approximate to a few pennies per transaction, dramatically reducing the transaction costs of payment and settlement. These new systems will enable inexpensive payments and settlements to support electronic commerce, and they will complement existing cash and credit card mechanisms.

Transaction templates are another infrastructure requirement for widespread electronic commerce. Transaction templates provide both formal languages and standardized ways of describing products, contracts and other attributes of transactions. Standardized message formats are important as they provide well agreed upon models for users to specify products and to receive information on quality, price, and other features of the product. Previous Electronic Data Interchange (EDI) initiatives have developed some standardized templates for message exchange customized to different industry sectors. In the United States the American National Standards Institute X.12 series formally specifies EDI standards. While current EDI standards are being ported implemented on the Internet, more specialized standards are required for describing consumer goods and expanding descriptions for features and quality attributes. Advanced transaction templates will make it easier for software agents to search and compare products and should accelerate the growth of electronic commerce.

Another key infrastructure required for electronic commerce are security and trust mechanisms. These infrastructure components mitigate against various

transaction risks confronted by buyers and sellers. There are three basic components to this infrastructure which are discussed below.

Authentication systems verify the counter party to an electronic communication, and transaction is whom she or he purports to be. The technology to solve this problem using public key cryptography is well known but must be implemented by certificate authorities. Certificate authorities are trusted third parties to the transaction who certify public keys of other parties and hence verify the other party's authenticity. The United States Post Office is beginning a program to become a certificate authority to support electronic commerce.

Security mechanisms assure that messages between electronic trading partners remains confidential, or protect the hardware and software from unauthorized access. A number of good technical solutions are available for security. Commercial encryption systems (such as those using the RSA algorithms) provide robust security for message transfer as long as the keys used to encrypt messages are of a large size.

Server security protects the firm's internal files from remote access. One mechanism is to have a proxy server which acts as a gatekeeper between a firm's internal Internet and the global Internet. The proxy server carefully monitors traffic to and from the organization, and enforces various limitations on access and transfer of messages consistent with the firm's policies.

Trust mechanisms provide legal or alternative frameworks for resolving any disputes that arise during transactions. Trust facilitates transactions and reduces the risks confronted by buyers and sellers. Besides certificate authorities, trust mechanisms that must be adapted for electronic commerce include: cyber-notaries, insurance, and laws to govern international and interstate transactions. As electronic commerce spreads a key unresolved issue is how individual states and international countries will regulate the Internet. For example, if a purchase and sale agreement between parties in New York and California occurs on a computer in the state

of Utah, or on a computer in the Bahamas, does either the Utah or Bahamian government have jurisdiction over the transaction?

While the progress to technical solutions is rapid, transaction templates, security policies, trust mechanisms and a legal framework to govern electronic commerce require institutional commitment as well as new levels of consensus among these different industry stakeholders. Institutional agreements are likely to substantially lag the capabilities made feasible by new technologies. Two features will most likely characterize the widespread institutional adoption and use of the emerging infostructure. First trade associations will become umbrella organizations where specific industry members can share knowledge and develop transaction templates and trust mechanisms of use to the industry. This will mean that transaction oriented applications on the Internet will initially be constructed or adapted to the specialized needs of specific industries. Once these industry specific systems become stabilized they will establish gateways to systems that serve other communities^c. Second the processes of communication and ratification of templates or other systems will increasingly be electronic and less formal. Proposals will be made, evaluated, and firms will accept them as de facto standards if it solves problems before formal ratification by a standards body like the American National Standards Institute. Standard setting processes will thus accelerate and have the potential of being more open to review by different interested parties.

