The impact of Internet and electronic technologies on firms and its implications for competitive advantage*

SENDIL ETHIRAJ  
Doctoral Candidate  
Dept. of Management  
The Wharton School  
Philadelphia, PA19104  
Ph. 215-898 1231  
Fax: 215-898 0401  
Email: sethiraj@wharton.upenn.edu

ISIN GULER  
Doctoral Candidate  
Dept. of Management  
The Wharton School  
Philadelphia, PA19104  
Ph. 215-898 3002  
Fax: 215-898 0401  
Email: guler@management.wharton.upenn.edu

AND

HARBIR SINGH  
Professor and Chair  
Dept. of Management  
The Wharton School  
Philadelphia, PA19104  
Ph. 215-898 6752  
Fax: 215-898 0401  
Email: singhh@wharton.upenn.edu

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Summary

The proliferation of Internet and electronic technologies (IETs) accompanied by the growth of the Internet is transforming the business and competitive landscape in radical ways. This paper systematically examines the changes in entrepreneurial opportunity space arising from IETs and their implications for competitive advantage. An organizing framework composed of three conceptual categories -- communication, brokerage, and integration -- is used to analyze the impact on market efficiency and changes in industry/firm value chains. We explicate how these changes create entrepreneurial opportunity through disintermediation, reintermediation, and/or reconfiguration of value chains and advance some propositions. We propose that the notion of a business model is useful for understanding the impact of these changes on the competitive advantage of firms. We identify four key components of the business model -- scalability, complementary resources and capabilities, relation-specific assets, and knowledge-sharing routines -- and explicate how and why they may be important drivers of competitive advantage in IETs-based business models.

Keywords: Internet; electronic technologies; entrepreneurial opportunity; technological change; competitive advantage.
Introduction

The writings of Schumpeter (1934) marked the birth of theoretical interest in the role and functions of the entrepreneur in the economy. The 80s witnessed the burgeoning growth of the entrepreneurship field, with contributions drawn from diverse social science disciplines. This literature addresses three broad questions: (1) why, when and how opportunities for the creation of goods and services come into existence; (2) why, when and how some people and not others discover and exploit these opportunities; and, (3) why, when and how different modes of action are used to exploit entrepreneurial opportunities (Shane & Venkataraman, 2000, p. 218). It has been recognized that the primary role of the entrepreneur is wealth creation through introducing innovations (i.e., in markets, products, services, or processes) in the economy (McGrath, 1999; Stevenson & Gumpert, 1985; Stopford & Baden-Fuller, 1994). Research in the Schumpeterian tradition has also shown that exogenous change precedes entrepreneurial events (Arend, 1999; Kirchhoff, 1989), suggesting that opportunities for innovation are considerably higher during such periods (Abernathy & Utterback, 1978; Zahra et al., 1995).

More recently, the rapid growth of the Internet and accompanying electronic technologies (IETs) has been a significant catalyst for entrepreneurial activity. In 1998, 11,000 US companies engaged in Internet commerce, generating revenues of $101.89 billion. US venture capital investment in Internet companies in 1995 was only $520 million. This figure grew to $31.9 billion in 1999. Assuming the market for venture financing\(^i\) to be efficient\(^ii\), over two-thirds of new entrepreneurial opportunities\(^iii\) in the US are arising from IETs.

There is an opportunity to systematically examine the impact of IETs on the business and competitive landscape (Bettis & Hitt, 1995). More importantly, as the preceding discussion
suggests, concerns such as what opportunities IETs pose for entrepreneurship and what drives competitive advantage in this new arena are at the intersection of entrepreneurship and strategic management (Sandberg, 1992; Zahra et al., 1995). Indeed the questions that emerge from this phenomenon map very well onto the substantive domains of entrepreneurship and strategic management. While the former is concerned with wealth creation in the economy through exploiting new opportunity, the latter focuses on the issue of how rents are created and maintained by firms over time. We see this opportunity to link theory and real-world phenomena as a vehicle to examine wealth creation strategies in the 21st century.

In the following two sections, we address the question, why and how new entrepreneurial opportunity arises from IETs (Shane & Venkataraman, 2000). In §2, we present an overview of IETs and the three mechanisms (i.e., communication, brokerage, and integration effects) through which they affect the business landscape. In §3 we broadly review the research literature examining the impact of IETs on market efficiency and industry/firm value chains and attempt to highlight, through propositions, the new entrepreneurial opportunity that may result. In §4, we attempt to bridge the entrepreneurship and strategy literatures by addressing why and how different modes of action may be used to exploit the entrepreneurial opportunities arising from IETs (Covin & Slevin, 1991; Shane & Venkataraman, 2000; Zahra, 1991). We propose the notion of a business model as a useful construct to describe and analyze the primary value proposition underlying an organization's founding and its continued viability. We then present four key elements of the e-business model -- scalability, complementary resources and capabilities, relation-specific assets, and knowledge-sharing routines -- and argue that they are important sources of competitive advantage in the new economy. We conclude with a summary of the contributions.
The nature of IETs

Malone et al. (1987) argued that electronic technologies are likely to reduce coordination costs, allow better communication of complex product information, and reduce the transaction specificity of assets. These capabilities may induce economic agents to shift business transactions away from hierarchies towards electronic markets. This work has resulted in a stream of research at the interface between technology and strategy (e.g., Arunkundram & Sundarajan, 1998; Bakos, 1991; Fulk & DeSanctis, 1995; Strader & Shaw, 1997; Wigand, 1997) that has examined the implications of electronic technologies for the competitive advantage of firms.

