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THE IMPACT OF THE INTERNET ON MARKET STRUCTURE

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RESEARCH PAPER No 467BIS
July, 2002

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2) Develop a conceptual framework that will help enable the world of business to understand and control the impact of the Internet and e-business.

3) Diffuse the knowledge generated by research in this field through the usual scientific and professional media.

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THE IMPACT OF THE INTERNET ON MARKET STRUCTURE

Abstract

The arrival of the Internet offers new opportunities for value creation. The new technology simultaneously affects demand and cost structures, leading to a radical transformation of existing market structures. Appropriation of the value created has, therefore, become more challenging. Furthermore, as the Internet impacts industries in several ways simultaneously, we find that simply analyzing the effect of the Internet on pricing behavior and price dispersion misses the point that whole industries are being transformed, which clearly affects the pricing power and possibilities of individual firms. In this paper we provide a conceptual model for analyzing the different elements within the dynamics of industry transformation, and for understanding the impact of the Internet on market structure. We illustrate the different concepts with real-life examples.

Key words: Internet, Value creation, Value appropriation, Pricing, Market structure.

THE IMPACT OF THE INTERNET ON MARKET STRUCTURE

1. Introduction

The Internet affects conventional competitive strategies in at least three different ways: 1) the greater efficiency generated by lower transaction costs and new organizational forms reduce the firm's cost structure; 2) the reduction of the consumer's search costs and new opportunities for product differentiation and redefinition affect the consumer's willingness to pay; and 3) electronic markets affect pricing and allow new pricing mechanisms.

The Internet is an enabling technology (Porter, 2001) that has allowed companies to influence both their demand and their costs at the same time, creating what Kim and Mauborgne (1997) call "value innovations". New entrants or incumbents have been able to radically reposition themselves within an industry, critically affecting the existing industry structure. This has triggered a competitive response which will lead to a new equilibrium in transformed industries. Therefore, as the Internet simultaneously affects demand and cost, simple comparative statics exercises are unlikely to provide much insight into the effect the Internet is having, as in many cases the market structure has been radically changed. In the financial services industry, for example, brokerage has been completely reshaped. In 1997 the market was divided in two main segments: full-service brokerage, with commissions averaging $117, and discount brokerage, operating at $66 (1), with an estimated 12 to 14 million discount brokerage accounts, and 40 to 45 million full-service brokerage accounts. By that time online trading was increasing, reaching 3 million online accounts, with around 60 firms offering online brokerage services at prices as low as $7.95. In the online segment a price war was taking place, as shown in Table 1.

(1) Costs for a 200 share trade of a $20 stock.

We thank Rafael Andreu and Joan Enric Ricart for their comments. Raul González gave excellent research assistance. The financial support of the PwC-IESE eBusiness center is gratefully acknowledged.

Table 1. Commissions in the Brokerage Industry

	200 Shares At $20	3,000 Shares At $10
Full Service		
Average Commission	$116.90	$672.59
Discount Brokerage		
Average Commission	$66.09	$145.05
Online Brokerage*		
DLJDIRECT	$20.00	$60.00
E*TRADE	$14.95**	$74.95**
FIDELITY BROKERAGE	$14.95	$14.95
DATEK SECURITIES	$9.99	$9.99
AMERITRADE	$8.00	$8.00
SURETRADE	$7.95	$7.95

*Internet Trades
**Active Traders
Sources: Credit Suisse First Boston Corp., Companies, *Business Week*, December 8, 1997