When software agent technologies, transaction templates and security and trust mechanisms are better defined and gain widespread use on the emerging infostructure, the transaction costs incurred by firms and individuals will fall dramatically. Transaction costs^{7,8} are the various costs incurred in the purchase or sale of a good or service. These costs include those of searching for and identifying products, drafting, negotiating and safeguarding the terms of a sale or purchase, payment and settlement, and the costs incurred to enforce contracts or to correct and resolve contract

^c The Securities Industry Association currently provides a forum for its industry members to define a certificate authority and certification policy requirements for its member firms. This will enable shared industry wide electronic authentication of counter parties for secure transactions over the Internet.

disagreements. As inexpensive communications and transaction infrastructures on the emerging infostructure reduce transaction costs, markets will become much more efficient. Below I consider the consequence of lower transaction costs, and increased market efficiency on firm profitability, strategies and managerial practice.

5.0 Strategy in the Wired World: Competing for Market and Mind share

Transaction costs will fall substantially as the emerging infostructure evolves to support widespread electronic commerce. Companies that previously exploited information asymmetries between buyers and sellers (such as real estate brokers), or those companies that leveraged transaction cost advantages by locating close to customers to reduce the customers' search and purchase costs (e.g., retailers) will find their profit margins and competitive advantage erode. Software agents that find the best price will further reduce the margins of inefficient producers and suppliers of products. This poses a key managerial challenge in the wired world. How will firms thrive in electronic market spaces characterized by low transaction costs and greater market efficiency?

A second major challenge in the wired world will be to adapt marketing and promotion strategies to capture the user's attention in an infostructure with an increasing overabundance of information. As the costs of electronic publishing plummet, every person connected to the infostructure can become a worldwide publisher. In this increasingly noisy environment, the consumer's attention will become the critical and scarce resource.

To respond to the challenges of greater market efficiency and information overload managers will have to reconfigure the firm's strategy and organization. To maintain or increase profits successful managers will have to re-organize around traditional sources of competitive advantage that enhance both market leadership and mind share. Adapting Porter⁹, Treacy and Wiersma¹⁰ and Tirole¹¹, these strategies include:

- Leveraging economies of scale, scope or externalities.
- Leveraging proprietary rights, innovation or differentiation
- Leveraging specialized learning relationships
- Implement integrated cross-media push/pull marketing programs

- Exit

These strategies are discussed below.

5.1 Market Leadership from Economies of Scale, Scope or Externalities

Price wars and competition for standard products will increase as software agents search for the lowest cost. In such an environment, scale or scope economies can permit firms to lower their costs and increase margins. For example consider Cyberwarehouse an electronic storefront selling various types of computer equipment on MarketplaceMCI. Its merchandise is generally undifferentiated with features not substantially different across brands and similar products available at other sites on the Internet. As search and price comparison tools on the Internet improve, customers will increasingly choose the lowest price option for a given feature set. For Cyberwarehouse or its suppliers to realize substantial profits in such an electronic market it must have sufficient scale to negotiate lower prices from the suppliers of computers and a high turnover of products with low margins to realize substantial net profit. Thus achieving scale economies is critical for effective competition in the electronic space. In the emerging infostructure where nearly all electronic storefronts are equally accessible, a hundred different electronic storefronts for the same product will be unnecessary unless each storefront carries unique merchandise. Over time markets will favor firms with economies of scale with undifferentiated products. Larger firms will be able to negotiate lower unit costs in merchandise or parts procurement and distribution, enabling higher margins.

Firms can also realize market power in the wired world from economies of scope. Economies of scope allow firms to produce or sell multiple products simultaneously, at costs lower than producing and selling each product separately. Economies of scope can be a key competitive driver in the information marketplace. As Internet access is typically priced at a fixed cost for a given level of service, or as servers become more powerful, it is more economical to host multiple information products on a single server. This distributes the fixed costs of the network and server over many information products. These economies of scope can also lead to shared infrastructure solutions.