We draw on the Malone et al. (1987) classification of the impact of electronic technologies on market structure to analyze the new entrepreneurial opportunity afforded by IETs in general. The three effects analyzed are: (1) the electronic communication effect – lower communication costs; (2) the electronic brokerage effect – connecting buyers and sellers; and, (3) the electronic integration effect – tighter coupling of buyer-supplier relationships. In this section we briefly summarize the mechanisms underlying the three effects. The next section analyzes the entrepreneurial opportunity resulting from them.

Electronic communication effect

The importance of information to the efficient functioning of the economy and the rational behavior of economic agents can hardly be over-emphasized. Information allows agents to reduce the uncertainties underlying consumer preferences, obtain knowledge of production possibilities, and determine the relations among production inputs. Consequently, availability of and access to information is a necessary condition for market efficiency. As previously suggested
(Bakos, 1991, 1997; Malone et al., 1987), IETs have affected both the cost and transmission of information in several ways.

First, the convergence of several traditionally disparate industries such as communication, entertainment and computing (Yoffie, 1997) through the integration of the telephone, television, and computer has enabled the instantaneous transmission of data, voice, and video across continents. This enhanced availability of information may impact not only information intensive transactions such as financial markets but also reduce end-user prices by eliminating wholesalers and their margins (Benjamin & Wigand, 1995). Capital markets and forex trading exchanges have exploited these technologies to increase market efficiency by reducing information asymmetries between transacting agents and the concurrent participation of large numbers of buyers and sellers (Goodhardt, 1992). Second, IETs have enabled the storage and transmission of information at lower costs than were previously possible. For instance, the print version of the Britannica, which only a few years ago cost $1600, is now available online for free.

However, as Arrow (1974) perceptively observed, access to or mere collection of information is of no value unless the information is coordinated and deployed to create value. In this regard, IETs have enabled information to not only be transmitted more quickly and cheaply but also processed faster, thus aiding decision-making. The Internet, in recent years, has seen the mushrooming of search and retrieval engines that can sift through large volumes of data embedded in distributed databases to produce information useful to the customer. For instance, www.dealpilot.com, a book search engine, accepts user queries on books they wish to purchase, searches through the inventories of over 50 online book retailers the world over and presents to the user a price-ordered list of stores where the book(s) is available.
Further evidence of this development is seen from the proliferation of intelligent agents—electronic tools that help users efficiently search through large volumes of information, extract relevant pieces, and act on it. Some of the intelligent agents already in existence include: (1) shopbots that help users locate products based on their pre-defined needs (www.mysimon.com); (2) personalized news services that deliver content based on user preferences (portals such as www.netscape.com or www.yahoo.com); (3) query engines that can integrate distributed databases and produce customized reports in real-time (www.bloomberg.com); and, (4) mass customization of value-added services such as the book recommendation system implemented by Amazon. In sum, the preceding discussion suggests that IETs have enabled more efficient acquisition, storage, transmission and deployment of information, which in turn has created opportunity spaces around the creation and dissemination of valuable information.

**Electronic brokerage effect**

The electronic brokerage effect refers to bringing together buyers and sellers, and has been noted by many authors in the literature. For instance, Berthon et al. (1996) have noted that the World Wide Web (WWW) resembles a giant flea market, where potential buyers and prospective sellers can meet, and is characterized by “openness, informality and interactivity.” The brokerage effect afforded by the WWW affects at least two drivers of competitive imperfections: the number and nature of the linkages between producers and consumers in a market, and the awareness of alternative product offerings.

The emergence of the Internet has enabled access to global markets at relatively negligible additional costs. For instance, the book retail industry once dominated by 3-4 large players and hundreds of independent booksellers scattered in geographically dispersed markets is now
populated by hundreds of new online entrants with potential market access far beyond the location of their physical infrastructures. While the fragmentation of the book retail industry has possibly declined, the altered industry structure poses serious challenges to the existing players. The earlier structure allowed the large chains and the smaller bookstores to coexist, with each offering a different bundle of services. The former offered an extensive selection, large store ambience, and discounted books, while the smaller counterparts offered access in neighborhoods where the large bookstores did not exist and/or more personalized service. However, the advent of the Internet has changed book retail competition considerably. The small stores can also go online and obtain enhanced visibility through independent bookstore aggregators such as www.booksense.com, and compete for the same customers as the larger bookstores. The larger bookstores which earlier could engage in discriminatory pricing, can now no longer afford to do so since the books are available online and the cost of locating the lowest price is negligible. The end result, we believe, is likely to be heightened price competition in the short-run, threatening the profitability levels of incumbents. This may lead to gradual consolidation of the industry in the long run through alliances and acquisitions as have happened in the airline industry.

Second, IETs inherently create a many-to-many communications medium as opposed to other traditional marketing media, and enable interactivity between firms, consumers, and the medium itself (Hoffman and Novak, 1997). These features require firms to change their conception of a passive, captive consumer set and transform their marketing and communication activities (Glazer, 1991; Hoffman and Novak, 1997). Further, interactivity afforded by IETs enables consumer-to-consumer relationships that were difficult to obtain before, as observed in auction sites and online communities. This enables the quick dissemination of information among a large number of customers.
As noted above, the proliferation of search engines has reduced the time and cost of comparing alternative product offerings on various attributes. These search engines are also likely to decrease switching and search costs for consumers by identifying the providers of alternative offerings. The overall effect has been not only the increased awareness of alternative product offerings, but also the elimination of impediments to the movement of both products and consumers.

**Electronic integration effect**

Holmstrom and Tirole (1998) argue that information, the primary source of transaction costs, occasions at least two problems of coordination: (1) processing information requires time and effort; and, (2) individuals with differing objectives and information respectively may pursue their own agendas, resulting in sub-optimal organizational performance. Consequently, the problem of organization is that of internalizing an optimal set of activities so as to minimize the hazards of appropriating the returns from the informational expertise that the firm possesses while simultaneously maximizing efficiency through market exchange wherever possible.