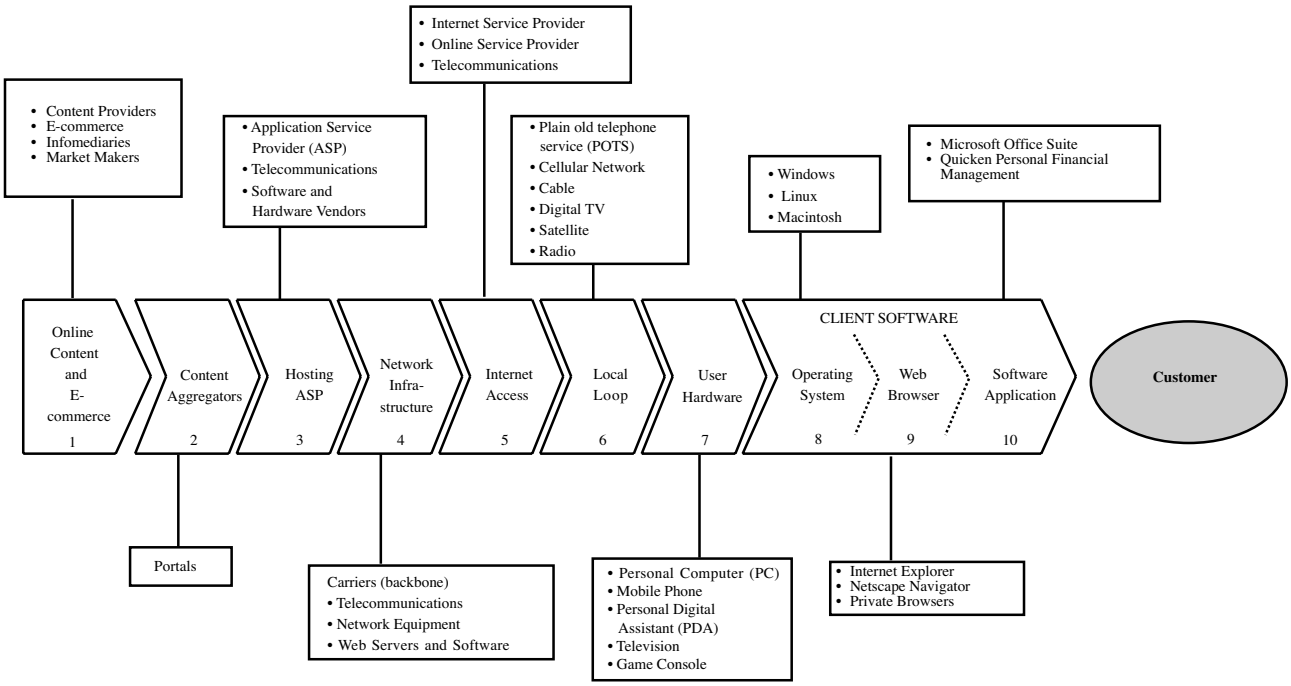
In 1998, Charles Schwab introduced an expanded Internet offering at a price of $29.95, which included more services than any other online broker, and which significantly hurt the traditional full-service segment. As a result, Schwab became the most valued trader in the industry, exceeding Merrill Lynch's market capitalization in one of the last trading sessions of 1998. In response, Merrill Lynch fought back and included online trading in their offering in October 1999, also at $29.95. The web-based product was packed with research, ease of use, and provided accurate and constantly updated information on accounts, hence including more full-service brokerage than Charles Schwab could offer. As a result of this and other initiatives, Merrill's share price recovered (see Figure 1 for the evolution of Charles Schwab and Merrill Lynch). More importantly, however, the industry has been completely transformed, offering the customer a different product at significantly lower prices.

Figure 1. Comparison of market capitalization (1998 – June 2001)

Similar transformations are going on in a whole range of industries, especially those in which information plays a key role, be it as content (such as the media industry), as communication of information (such as the telecommunication industry), or as the infrastructure for information (such as the computer and electronics industry). All these industries have undergone fundamental changes and are currently immersed in a process of industry convergence, while new industries with new competitive dynamics have emerged. Thus, the merger of America Online and Time Warner, completed in January 2001 and aimed at creating "the world's first Internet-powered media and communications company which will connect, inform and entertain people everywhere in innovative ways" (2), shows that the transformation of the traditional movie, media and telecommunication companies has only just begun, and that industry convergence will be ongoing. AOL Time Warner has opted for an integrated strategy, as it wants to be present in both the content, content aggregation and telecommunication steps of what Valor (2002) has called the "online value chain" (see Figure 2). AOL Time Warner provides content through a variety of companies in the publishing (Time Inc and Time Warner Trade Publishing), filmed entertainment (Warner Bros and New Line Cinema), music (Warner Music Group), and interactive video (AOL Time Warner Interactive Video) industries. These contents are aggregated through their interactive services and properties (America Online), and brought to the customer using their own Internet access provider (America Online), as well as their own networks (Turner Broadcasting, Home Box Office) and cable systems (Time Warner Cable).

(2) AOL Time Warner Press Release, January 11, 2001.

Figure 2. The online value chain



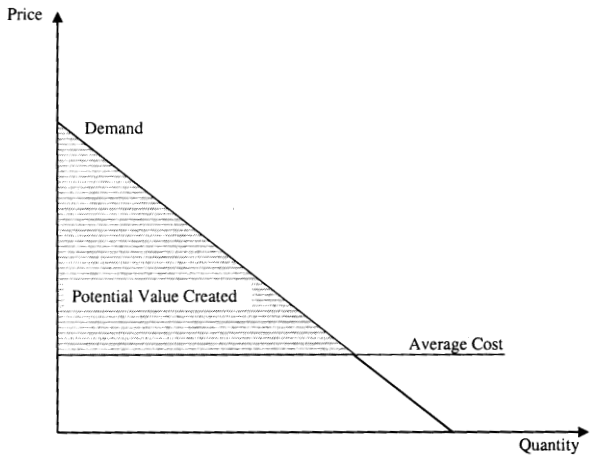
Still, it is necessary to better understand the underlying factors that affect industry transformation, as shown in the cases of the financial services and the media and telecommunication industries. In this article we provide a framework that allows us to better understand the impact of the Internet on today's competitive landscapes. First, we introduce the concept of value creation, showing that the Internet affects the value creation potential of both the demand and the supply side. Next, we discuss how the increased value creation potential of the Internet has triggered fundamental transformations of industries, thus affecting the potential of firms to appropriate the additional value created. We analyse the main dimensions that affect value appropriation possibilities and conclude by showing that a firm's pricing power is the result of the combination of value creation and value appropriation opportunities, which may have led to a complete industry transformation that requires not only an adjustment of pricing but a new competitive approach.