Firms in the electronic marketplace, can also realize market leadership from positive consumption externalities or weak interdependencies between customers. For example the dominant WWW browser (the software providing an interface to the WWW), Netscape Navigator is provided virtually for free and has established a large market share. Netscape is constantly enhancing its browser to provide new features that rely on its proprietary server. As more users use the Netscape browsers, other firms that develop innovative features on the WWW license their technologies to Netscape, giving Netscape a market advantage in the markets for server and browser software. This in turn creates a bandwagon effect, leading more users to adopt Netscape technologies and greater dominance of Netscape products in the marketplace. The ability to exploit externalities will be a key source of competitive advantage^d.

5.2 Increasing Market Leadership Leveraging Proprietary Rights, Innovation and Differentiation

A second source of market leadership and superior returns arises from innovation or differentiation of products and services. When an innovation or information is proprietary and protected by patent, copyright or trade secret, they can give the firm market leadership and superior returns on investment. In the information marketplace service marks on brand and domain names, copyrights on information and artwork, patents on security mechanisms and other Internet technologies provide firms with a competitive advantage.

However for firms who are retailing products, differentiation will be a key source of competitive advantage. For example, in the Virtual Vineyards case a key strategy was to select smaller California vineyards and define a differentiated and unique merchandise not typically available in retail outlets. Similarly, if Cyberwarehouse is not able to compete on price, it will be best off selling a unique and differentiated merchandise.

^d See Katz and Shapiro¹² for a detailed discussion of competition given externalities.

Thus if a firm is unable to achieve advantages from scale economies, they must consider shifting toward an innovation centered or differentiation strategy.

5.3 Leveraging Specialized Learning Relationships

A third source of market leadership and the ability to generate superior rents arises from leveraging learning relationships that enable firms to provide superior customer service.

The emerging infostructure is especially suited to supporting "information bonds" or enabling specialized or learning relationships¹³ with the customer. Using software agents and expert systems, a customer can specify both general preferences and specific product requirements to a potential supplier. Similarly, using expert systems a supplier can then suggest products which meet the buyer's need. If the supplier's software can also remember prior purchases, it can suggest new purchases to the customer that build on prior purchases. Such a system reduces the customer's search costs and memory costs, but requires precise and sometimes private information from the customer. The Internet and similar networks make the cost of collecting such specialized customer information much lower for firms. Firms that collect this information and maintain it for their own use can then enter into a repeated service relationship with their customers. They can leverage the growing information assets to improve the service relationship and thus generate greater revenues. Firms can also use the Internet to provide specialized information to the customer to enhance the service relationship.

Early examples of such software are available on the Internet. Conde Nast's Traveler web pages enable a customer to specify their general vacation preferences and needs to a simple software agent. The software agent then identifies the product options most suitable for the customer. Another firm using such tools is Individual Inc., which provides a customizable news filtering service to clients. Individual representatives invest in learning the new needs of their clients, and adaptive software also is used to learn user needs. This forms the basis of providing daily filtered news feeds. Like Individual Inc., other firms will begin to specialize and customize products to users, and invest in a repeated business relationship. The emerging global

infostructure provide new low cost ways of identifying user preferences and supporting these relationships.

The strategies outlined above help firms to establish market leadership and maintain margins. In addition it's important to capture the attention of the customer and further reduce their evaluation and search costs for complex goods or services. The strategies below address the capture of customer mind share.

5.4 Implementing Integrated Cross Media Push/Pull Marketing Programs

Both individuals and firms can publish and disseminate information worldwide at a very low cost on the emerging infostructure. This results in an explosion of marketing information available across multiple channels (for example web sites) on the emerging infostructure. Consumer attention in this environment is fragmented across many specialized media channels (whether it is specialized web sites, television and radio channels or print media) and the consumer is confronted with ever increasing amounts of published product information to interpret. Capturing the consumer's mind share (attention) and making them aware of, and helping them interpret product information in this market place is a precursor to product sales.

Integrated cross media push/pull strategies will be essential to capturing mind share. "Push" strategies rely on special offers (discounts, coupons, sales) to push the product out to the market place¹⁴. The emerging infostructure can support various push strategies ranging from offering on-line discounts or coupons, to prizes for visiting sites or playing and winning games^e. Push strategies are most appropriate lower value added products, or those products without a strong brand identity¹⁴.