It follows that information is central to the coordination problem of the firm. The diffusion of IETs that influence communication patterns within and between firms is thus also likely to significantly affect the organization of productive activity away from hierarchies to markets (Malone et al., 1987; Clemons and Row, 1992) by enhancing informational efficiencies and enabling better monitoring of the exchange relationship. These features may reduce the transaction costs of coordination and/or the appropriability hazards, making the market more efficient than the firm.
IETs and new opportunity

The research on IETs may be decomposed as addressing two broad issues: (1) the impact of IETs on market efficiency; and, (2) the impact of IETs on firm and industry value chains. However, little research to date has examined the new entrepreneurial opportunity stemming from IETs. In this section, we interpret this broader literature in terms of the new entrepreneurial opportunity that is created.

Impact on market efficiency

The general argument has been that the increased use of IETs is likely to increase market efficiency through the three effects described above. Namely, as the ability to process information increases, the accessibility and mobility of buyers and sellers increases through decreasing search, switching, and transaction costs, markets become more efficient (Press 1993; Malone et al., 1987), and price competition increases (Bakos, 1991, 1997).

Brynjolfsson and Smith (1999) attempted to empirically test this conjecture by operationalizing efficiency as a function of four dimensions: price levels; price elasticity; menu costs; vii and price dispersion. They find that as compared with brick and mortar retail, Internet retail results in lower prices, lower menu costs, and substantial price dispersion. On the other hand, Degeratu et al. (1998), in a study of online grocery purchases, found that price sensitivity was also lower online. Recognizing the contingent nature of these observations, other authors have attempted to determine the conditions under which price competition will prevail.

First, the scope of the electronic market viii is likely to mediate the relationship between IETs and market efficiency. To the extent electronic markets provide price information (selection) in addition to product awareness (identification), markets move toward price competition (Bakos,
1997; Choudhury et al., 1998). In the short-run, greater price competition may contribute to heightened selection pressures. This in turn is likely to lead to higher mortality rates among less efficient firms. Consequently, the long-run effect is likely to be greater consolidation along the value chain.

Second, the nature of the product may be important. Bakos (1991, 1997) argues that in commodity markets, where price is the primary determinant of competition, decreased search costs translate into lower seller prices as buyers can engage in greater search to find the lowest price. In differentiated markets, on the other hand, the reduction in search costs allows buyers to compare a greater number of product offerings to locate the one that best matches their needs. Here, intelligent agents handle the complexity of product descriptions by identifying consumer preferences through a series of choices (based on product attributes) that they are asked to make. More differentiated products are less likely to be driven toward price competition by the use of IETs than are commodity products (Bakos, 1991; 1997; Choudhury et al., 1998; Peterson et al., 1997). However, IETs may enable a better match between customer needs and product attributes. These studies suggest that, relative to traditional channels, the efficiency effects of the Internet are ambiguous. However, the lower average price level and higher price dispersion of Internet products make it likely that the marginal search cost of consumers is lower than is the incremental gain from locating a lower price. In the long run, as consumers realize this fact, they are likely to engage in increased search and thus drive average price further down.

Given the potential for IETs to help increase market efficiency, they represent an opportunity for entrepreneurial initiative along the value chain. This is addressed in the following section.
**Impact on value chains**

The second, related argument is that as the three effects enable better access to and processing of information, accompanied by a decrease in transaction costs, the role of traditional intermediaries in the supply chain is likely to be threatened, and markets are likely to move toward disintermediation (e.g. Benjamin and Wigand, 1995). However, this conjecture has been challenged by authors who observed the creation of new intermediaries, such as rating services, automated ordering services, order consolidation services, and credit card companies (Sheth & Sisodia, 1997; Peterson et al., 1997; Picot et al., 1997). The emerging consensus is that there are several contingencies that affect the transformation of value chains occasioned by the rise of electronic technologies.

The value chain refers to the sequence of discrete activities involved in the transformation of inputs into outputs such as design, production, marketing, delivery, and support activities (Porter, 1985). They include all transactions and activities performed before the final product reaches the end-user. Peterson et al. (1997) distinguish between three types of intermediaries: distribution, transaction, and communication. Distribution intermediaries perform such functions as distribution to different markets, and achieve distribution economies by supplying goods of several producers (e.g. supermarkets). Transaction intermediaries differ from distribution intermediaries in that they assume strategic control over price and merchandising, and provide such functions as risk management (i.e., warranties, returns). They include wholesalers and retailers. Communication (information) intermediaries provide information and allow communication between buyers and sellers through product search, evaluation and matching with consumer needs, information dissemination, tracking market demand, monitoring changes
in consumer tastes, influencing purchase behavior, and so on. Examples include ad agencies and broadcast media.

We argue that the use of IETs does not have a uniform impact on value chains. In particular, we distinguish between three forms of changes in existing value chains: (i) disintermediation, (ii) reintermediation, and, (iii) reconfiguration. Disintermediation refers to combination, consolidation, or elimination of different products/services/activities within an existing value chain, while reintermediation refers to addressing existing markets with new products/services. Reconfiguration addresses a common market need with a bundle of products/services.

**Disintermediation**

To the extent that IETs enable more efficient market transactions, disintermediation is more likely to occur. However, even under conditions of increased efficiency, the type of intermediary mediates the likelihood of disintermediation (Peterson et al., 1997).

Transactional intermediaries that exploit value through creating and preserving market inefficiencies are likely to experience some pressures from the diffusion of IETs. An example in this context is the IPO market. Investment banks\(^{ix}\) that traditionally managed the IPO issue process are being bypassed as the Internet enables the general public to directly participate in IPOs and buy shares through a Dutch auction. In this case, the brokerage effect enables market makers such as E*Offering to bring together the IPO issuer and the participating public to complete the transaction.