3. Value Creation

Value is created whenever the willingness to pay for an item or service exceeds the (opportunity) cost of providing that item or service. The *potential value created* in an industry is represented by the area between the demand curve, i.e. an individual's maximum willingness to pay for a particular good, and the cost of providing that good to that individual (see Figure 3). For the sake of exposition we will assume a constant average cost which is equal to marginal cost. The same argumentation can be applied at the individual firm level. Dell, for example, buys supplies from component manufacturers, hires workers and accesses capital through the stock market. These inputs are transformed into a PC, which is sold to a Dell customer. In the process value is created whenever the PC user's willingness to pay exceeds the opportunity cost of the resources used to provide this offering. Furthermore, Dell will have a higher profit potential than its competitors whenever Dell is able to create "more

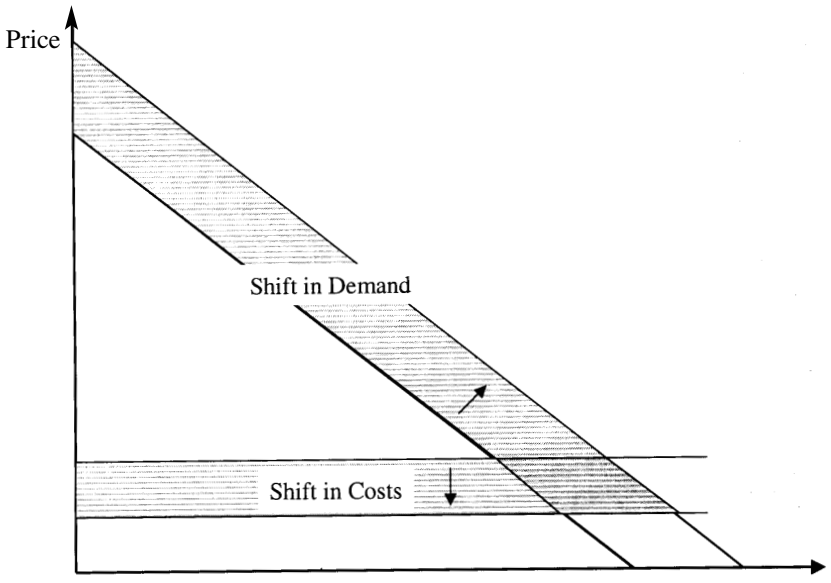
value" than its competitors. We refer to this "more value" as *added value* (Brandenburger and Stuart, 1996). Whether Dell, in the end, is more profitable than its competitors will depend on Dell's ability to appropriate more of the value created than its competitors. We will discuss the issue of value appropriation in more detail in Section 3.

Figure 3. Potential value created in an industry



The effect of the Internet on the potential for value creation therefore depends on how the costs of providing this offering and the demand are affected. Figure 4 indicates the effect of changes in demand and costs on the potential value created. In the following sections we discuss the specific effect of the Internet on the cost structure of the firm and the demand conditions of the firm and the industry.

Figure 4: Effect of the Internet on Potential Value Created



3.1 Value Creation and the Cost Side

3.1.1. Transaction Costs

The main effect of the Internet on the supply channel has been through the lowering of transaction costs (Williamson, 1975). Milgrom and Roberts (1992) distinguish between two types of transaction costs: costs of coordinating and costs of motivating the value system. The costs associated with coordination include the determination of prices, allocation of resources and location of buyers and sellers to conduct transactions. Motivation costs include the costs generated by information asymmetries and imperfect commitment. When buyers and sellers agree to exchange goods or services, buyers have private information about their willingness to pay and sellers about their opportunity costs, i.e. about the potential value created. This leads to information asymmetries that increase the cost of transacting. Furthermore, the fact that partners in a deal can only imperfectly commit to provide the necessary investments into a project results in opportunities for hold-up, affecting the initial investments into the project.

Both types of transaction costs exist in the supply channel, but the Internet is unlikely to affect both to the same extent. A priori, one might expect that while the Internet can substantially reduce coordination costs, motivation costs might actually increase. As the Internet allows trades to occur across larger distances and more anonymously, asymmetry of information increases, making trade more difficult. Garicano and Kaplan (2000) explicitly study the changes in transaction costs resulting from the introduction of electronic markets for the auctioning of used cars. The authors calculate the potential reductions in transaction and production costs for an online auction company (3). The results estimate a reduction of approximately 52% when moving from physical auctions to an online process. While coordination costs seem to be the main drivers of this reduction in transaction costs, the authors find no evidence of an offsetting increase in asymmetric information for trades on the Internet.