Pull strategies rely on advertising to build brand identity and "pull" the customer to the product. Building, maintaining and leveraging brand identities across media channels will be important for complex product sales.. A brand identity around a firm or its products can reduce the "information overload" confronted by consumers. A brand identity typically associates a

^e See for example: <http://www.riddler.com>

number of valued characteristics with the branded product and reduces the information processing required of the customer to value the product. A brand also establishes a reputation for the seller and a promise between the seller and customer, that the seller will honor the commitments associated with the brand identity. It reduces information overload because the valued attributes of a product are previously communicated with the customer as an attribute of the brand. Building a brand, through advertising over multiple channels will overcome problems of channel fragmentation confronted by sellers.

Building and maintaining brand identities become more challenging in the emerging infostructure. The Internet provides a media with low cost entry for talented individuals to bypass traditional advertising channels, promotion and brand management efforts to become opinion leaders influencing brand evaluation and identity. Brands established over other media do not automatically transfer to the Internet and the new media. Examples of new opinion leaders in the Internet include the editors of Wired magazine and its HOTWIRED web site¹⁵, Robert Seidman and his electronic newsletter, "In and Around, Online" about online services. Marketing managers must extend their advertising and brand management strategies to adapt to the new opinion leaders on the emerging global infostructure. In addition they must adopt integrated cross-media strategies (for example WWW references in print and television advertising) to develop and reinforce their brand strategies. Integrated cross media strategies are critical for creating repeated exposures of consistent and complementary marketing messages to consumers. The new media can also be used in innovative ways to engage potential customers in a repeated dialogue and to build a brand identity¹⁶. To date the innovative use of the Internet to build brand equity or its integration with marketing efforts on other media is still in its infancy.

Maintaining brands in the wired world also requires quick and effective responses to customer problems. Inexpensive Internet publishing allows individuals to disseminate favorable or unfavorable reports on products and services to a wide audience. Both managers and individuals need to be vigilant for product problems or rumors in the new media. Managers must address these issues clearly and quickly before it adversely affects products

sales. For example, when user identifies a flaw in Intel's Pentium processor, the discovery was originally transmitted on and discussed on Internet newsgroups. IBM and others made available software to determine if there was a Pentium error. Intel initially played down the error as insignificant and not likely to affect most users. However, discussions on the Internet created substantial consumer pressure, that spilled across to other media. This led Intel to change its policy, apologize for the problem, and permit users to replace flawed chips at no charge.

Managers and consumers need to be alert, correctly interpret, evaluate and respond to information and customer issues that arise in the electronic space in an accelerated time period. Firms that implement effective market push strategies, or firms that successfully create and leverage brand identities will reduce the information "overload" problem confronted by consumers and capture their attention. Cross-media strategies for promotions or for establishing and leveraging brands across different media raises barriers to entry and further captures the customer's mind share.

5.5 Exit:

As the emerging infostructure evolves to become a major marketplace, many firms will be unsuccessful in re-positioning to successfully undertake the strategies outlined above. These firms will see eroding margins as markets become more efficient. In such cases early corporate exit through asset sales from specific industry and market segments most vulnerable to the emerging infostructure is likely to realize higher value than later exits when operating margins and earnings decline.

In summary competition in a wired world will be characterized by low transaction costs and an excess of information. To compete effectively in this new environment, firms will have to refocus and organize around a fundamental source of competitive advantage arising from economies of scale, scope, externalities or proprietary advantages from innovation or service. If firms are unable to transform their strategies, they should exit those businesses which will be rendered unprofitable by the Internet or similar communication infrastructures. Managers will also have to devise new online marketing programs. The programs may rely on "push" strategies that

highlight specific promotions of the product. Alternatively managers must implement “pull” strategies that restore, enhance and leverage brand identities for more complex and valuable products. Brand strategies across multiple channels can reduce the information overload and channel fragmentation confronted by customers in this media.