Similarly, the integration and/or brokerage effects may affect distribution intermediaries. As outlined earlier, the reduction in coordination costs achieved through IETs reduces the bureaucratic costs of undertaking activities within the firm or coordinating activities through
alliances, which we term the integration effect. When distance and time constraints are removed, sellers can internalize activities previously handled by geographically dispersed intermediaries. An example is firms’ ability to buy and sell internationally without the need for local intermediaries to handle sales and distribution. Additionally the greater market reach afforded through the brokerage effect has helped retailers attain greater economies of scale and eliminate intermediaries involved solely in physical and geographic distribution. For example, Audio Book Club, a membership club that markets and sells audio books, which earlier relied on mail-order and physical store sales, has been able to scale up operations by directly marketing its products through its website. It has reduced costs by eliminating intermediaries and other overheads such as warehousing, inventory, and physical store costs.

Finally, communication (information) intermediaries may also come under pressure due to the communication effect. The information content of the value added of traditional communication intermediaries may be easily digitized and transmitted to users in real time. The stock brokerage industry is a clear case in point. Traditionally, the brokerage\(^x\) industry was segmented along three lines: full-service, discount, and deep-discount, which were differentiated in the range and customization of services offered as well as price. However, the advent of the Internet paved the way for the growth of a fourth segment – the electronic deep discount broker. This new segment made extensive use of technology to achieve significant cost reductions and provide highly discounted services. Further, the use of technology has enabled the customization of (normally premium) information-based services, such as electronic portfolio management, resulting in the tremendous growth in online brokerage revenue at the expense of full-service brokerages\(^{xi}\).

**Proposition 1a:** The greater the extent of the brokerage effect, the greater the disintermediation pressures on transaction channel intermediaries that create and preserve market inefficiencies.
Proposition 1b: The greater the extent of the communication effect, the greater the disintermediation pressures on communication intermediaries engaged only in dissemination of publicly available information.

**Reintermediation**

IETs, while creating opportunities for disintermediation, have also enabled reintermediation opportunities. First, the unique aspects of e-commerce are likely to give rise to transactional reintermediaries. When Internet-based commerce is perceived to bear greater risks than do other forms, transacting parties may be willing to pay a small premium to intermediaries willing to absorb the risk. Such reintermediaries are fallout of the brokerage effect, which enables a large number of faceless buyers and sellers to come together. In this case, the need for trust and credibility between transacting agents facilitates reintermediation. Thus, intermediaries may get added to the value chain. A clear example of this is the electronic payment system, such as I-Escrow, which holds the payment made by a consumer until the transaction is completed to the satisfaction of both parties. Such reintermediation opportunities present themselves in the value chain segment between buyers and sellers, ranging from identification and selection of products and/or buyers/sellers to the execution and fulfillment of transactions (Choudhury et al., 1998).

As improved communication has made it easier to access information, the need to process greater volumes of information has led to the formation of a new type of communication intermediary – the infomediary (Hagel & Armstrong, 1997). An intelligent agent, which compares product attributes and prices across online retailers (cited elsewhere in the paper), is an instance of an infomediary. Collaborative filtering agents such as Firefly (implemented by Barnesandnoble.com) engage in data mining of point of sale consumer information to customize offerings to individual consumers based on their past purchases and similarity to other
consumers. Other infomediaries include portal sites, which categorize and search web sites for specific information, and independent evaluators that rate websites on dimensions such as ease of use, security, privacy, or reliability.

Finally, the integration effect is also promoting a variety of reintermediaries. Firms have exploited the ease with which electronic linkages can be established between individuals and/or firms to not only integrate erstwhile market transactions within the firm but also use hybrid transaction forms (such as alliances) to carry out activities that were traditionally integrated. A highly visible example of such reintermediation is the associates/referral programs pioneered by Amazon.com and subsequently imitated by scores of e-businesses. The "associates," as Amazon.com calls them, promote and market the Amazon website. They receive a small percentage of the revenues realized from the completion of transactions with customers that they refer to Amazon.com. Electronic technologies are instrumental in facilitating the seamless operation of such hybrid transaction forms.

**Proposition 2a:** The greater the extent of the brokerage effect, the greater the extent of reintermediation opportunities along the value chain between buyers and sellers.

**Proposition 2b:** The greater the extent of the communication effect, the greater the extent of reintermediation opportunities for processing the information.

**Proposition 2c:** The greater the extent of the integration effect, the greater the creation of reintermediaries in the form of hybrid structures to coordinate activities.

**Reconfiguration**

We call the last category of transformation of value chains reconfiguration, which refers to the bundling of products and services around a common market need. For instance, babycenter.com
is a one-stop website for expecting parents that provides services ranging from professional advice and information to selling pregnancy and baby-care products through its own virtual store, and offers a community-oriented forum for expecting parents. This business, by bringing together all products/services related to parenting, has implications for several value chains, including parenting magazine publishing, retailers that stock baby-care products, and traditional media advertising (newspapers, television, and flyers). This form of reconfiguration of value chains across industries is distinct from disintermediation through consolidation of several activities in a value chain. While the latter just combines activities within an existing value chain, the former re-combines activities from several distinct value chains.

This form of value creation is based on the premise that complementarity among a bundle of products/services influences the demand for the individual items. It leads to an overall demand for the bundle of products/services that is greater than the sum of the demand for them singly. Traditionally, the logic of firm organization is based on exploiting production and distribution competencies and taking consumer demand as largely given. However, the re-configuration of value chains is based on the strategic logic of creating and exploiting downstream competencies (i.e., delivering greater value to the customer) by recognizing the possibility that the bundling of services around a common need can influence demand for the individual services.