3.1.2.Organizational Forms: Markets versus Hierarchies

The arrival of the Internet has affected coordination costs, hence making alternative organizational forms potentially more appropriate. Markets play a central role in the economy, working as mechanisms of exchange where buyers and sellers match and prices form. Under a hierarchical interaction, value chain activities are governed by managerial control procuring production inputs though established suppliers. Through this organization the cost of searching for other suppliers, writing contracts, etc. is reduced. However, if value system activities are guided through open market relationships, the firm will obtain better deals and more competitive prices.

The information technology revolution in general, and the Internet in particular, has reduced the costs of coordinating and information gathering, increasing information transparency for all involved players. As a consequence, under certain conditions it becomes more efficient to conduct transactions through markets than through hierarchical organizations. In particular, in the "electronic marketplace", understood as "an interorganizational information system that allows the participating buyers and sellers to exchange information related to prices and product characteristics" (Bakos, 1991, p. 296), transaction costs have been reduced and hierarchical relationships are becoming less efficient

(3) The company analyzed is Autodaq and operates in the wholesale used car auction market.

compared to market relationships. The role of electronic markets or digital value chain integration in this process has been at the basis of the introduction of new efficiencies and market transparency in the value system of an industry across all value-added activities, allowing a deeper integration of the value chains of different organizations that form part of the value system.

These efficiencies come mainly from the reduction in transactional costs, making both markets and hierarchies more efficient and shifting the economic organization from hierarchies to markets (Malone, Benjamin and Yates, 1987). According to a recent estimate by *The Economist*, over 750 networked marketplaces have been developed worldwide (4). Some of these new marketplaces cover a wide variety of products and an extensive group of buyers and sellers.

The job search market is experiencing some fundamental innovations due to the appearance of an online counterpart. The online recruitment market is clearly growing. Goldman Sachs predicts that online recruitment advertising and related services in Europe will be worth €6,131 million by 2006. According to a study by iLogos Research (April 2001), use of the Internet for recruiting purposes has increased worldwide from 29% of Global 500 companies in 1998 to 88% in 2001. However, most of this expansion has been through the companies' own corporate websites. Looking at candidate behavior, Forrester Research (June 2001) found that in Europe, while newspapers were still the most important source of job advertisements for candidates (62% of candidates used newspapers in their job search, compared to 15% who used job recruitment sites), job recruitment sites attracted twice as many job seekers as corporate sites. Online job search portals, such as the leader of the Spanish market Infojobs.net, are characterized as offering every type of tool to facilitate the recruitment process. They have two types of customer –the companies which want to advertise jobs, and the candidates who are looking for a job– and are able to coordinate their demands in a more efficient way than offline recruiters. They save costs on a) the publishing of the job offering and CV, b) the information gathering process for both recruiters and job seekers, and c) overall time to "match" demand and supply. Hence, although offline recruiting still offers some advantages through the personal nature of the service, the emergence of generic job search marketplaces that could not be efficient before due to the huge coordination costs of matching of job seekers and offers, are significantly changing the industry, and some of the traditional players are already adopting click-and-mortar strategies.

Similarly, firms such as Dell Computer and Cisco Systems have shown an impressive growth in value since they made the Internet a key element of their business architecture. They have automated the coordination of most of their activities, both internal and with external suppliers, achieving greater efficiency and transparency of the value system, allowing a deeper integration of the value chains of the different organizations belonging to the value system.

The impact of information technology on an industry's value system has also triggered a process whereby some of the traditional intermediaries are becoming obsolete, and new virtual intermediaries are being incorporated. The repercussion of this changing environment for firms and consumers will depend on the individual industry and the characteristics of the value system. In most industrialized countries, intermediation margins are close to 33% of the final price of goods (5). This means that a large sector of the economy

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(4) *The Economist'* "Seller Beware," March 4, 2000, p. 61-2.
(5) OECD Report on electronic Commerce, www.oecd.org

may be affected. Benjamin and Wigand (1995), for example, find that in the high-quality shirts market it may be possible to reduce the retail price by up to 62% if wholesalers and retailers are eliminated from the value system. The manufacturer now has the possibility of selling its products directly to consumers or through integrated retailers that are more efficient, thus reducing the final selling price and increasing the profit margin.

Sony is planning to start selling directly to consumers through the Internet. Even though the company expects to sell only 20% of its products on-line over the next three to five years, the impact of this decision on the electronics retail industry may be significant (6). Similarly, twenty-seven airlines, including the big five (American, Continental, United, Northwest and Delta), have banded together to create a unique travel site where they will be able to offer fares, ticketing and other services. One of the most important aims of this new initiative is to cut out the $5 to $10 dollar commission fees paid to online brokers, in a business that, according to Forrester, will create US$64 billion in online ticketing (7).

In conclusion, simple "before" and "after" comparison of outcomes is complicated, as the arrival of the IT revolution has profoundly impacted organizational forms, enhancing the creation of market places, and giving rise to new opportunities for disintermediation and re-intermediation both of firms' internal processes and of an industry's entire value system.