6.0 Conclusions

Our research suggests that the Internet and the emerging infostructure will dramatically alter commerce. Firms will use these new technologies to:

- redesign their enterprise wide systems, accelerating systems delivery at lower costs and gaining greater vendor independence,
- improve product and customer service, making it more customized and providing more detailed information through differentiated channels (sites) on the Internet,
- restructure retail and distribution through bypass of traditional intermediaries and substitution by electronic markets,
- expand the global reach of businesses through low cost information gathering and dissemination of product and service information.

The use of the Internet is a *competitive necessity* as suppliers and customers communicate through this media. Electronic commerce will accelerate as new software agents, transaction templates, security and trust systems, and improvements in hardware and software occur. However, the definitions of transaction templates, or trust mechanisms requires industry or broader social consensus on how to govern transactions over electronic media. Managers will have to invest substantial effort and time, participating in their different industry groups to develop rules, trust mechanisms, and other standards for electronic transactions. It is unlikely that broad legal frameworks will evolve quickly enough to meet the challenges posed by electronic commerce.

Widespread electronic commerce will lead to dramatic reductions in transaction costs and profits gained from exploiting transaction cost differences among firms. As transaction costs fall firms will have to rely on

different and new sources of market power to realize superior profits. Firms can achieve market leadership to realize superior profits by restructuring strategy and operations to focus on following fundamental sources of competitive advantage: economies of scale, scope and externalities, differentiation, innovation, and unique service. If the firm has a cost leadership strategy it requires sufficient scale to turnover large transaction volumes on standard products, and internal efficiencies to generate a small margin but large profits based on the volume. Firms competing through innovation must acquire and maintain the resources and environments supportive of innovation. In contrast if a firm competes on superior service it has to invest in information, training and other assets specific to different customers to sustain such a strategy.

The development and maintenance of strong brand identities combined with cross-media leverage of promotions will enable firms to both capture attention and reduce the information processing costs to customers.

Electronic communications will make many of the existing assets and strategies of firms (such as warehouses, location, marketing tactics and distribution of operations) obsolete and sub-optimal for electronic commerce. Some firms not well positioned for electronic commerce will have to exit from specific industries. Thus electronic commerce will dramatically alter the competitive environment of firms.

The effective use of the Internet and the emerging global infostructure will be a pre-requisite for effective competition in the wired world. However, as the costs of leveraging the infostructure fall, managers will have to rely on more fundamental sources of competitive advantage discussed above to create effective barriers to entry or generate superior profits.

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Appendix A

Glossary

Browser -- software that allows a user to connect to WWW documents and view their contents. The most popular browser programs are Netscape Navigator and Mosaic.

Client-server computing: Clients are software programs that sit on the desktop providing formatting and other useful functions to the user. Servers are software programs that reside on remote computers. Server software provides information to the client program to process for the end-user. Clients may format the data for viewing. This model of computing shares tasks between the client and server software modules.

HTML (Hypertext Markup Language) This is the principal language used to define multimedia documents on the World Wide Web. HTML is a markup language which allows for the creation of hypertext links between related documents or objects.

HYPERTEXT - documents or text with hyperlinks - which allow users to navigate text or other types of document databases

IP (Internet Protocol) The standard protocol used to transfer data from machine to machine on the Internet.

Proxy server: A server that makes a requests on behalf of a client program instead of the client program doing it directly of a server. This is often required in the case of a firewalled network, where the proxy server sits on both the Internet and the secure internal network checking messages that cross over networks.

Software agent -- a program that processes or seeks out information on behalf of its user.

URL -- uniform resource locator is a way of specifying the address of documents or files. URLs for web pages typically are of the form:
<http://www.somename.someorganization>. For example see
<http://edgar.stern.nyu.edu>

World Wide Web (WWW) The distributed, multimedia network of hypertext documents that operates on computers connected to the Internet.

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