This form of reconfiguration of value chains requires the assembling of a large number of suppliers that can together meet the common market need. Without electronic technologies, the coordination and implementation of such an enterprise is likely to be economically unviable. The communication effect helps reduce the cost of implementing such a system. The integration effect enables several suppliers to come together and coordinate their activities in a hybrid form that keeps both transaction and bureaucratic costs (Demsetz, 1988) of the business within
acceptable limits. Finally, the brokerage effect, which allows one to tap a potentially large market, provides an economic incentive for such a system to be created.

Proposition 3: The joint operation of the three effects (communication, brokerage, and integration) is likely to enable reconfiguration of value chains around a common market need.

Summary
In sum, we proposed that the rise of IETs has created entrepreneurial opportunities. In support of this conjecture, we argued that IETs, manifest in the three effects outlined above, have implications for both market efficiency and structure of firm and industry value chains. Our preceding analysis outlined the conditions under which IETs create entrepreneurial opportunities. In the following section we elaborate the key tasks confronting the entrepreneur attempting to exploit some of these opportunities.

Strategic responses to opportunities arising from IETs
In the post-industrial economy, technological change has been particularly instrumental in fuelling entrepreneurial activity. Heightened periods of such activity have occurred in the wake of major inventions (or removal of patent restrictions) such as the internal combustion engine (cf. Raff & Trajtenberg, 1997), transistors (cf. Mowery & Steinmuller, 1994), and the telephone (cf. Barnett, 1990). Further, technological change, in conjunction with innovation and entrepreneurial activity, tends to disrupt existing industry structures, spawn new industries, and re-defines the basis of competitive advantage (Sampler, 1998).

A stream of research in strategy examines the impact of technological change on incumbents versus new entrants to an industry (e.g., Christensen & Rosenbloom, 1995; Henderson and Clark, 1990; Levinthal, 1997; Tripsas, 1997; Tushman and Anderson, 1986). Henderson and Clark
(1990) argued that organizations’ structures tend to mirror the architecture of the products they are geared to produce. Therefore, when there is a technological change that impacts the architecture of the product, organizational structures tend to change at a slower pace than does technological change. In such circumstances, new organizations tend to adopt structures appropriate to the new technology, thus enhancing their survival chances relative to their established counterparts.

Tushman and Anderson (1986) argue that technology generally evolves through periods of incremental change punctuated by technological breakthroughs. These breakthroughs can either be competence-enhancing or competence-destroying for existing firms. While liabilities of newness (Stinchcombe, 1965) plague new firms confronting competence-enhancing breakthroughs, liabilities of age and tradition constrain existing, successful firms in the face of competence-destroying discontinuities (Tushman & Anderson, 1986).

There is a consensus in the literature that discontinuous change in technologies creates the need for new organizational structures, processes (Christensen & Bower, 1996), routines (Nelson & Winter, 1982), and possibly new strategies to exploit new sources of competitive advantage (Bettis & Hitt, 1995). Such changes pose different challenges for new entrants and established players. While new entrants confront the task of creating new organizations to exploit the new opportunity (Katz & Gartner, 1988), the established players need to renew their existing strategies, structures, and processes (Dess, Lumpkin, & McGee, 1999; Guth & Ginsberg, 1990), and/or create new organizations to exploit these opportunities (Zahra & Covin, 1994; Zajac et al., 1991).
In this section we examine the nature of strategic and organizational challenges, whether for new entrants or established players, occasioned by the opportunity presented by IETs. We subsume organizational structures, strategies, and processes under the general heading of a "business model," and define and elaborate this term.

**Business models**

The term "business model" is relatively new to the business literature, and is associated mainly with the growth of the Internet economy. It is widely employed in the popular press, often without a clear or consistent definition. The usage of the term seems to refer to the sources of revenue\(^{xiv}\) (e.g., Rappa, 2000; Rayport, 1999), the core strength of the business (e.g. Green, 1999); governance structure\(^{xv}\) (Wilder, 1999); or one (or more) business method(s)\(^{xvi}\) (e.g. Rappa, 2000). The multiple uses of the term, often in an interchangeable manner, creates ambiguity about its meaning. In a more comprehensive account, Timmers (1998) defines a business model as encompassing “an architecture for the product, service and information flows, including a description of the various business actors and their roles; a description of the potential benefits for the various business actors, and a description of the sources of revenues” (p.4). However, to be more useful as a unit of analysis for corporate strategy, the definition must capture the configuration of organizational attributes that enable a firm to deliver some unique value and consequently confer a competitive advantage.

A business model refers to a template, prototype, or imprint consisting of the core set of organizational processes and routines that form the basis for the continuing viability of the organization. In that sense, a business model is akin to what Winter and Szulanski (1998) define as "Arrow core" (Winter & Szulanski, 1998). It embodies the strategic logic on which the organization was founded and enables the performance of its productive activities. We formally
define it as *a unique configuration of elements comprising the organization’s goals, strategies, processes, technologies, and structure, conceived to create value for the customers and thus compete successfully in a particular market.* The business model, among others, is manifest in: (a) the core value proposition; (b) the sources of revenue; (c) how the revenue is generated; (d) the costs involved in generating this revenue; and, (e) the plan and trajectory of growth. The strategically relevant aspect of a business model is in the value proposition that it implies. Consequently, we differentiate business models by classifying them based on the opportunity for value creation they express or imply. Formally, value creation refers to the surplus (difference between revenue and cost) resulting from the production of a product/service using a distinct technology (physical and organizational) to meet an identifiable market need. In this paper, we are concerned with e-business models, which are oriented toward the use of Internet and other electronic technologies (IETs) to create and/or deliver value. The organizational and strategic logic of an e-business model is contingent on the use of IETs. Two important factors affect the creation of an e-business model. These include:

**Systemic industries.** The convergence of traditionally disparate industries such as telecommunication, entertainment, media, and computing ushered in by IETs (Garud et al., 1998; Yoffie, 1997) has resulted in highly interconnected business and markets. Consequently, competition is less intense within industries or product-markets than it is between competing systems. For instance, AOL is not merely competing with other Internet Service Providers (ISPs) but with several competitors in related markets such as search, directory and content provision (Yahoo.com), software standards (Microsoft), advertising (both traditional and on-line advertisers), retail (both traditional and on-line retail) and so on. In such types of competition, dominant firms in a system may lock-in a substantial share of the market (Katz & Shapiro,
firms strong in product-market competition may lose the systems-market competition (Shapiro, 1999), or new technologies may be locked out of dominant systems (Arthur, 1989b). The key to competitive advantage may be firms' ability to influence and control the system through standard-setting innovations, alliances with other key players in the system, and/or acquisition of platform technologies (Shapiro & Varian, 1999b).