3.2 Value Creation and demand

Affecting consumers' willingness to pay implies shifting their demand curve. As in the case of cost drivers, demand drivers are affected in different ways by the surge of the Internet. The most important impact has been on the consumer's search costs, which have considerably decreased, as information is instantaneous and buyers can compare the offerings of sellers worldwide. Other drivers, such as brand image and value added services have not been directly impacted by the evolution of the Internet. However, investing in these types of demand drivers is more important today to achieve a differentiation advantage (see Latcovich and Smith, 2001). Furthermore, the Internet has allowed firms to become more knowledgeable about their customers. Analyzing click-streams, for example, provides information that can be used to adjust the offer being made and thus increase customers' willingness to pay.

In this sense, the emergence of eToys as an online toy e-tailer has significantly impacted the toy industry. Toy buyers (usually parents) arrive at the market with a fixed demand (the child is a product prescriptor), and their total gross willingness to pay is composed of a) the value of the toy, b) the search cost of the lowest price, and c) the time consumed in the buying process. In the traditional retail world, search costs are high, as different toy stores have to be visited, and the buying process is extremely time consuming (especially during the Christmas period, when streets and shopping malls are overcrowded). eToys' selling proposition, with low prices, easy comparison of prices, and little time consumption, was clearly revolutionary in the toy industry. The entry of eToys transformed the toy industry in a fundamental way, and during the 1999 Christmas season eToys was able to capture sales for a total amount of $107 million.

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(6) *E-Commerce Times,* "Sony Shocks Japanese Dealers with Direct Sales Web Site", 01/02/00 by Rob Spiegel.

(7) *E-Commerce Times*, "Airlines Band Together to Launch Travel Site", Jan 13, 2000 by Mary Hillebrand.

3.2.1. Search costs

It has been claimed that the Internet reduces search cost. This would increase the individual consumer's net willingness to pay, shifting the demand curve for the product on offer outward. At the same time, the reduction of search costs would imply that substitutes are more easily available. This would reduce the demand for individual firms, increasing rivalry and leading to lower prices and less price dispersion (Janssen and Moraga, 2001). Thus, Brynjolfsson and Smith (2000) have found that book prices are 9% to 13% lower on the Internet than in brick-and-mortar stores, while music CD prices are 9% to 16% lower. In addition, price dispersion has also been reduced. Therefore, taking into account that, as Stigler says, "price dispersion is a manifestation –and indeed it is the measure– of ignorance in the market", reduced search costs seem to be increasing overall market efficiency. Different types of search technologies such as search engines and shopbots, which help consumers to find the lowest prices and bargains, support the transparency provided by online shopping (8). Nevertheless, although search costs are lower, the overall effect on prices remains unclear. A survey conducted by McKinsey & Company found that most online shoppers in fact do not search for lower prices with the intensity that was expected. More than 80% of online shoppers for books, toys and CDs buy from the first site they visit. For durable goods such as electronics the percentage of shoppers buying on the first site is 76% (Baker et al., 2001a,b). Furthermore, Janssen and Moraga (2001) show that the effect of reduced search costs on prices and price dispersion is conditioned by the maturity of the market and the size of the purchase.

3.2.2. Customization

Customization of the product involves adding features to the product that the customers value. Therefore, increased customization, i.e. the provision of complementary goods/options, shifts the demand for the product outward. Customers may be willing to pay a premium price for quality service, brand name and trust. For example, Amazon.com offers a whole range of complementary (and personalized) information on each book they sell, providing an extensive summary, comments from the editor, author, and other readers, as well as information on possible complementary books that a buyer may find interesting to read ("readers that bought this book also bought…"). The company, although charging higher prices than other competitors (Clay et al., 2001), has a market share of more than 80% in the online book retail industry. This evidences that it is not only low prices that matter for customers when buying online.

Dell, while having a predefined range of recommended buying options, started offering complete customization of any of its computers and notebooks through its webpage, opened in 1996. In addition, they have set up a number of forums to ensure the free flow of information with customers on a constant basis (Magretta, 1998). All of these initiatives have allowed Dell to differentiate itself from its competitors, while charging distinctly higher prices. Although nowadays a number of competitors, such as Apple, have tried to follow this approach, i.e. increasing customization and customer care, Dell continues to be the only major computer company able to meet its profit forecasts, with a market share of about 27% of the total personal computer market.

(8) Examples of these type of price search sites are mySimon, Dealtime, Pricewatch and Pricescan.

Hence, the combined effect of lower search costs and improved possibilities for customization not only affect demand, but simultaneously change the existing market structure, thus affecting the outcome observed before and after the introduction of the Internet.

4. Value Appropriation and Pricing

Achieving cost or differentiation advantages are the most important determinants of strategic positioning. The Internet has created new opportunities to articulate and develop such advantages on the supply side and on the demand side (Porter, 2001). As discussed before, the dynamics of competitive advantage in this context can be examined using cost and benefit drivers. These drivers reflect the most important activities that will affect the cost and differentiation advantages with respect to other industry competitors. Lower search costs and customization opportunities have the effect of increasing the buyer's perceived value, and lower transaction costs reduce firms' cost structure, so that more value is created. However, these changes have at the same time affected the overall market structure. Therefore, it is not clear how firms can appropriate this added value. Especially on the consumer side there are important challenges in appropriating the added value created by the Internet.

In this respect, eToys had a clear new value proposition which increased customers' willingness to pay by offering them greater convenience. Despite the brilliant start-up, significant challenges for value appropriation appeared during the following months. First, the company failed to deliver because they lacked shipping capabilities and were unable to supply the quantities demanded of the hot products. The suppliers were unwilling to cut out their regular customers in times of product scarcity. Second, the incumbents were bound to react, as the new, superior value proposition was threatening their own sustainability. Thus, the leading US retailer, Toys "R" Us, tried to buy the new entrant eToys in Spring of 2000. When eToys rejected the deal, Toys "R" Us decided to establish an alliance with Amazon.com (combining the toy store's merchandising expertise with Amazon's knowledge of web operations, inventory management and fulfillment), adopting a click-and-mortar approach. This, in turn, affected the value proposition for the customer, as Toys "R" Us now offered an additional service, in that returns were allowed to the brick-and-mortar stores, thus increasing customers' willingness to pay even further. As a result, eToys started running into trouble, selling much less than expected during the Christmas season 2000, and closing their business in Spring 2001. Other pure e-tailers, such as toysmart.com, toytime.com, and redrocket.com, had already had to shut down operations some months before. Still, the toy retailing business has been reshaped, as online sales have been included in the retailers' value proposition, price pressure has increased, and more service has to be offered, hence resulting in less value appropriation opportunities.

Nevertheless, not all online businesses have appropriation problems. Firms such as eBay have reported profits since their first year of operations, and their profits are still growing. The company reported a net income of $18.3 million in 1999, rising to $568.6 million in 2000, showing an extremely robust business model. eBay has profited from being the first mover in the online auction market. It has been able to differentiate itself from the competition by creating and taking advantage of network externalities, and the subsequent creation of lock-in of both buyers and sellers. This has allowed them to reach very high volumes, and as economies of scale and scope are important, their average costs have gone down, which in turn gives them a significant advantage over their competitors (see Sieber, Andreu and Ricart, 2002).

The solution to the appropriation challenge crucially depends on the competitive environment: rivalry, entry barriers, and the new equilibrium between the firm, its customers and its suppliers. These forces determine the pricing power of the firms in the industry.

4.1 Rivalry and Entry of New Competitors

A senior vice president of Lehman Brothers, New York, when talking about the effect of electronic marketplaces on the chemical industry, noted: "It's pretty clear that with e-business you have more to lose on sales price compared to how much you save on raw materials, simply because you are selling more specialty products and buying more commodity products –where markets are very efficient already– to manufacture them (9)." This reflects the pressure of competition and market transparency on profitability for some industries.

Depending on firms' market power, the possible value appropriated will be completely different. For example, if there is only one firm in the market, with all the market power (monopoly), that firm will be able to appropriate more of the added value created by the introduction of the Internet from consumers and suppliers compared to firms that have no market power (10). If firms have no market power (competitive scenario), the result will be completely different. Prices will be closer to the opportunity cost and there will be fewer opportunities to appropriate any value from the consumer side. This implies that buyers will increase their consumer surplus by appropriating most of the value created through the introduction of the Internet. Firms will only appropriate the added value created through cost reductions if they are able to reduce the prices they pay to their suppliers, while the prices they charge to consumers do not drop at the same rate. If market rivalry is high and the barriers to entry low, the existing firms will need to decrease prices, giving up a substantial part of the additional value created through the Internet.

The arrival of the Internet has increased rivalry, especially within the online retail channel. Industries with lower entry barriers face greater competitive pressure in the short run, reducing aggregate profitability and market prices. Nevertheless, the investment in IT infrastructure and other marketing and branding costs seem to increase entry barriers. In the online book industry, Latcovich and Smith (2001) find that Amazon spends 32% of sales on advertising while Barnes and Noble.com spends more than 50%. Off-line, Barnes and Noble and Borders spend only between 14% and 20% of sales on advertising. Therefore, given the endogenous nature of market structure, the competitive interactions that might be expected in the off-line book market should be quite distinct from those in the online market. Lucking-Reiley and Spulber (2001), however, argue that entry costs appear to be lower for some dot.coms since new companies can outsource IT infrastructure and software, thus reducing their initial investment by variabilizing a cost that for incumbents with existing IT infrastructures is a sunk cost. Furthermore, easy access to the capital market reduces financial entry barriers. Therefore, increased rivalry will presumably lead to increased price competition.