Information-based products and services. The value added of businesses exploiting IETs is largely information based. As Arrow (1962, 1974) highlighted, information possesses some unique characteristics: (a) it is costly to produce but almost costless to reproduce; (b) its indivisibility makes partial sharing impossible; (c) it is non-rivalrous in use; and, (d) it does not allow the selective exclusion of users from access to the informational asset since any single user with access can replicate and diffuse it among others. These conditions pose a set of countervailing tensions. On the one hand, increasing returns to information makes it possible for a single firm to saturate the demand in the market (Arthur, 1996), lending a "winner-take-all" character to competition. This highlights the importance of first mover advantages (Shapiro & Varian, 1999b). On the other hand, the non-rivalrous and non-excludable nature of information makes it easy for later entrants or competitors to imitate the value proposition and erode initial advantages of the pioneer. This challenge makes it important for a firm to protect the knowledge underlying the core value proposition or the template on which its business model is based (Winter & Szulanski, 1998).

These unique characteristics suggest four important elements of business models based on IETs: (1) scalability; (2) complementary resources and capabilities; (3) relation-specific assets; and, (4) knowledge sharing routines. Each of these is explained in some detail.
Scalability

E-businesses, by definition, are conceived to leverage the Internet and associated electronic technologies in unique ways. The information-based nature of assets in the e-business world entails two unique properties each on the supply- and demand-side. First, as argued earlier, informational assets, unlike physical assets, are not subject to scale-related barriers. Therefore, in the absence of diminishing returns to scale, it is possible for a single firm to saturate the entire demand in the market, resulting in winner-take-most markets (Arrow, 1962; Arthur, 1989a; Shapiro & Varian, 1999a). On the demand-side, competition in network markets revolves around establishing industry standards (David, 1985; Schilling, 1999; Shapiro & Varian, 1999b), creating switching costs for customers (Farrell & Shapiro, 1988; Klemperer, 1987) and creating strategic incompatibilities (David & Steinmueller, 1994; Economides, 1996; Economides & Salop, 1992; Katz & Shapiro, 1985) that reduce consumer choice and contribute to market convergence on a single product/service (Arthur, 1989b; Bara, 1998). In the aggregate, these two effects make it possible for a single firm to dominate an entire market space.

It follows that for a firm to exploit these unique aspects of competitive advantage in the e-business arena, it should be able to scale up the business model to address a growing market need. In calling this capability scalability, we refer not only to the ability of the business model to handle large volumes of a similar kind of transaction (i.e., exploit economies of scale), but also to the extension or scalability of the business model on multiple dimensions. It may encompass extension across geographic markets, products, or customer segments. Therefore, the notion of scalability is not limited to either exploiting economies of scale or scope by distributing fixed costs over a large volume of a single activity or small volumes of several activities respectively (Panzar & Willig, 1981). It refers to the ability to extend the business model's
unique advantages along the value chain (i.e., leverage its upstream and downstream competencies to integrate vertically) and also to exploit the business model's inherent complementarities to diversify across markets, products, or customer groups (Milgrom & Roberts, 1990).

Proposition 4: Competitive advantage obtained from IET-based business models will be greater to the extent the business model is scalable.

Complementary resources and capabilities

The importance of complementary assets in helping firms cope with disruptive technological change has been recently documented (cf. Tripsas, 1997). When an industry is in the early stages of development, as is the case with the Internet and associated technologies, the sources of competitive advantage may be embedded in the technology (Abernathy & Utterback, 1978). However, as a technology matures and knowledge of its use and implementation gets relatively standardized, sustainability of competitive advantage from it may become increasingly difficult. Moreover, competitive advantages in the virtual world are often based on informational assets (e.g., a unique technology to analyze online consumer behavior, a software algorithm to search the Web and update content in real-time), which are harder to protect from imitation.

For this reason, the sustainability of competitive advantage in different business models is likely to depend on the effective leverage of complementary physical assets, which are harder to imitate than are informational assets, especially if they are accumulated and integrated over a long period of time (Dierickx & Cool, 1989). A new entrant wishing to duplicate them would be faced with significant entry barriers, including high capital cost, scale economies, and learning (Porter, 1980). For instance, Amazon.com's main advantage was the ability to deliver low cost
books by saving on store, warehouse, and inventory costs (Kotha, 1998). However, the company has recently begun building complementary physical assets to compete effectively with Barnes and Noble (Amazon.com Annual Report, 1999). It has opened several physical distribution centers spread across the United States, several customer service centers, and invested in Kozmo.com, a one-hour home delivery service currently operating in six major markets. Similarly, the merger of the old and new media, AOL’s acquisition of Time Warner, clearly reflects a strategy grounded in attempting to obtain synergies between physical and virtual assets. However, a single firm may not be able to develop all the complementary assets it needs or may need (Penrose, 1959; Teece, 1980). Firm capabilities are path dependent (Dierickx & Cool, 1989), evolve incrementally through refinement of firm-level routines (Nelson & Winter, 1982), and are constrained by their absorptive capacity (Cohen & Levinthal, 1990). Consequently, the acquisition or development of complementary assets not proximal to the firm's core capabilities may be impeded. Further, in times of discontinuous change, the core capabilities may actually become core rigidities (Leonard-Barton, 1992). In such cases, the business model should enable access to such assets through acquisitions or alliances. There is some support in the literature that complementary assets drive returns from alliances (Hamel, 1991; Harrigan, 1985; Hill & Hellriegel, 1994; Shan, Walker, & Kogut, 1994; Teece, 1986).

**Proposition 5**: Competitive advantage obtained from IET-based business models will be enhanced by access to complementary resources and capabilities.

**Relation-specific assets**

The Internet and the World Wide Web (WWW) are not technologies that any one firm can hope to dominate now or in the future. As argued earlier, the domains in which e-businesses operate
are clearly beyond the scope of product/market or resource/market conceptualizations. As the metaphor of the Web suggests, e-businesses live and thrive in a networked world; a world of relationships and ties (DeSanctis, 1999). Besides, it has been recognized that competitive advantage in this arena often accrues from managing the right collaborative relationships with other constituents in the network (Garud & Kumaraswamy, 1995; Stuart, 1998). It is estimated that e-businesses engaged in over 6000 alliances in the last three years (SDC Database, 2000).

Dealing with customers, complementors, or suppliers through the market is clearly efficient when price governs performance of the transaction. However, market imperfections such as uncertainty, information asymmetries, or product complexity influence the choice of transaction mode, which may range along the continuum between the market and the firm. For instance, it has been shown that when firms need to make transaction-specific investments (e.g., a special loading/unloading facility at a port), the market mode of carrying out transactions ceases to be efficient (Klein, Crawford & Alchian, 1978; Teece, 1986). Firms need to internalize the activity within the firm or devise an intermediate mechanism (e.g., joint venture or alliance) to carry out the transaction. Asset specialization afforded by these mechanisms may generate rents from productivity gains (Williamson, 1985), improved quality (Clark & Fujimoto, 1991), decreasing coordination costs (Dyer, 1996), and increasing speed to market (Asanuma, 1989).

Analogously, when e-businesses' environments are undergoing rapid and unpredictable changes, such firms may not be able to negotiate the uncertainty on their own. Strategic alliances are one way to procure assets, competencies or capabilities not readily available in competitive factor markets (Oliver, 1997). Consequently, firms will cooperate with one another so as to collectively cope with the heightened uncertainty that the Internet presents (Saxenian, 1994).
These relation-specific assets at the boundaries of the value chain may provide access to (a) customers and/or markets; (b) new technologies; (c) knowledge assets; (d) complementary assets and, (e) new opportunity. Moreover, such alliances can be used for relationships with not only players such as suppliers or customers but also complementors and competitors.

Proposition 6: Competitive advantage obtained from IET-based business models will be enhanced by the development of relation-specific assets with key partners.

Knowledge sharing routines
We argued above that it is especially important for firms exploiting IETs to create value to exploit complementary resources and capabilities and develop relation-specific assets. This suggests a necessary condition -- that collaborating firms develop the knowledge-sharing routines necessary to ensure efficient utilization of each other’s capabilities. We define knowledge sharing routines as regular patterns of interfirm interactions that permit the transfer, recombination, or creation of relation-specific assets (Dyer & Singh, 1998).

As IETs are increasingly deployed to store, access and process information, the specificity of informational assets may be reduced, making it possible for partners to more easily access and exploit each others' resources and capabilities. However, it is important to distinguish between information and know-how (Grant, 1996; Kogut & Zander, 1992). While information can be easily transmitted without loss of integrity once the syntactical rules for deciphering it are known (Kogut & Zander, 1992), know-how includes knowledge that is tacit, sticky, complex, and difficult to codify (Kogut & Zander, 1992; Nelson & Winter, 1982). Moreover, the tacitness and complexity of such knowledge makes it difficult for competition to imitate such knowledge, thus
preserving the rent-generating potential of the know-how (Zahra et al., 1999). This suggests that partner-specific knowledge sharing routines can be a source of competitive advantage.

Cohen & Levinthal (1990) argue that there is a tradeoff between the efficiency of internal communication (knowledge sharing) and the ability of the firm to assimilate and exploit information originating from the environment. At the firm level, "the ideal knowledge structure for an organization should reflect only partially overlapping knowledge complemented by non-overlapping diverse knowledge," balancing the need for diversity and commonality of knowledge (Cohen & Levinthal, 1990, p. 134). Extending the argument to inter-firm knowledge structures, it is possible that the effectiveness of knowledge sharing routines is a function of the extent to which: (1) partners have developed overlapping knowledge bases (Mowery, Oxley & Silverman, 1996; Szulanski, 1996); and, (2) partners have developed interaction routines that maximize the efficient utilization of their unique or non-overlapping knowledge bases (Arrow, 1974; Daft & Lengel, 1986; Dyer & Singh, 1998). The interaction routines at the boundaries between firms store critical information about where particular expertise resides within each firm and under what circumstances it can be retrieved. Consequently, they may be important for effective transfer of knowledge across boundaries of collaborating partner organizations.

Proposition 7: Competitive advantage obtained from IET-based business models will be enhanced by the development of knowledge sharing routines.

Conclusion

Previous research on the use of IETs has directed attention to their impact on market efficiency or changes in the structure of the value chain. However, the implications of IETs for entrepreneurship and strategic management have received little articulation. We attempted to
meet this need by posing two questions: (1) why and how new entrepreneurial opportunity arises from IETs, and, (2) why and how different modes of action may be used to exploit the entrepreneurial opportunities arising from IETs. Starting from the premise that technological change creates grounds for innovation and entrepreneurial activity, we argued that the adoption of IETs influences the competitive landscape by altering the entrepreneurial opportunity space. Using an organizing framework composed of three distinct conceptual categories (communication, brokerage, integration), we first analyzed their impact on new entrepreneurial opportunity through transformation of value chains. Drawing on the notion of a business model, we then attempted to articulate how sources of competitive advantage are affected by the discontinuous change that IETs represent.