In the book industry, Bailey (1998b) examines the impact of the entry of the large brick-and-mortar book store Barnes and Noble into the Internet market and the reaction of the incumbent leader Amazon.com. The main result is that the incumbent firm, Amazon, reduced its prices to match the prices offered by Barnes and Noble for the same basket of books (see

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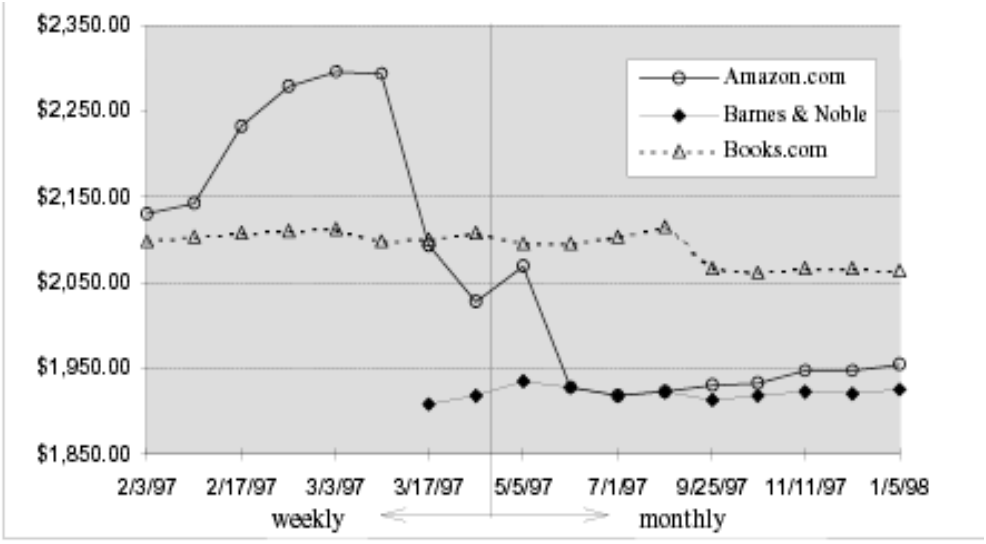
(9) *IndustryWeek*, "E-Rosion?", 8.13.2001 by Tim Stevens

(10) It is important to note that not all the value appropriated from cost reduction comes from extracting value from suppliers. Other drivers such as learning processes, or improved process efficiency can generate cost reductions that do not necessarily come from the supplier.

Figure 5). Interestingly, in this process B&N reduced prices only in the Internet channel, leaving the prices at physical retailers unaffected.

Figure 5. Market Basket Price at Amazon, Barnes & Noble and Books.com.



Source Bailey (1998b)

Friberg, Ganslandt and Sandström (2001) analyze the problem of price differences across traditional and electronic channels by setting up a model that compares a conventional retail firm and an independent electronic retailer in a duopolistic market structure with a monopolistic firm selling in both channels, electronic and conventional. Using a sample from the Swedish books and CD market they find evidence of lower prices in the online channel for firms selling exclusively through the Internet. The intuitive explanation for this outcome is that monopolistic firms in on-line markets charge a higher price to avoid cannibalizing sales from their conventional retail stores. Independent electronic retailers compete with conventional firms by charging a lower price. The empirical results also demonstrate significant price dispersion for both traditional and online retail stores. Mazón and Pereira (2001) develop a model that generates very similar predictions, but endogenizes the prevailing market structure.

4.2 Increased market transparency

The arrival of the Internet, together with powerful search engines, potentially creates a perfect information environment in which firms selling at the lowest price are posted. The impact on price competition may result in all firms reducing prices to opportunity cost. However, this is not exactly how it works. According to Ellison and Fisher (2001), search engines that post only the lowest-price retailers will have a short life in the market. Price search engines appropriate some of the value created through the transaction, typically charging a percentage of every transaction that gets completed through their webpage. For example, all e-tailers that are accessed through plaza.terra.es have to pay a negotiated part of the value of the transaction to Terra if the user finally buys any item during that connection (11). If only firms selling at prices equal to opportunity cost are posted, the search engine will

(11) If during a session the user only looks around, and buys at any other moment, accessing the e-commerce site directly, Terra is not able to charge anything.

be unable to appropriate any value in the long run, as there will be no margin left to appropriate. Kephart and Greenwald (1998), following Salop and Stiglitz (1982), provide one of the earliest theoretical treatments on how search engines may affect competition in electronic markets. In these authors' model, firms randomize prices between two types of buyers in order to price-discriminate between active bargain searchers and non-searchers. This way firms can compete for the active searchers with lower prices, but compensate by charging a higher price to the others. Baye and Morgan (2001) show that, when an information gatekeeper regulates access to customers, the gatekeeper will not give all firms access to consumers. This way the gatekeeper can appropriate some of the value of the transactions performed via its site. Iyer and Pazgal (2001) model firms' choice to join Internet shopping agents. It turns out that not all firms want Internet shopping agents to recognize their sites, either, resulting in increased price dispersion.