In general, our analysis suggests that IETs are generating new entrepreneurial opportunities by transforming the value chain -- disintermediation, reintermediation, and reconfiguration. We argued that IETs are likely to create disintermediation pressures on transaction channel intermediaries that create and preserve market inefficiencies and intermediaries engaged only in the dissemination of publicly available information. Reintermediation opportunities from IETs are likely to occur in the value chain segment between buyers and sellers, in information processing and in the creation of hybrid structures to enable efficient exchange of goods and services. Reconfiguration opportunities are likely to arise around meeting common market needs (i.e., in the downstream integration of fragmented upstream industries).

The extant literature on how technological change impacts firms' competitive advantage suggests that such changes tend to create disruptions for existing organizations by altering their fit with the environment. In other words, organizational strategies, structures, and processes that were appropriate for the prior technological regime are rendered ineffective by the change. We
proposed that a business model is a useful concept to understand the impact of these changes on firms' competitive advantage and identified its four key components. Specifically, we have argued that the business models of firms exploiting IETs: (1) need to be scaleable to exploit the advantage stemming from the increasing returns accruing to informational assets and exploit potential network externalities when the market converges on a dominant standard or design; (2) should be able to effectively acquire and/or develop complementary resources and capability, especially since the systemic nature of competition renders product-strategies less effective; (3) should be able to develop [highly inimitable] relation-specific assets at the boundaries of the firm value chain that form the basis for generating rents; and, (4) need to create and deploy effective knowledge-sharing routines to exploit complementary resources and capabilities in the technological system and develop rent generating assets that are relation-specific.

In conclusion, IETs have induced significant changes in the competitive landscape in many industries. We have explicated the key opportunities arising from IETs and then identified how competitive advantage will be altered by these changes. We articulated the different opportunities -- disintermediation, reintermediation, and reconfiguration -- arising out of these technologies, and advanced propositions based on our arguments. We also discussed the key components of business models designed to leverage the potential of IETs. The changes associated with IETs are creating many research opportunities. We hope this paper informs such efforts.
Reference List


Endnotes

i Venture capital usually supports new opportunities pursued by individual entrepreneurs as opposed to corporations since the latter can raise finances from the capital market.

ii Money following the best opportunities.

iii According to data from Thompson Financial Securities Data. See www.ventureeconomics.com

iv Intelligent agents, also known as "spiders," "agents," "worms," "daemons," "intelligent agents," "crawlers," "webwalkers," or "wanderers," or more generally webbots are automated programs that continuously gather statistics or index content available on the World Wide Web and/or build databases that can be queried in real-time. See www.botspot.com for more information about webbots.

v Data compiled by the American Booksellers Association (www.bookweb.org/research/stats/389.html) supplemented with SEC filings information suggests that the market share of the three (Barnes & Noble, Borders, and Books-a-Million) largest booksellers increased from 31.3 percent to 52.136 percent from 1994 to 1999.

vi Even though online bookstores such as Amazon.com and Barnesandnoble.com have generated revenues in excess of $200 million, their potential profitability is unclear.

vii Costs incurred in carrying out the price changes (e.g., the cost of changing price displays in a store).

viii An electronic market is defined as an inter-organizational information system that allows participating buyers and sellers to exchange information about prices and product offerings or more generally an electronic intermediary over which multiple buyers and sellers do business (Bakos, 1997; Malone et al., 1987). It includes market-making activities such as: (1) identifying potential trading partners, (2) selecting a specific partner, and, (3) executing the transaction (Choudhury et al., 1998).

ix Investment banks raise equity for their clients and typically charge 5% commission. They usually underprice the equity so their clients have an incentive to subscribe. Consequently, IPO markets may be seen to be inefficient since the issuing firm is selling at below market value while also paying out a significant commission fee.

x Information on the brokerage industry was drawn largely from C. Glew, M. Lotke, M. Palumbo, & M. Schwartz (1996). E*Trade Securities, Inc. Graduate School of Business, Stanford University Case # M-286.

xi Forrester Research (1999) estimates for 1999 indicate that deep-discount and discount brokers account for 3 million household accounts totaling assets over $300 billion, while full-service brokerages account for only 0.1 million households totaling assets of $67 billion. For the complete report, see Forrester Research Report (1999). Net Investing Goes Mainstream. URL: http://www.forrester.com/ER/Research/Report/0,1338,5876,FF.html.

xii Two goods are said to be complements when the decrease in price of one leads to an increase in the demand for another. Others have extended this idea to study the problem of firm organization, and defined “several activities (to be) mutually complementary if doing more of any one activity increases (or at least does not decrease) the marginal profitability of each other activity in the group.” See Milgrom & Roberts (1992, p. 108) for a detailed discussion.

xiii Strictly speaking, consumer demand is assumed as given only in the case of undifferentiated, commodity products where price is the basis of competition. Product/service differentiation itself constitutes attempts to actually influence consumer demand.

xiv For example, Rappa (2000) identifies nine business models: brokerage, advertising, infomediary, merchant, manufacturer, affiliate, community, subscription, and utility.

xv For example, implementing e-business throughout an existing organization, setting up a subsidiary, or creating a separate organization.

xvi A patentable method of doing business such as Priceline.com's "name-your-price" service.

xvii For example, Microsoft and Intel.
For example, Netscape losing the browser war to Microsoft.

For example, Linux was locked out of the desktop operating system market until recently.