Increased market transparency has led to the hypothesis that competition in electronic markets will take the form of Bertrand competition, where firms compete purely on prices, resulting in lower prices and lower price dispersion and reduced industry profitability. However, the most recent empirical evidence does not support this hypothesis. There exist several empirical studies of prices on electronic markets, most of them focused on books, CDs and software (12).

The earliest analyses show that prices on the Internet are higher than in the traditional channels. The study reported by Lee (1997) compares the prices of used cars in conventional and electronic markets from 1986 to 1995. He found that prices were higher on the Internet than in conventional channels. A possible explanation for this outcome is that the study was based on prices formed through auctions, where the consumer with the highest willingness to pay is the one who obtains the unique good. This implies that prices in auction markets will usually be higher than in traditional markets, allowing firms to appropriate some of the value created by the Internet by developing creative pricing mechanisms. Bailey (1998a, 1998c), using a sample of books, CDs and software sold by US retailers from 1996 to 1997, also found higher prices on the Internet channel. However, the most recent empirical evidence presents a different picture. All the studies on price level report lower prices on the Internet channel than in traditional stores. We have already mentioned Brynjolfsson and Smith's (2000) results on book and CD sales on the Internet. Similarly, Clay, Krishnan and Wolff (2001) find lower prices in the Internet channel, although they also report significant price dispersion. They report lowest average prices for New York Times bestsellers (69% of the publisher's recommended price), higher for computer bestsellers (78%), and highest for random books (86%). Regarding price dispersion, they found the highest dispersion for NYT bestsellers (28%), followed by computer bestsellers (16%), and lowest for random books (13%). Given the results on price dispersion reported by Sorensen (2000) for the traditional prescription drugs market, one would have expected price levels and dispersion to be lower for more frequently purchased items.

Other studies look at used cars, travel agents, life insurance and real estate markets (13). Scott-Morton, Silva and Zettelmeyer (2000) found that the average customer pays approximately 2% less for cars bought using online services compared to traditional channels. According to the authors, consumers will benefit from buying online even though dealers will not offer different prices to online and offline customers. However, because of

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(12) See Smith et al. for a very complete survey on empirical studies about prices on electronic markets.

(13) For examples on these industries see Clemons, Hann and Hitt (1998) on travel agencies, Brown and Goolsbee (2000) on life insurance and Crowston and Wigand (2000) on real state.

reduced search costs, the Internet helps to locate the cheapest dealer in the area, reducing average prices. They found that dealers' gross margins from sales through the Internet channel are significantly lower than gross margins earned selling vehicles in the traditional way. However, because online customers are cheaper to serve, the net effect makes dealers better off working through the Internet channel. This indicates that the online branch is able to retain part of the value created on the supply side through reduced transaction costs.

The empirical evidence surveyed suggests the existence of lower prices and lower menu costs on the Internet channel, but an important degree of price dispersion. Deviations from the Bertrand assumptions of product homogeneity, zero search costs and symmetric information lead to price dispersion. Several models have been developed to study the effect of these different assumptions on the Bertrand outcome (14).

4.3 New products and pricing mechanisms

While increased rivalry and market transparency seem to lower value appropriation opportunities for firms, empirical evidence has shown that some firms have been able to create new value appropriation opportunities by redefining their products and implementing new pricing mechanisms.

We have already emphasized the importance of customization for value creation, as it increases the customer's willingness to pay. On the other hand, it may also allow firms to appropriate value, as increased differentiation with regard to competitors may be achieved. For example, Amazon not only offers books, but also a whole set of complementary information, some of which is based on an analysis of the customer's profile (information on present and past online behavior stored in Amazon's databases). Therefore, the offering is not imitable by any of its competitors. Similarly, Yahoo! bases much of its competitive advantage on the fact that its users have personalized homepages, access their email accounts through the Yahoo! site, and actively participate in the Yahoo! communities, thus creating a stickiness that is not easily replicable by any other portal and that allows Yahoo! to appropriate value through advertising income. In addition, Yahoo! is able to charge different advertising prices depending on the amount of information it has about each user.

The Internet also offers new price discrimination opportunities. One very popular new price mechanism is the auction, as it allows companies to almost perfectly discriminate on price, extracting the complete willingness to pay from each customer. In addition, other subtler price discrimination mechanisms include new pricing possibilities in, for example, supermarkets. Peapod, the largest American online grocer, offers coupons and discounts to customers based on each customer's profile, extracting information from repeat customers to capture new potential sales. For example, a "historical" cereal consumer who has never purchased a "Tropicana" juice may well be shown a "Tropicana" coupon (in the form of a banner) during an online shopping session. In addition, Peapod follows each customer's particular buying process and may offer a discount on dips while you are buying some chips. All of these initiatives, which are valuable to the customer, as the overall price paid is reduced, result in an increased value appropriation for the producer.

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(14) See Diamond, 1987; Varian, 1980; Shilony, 1977; Stahl, 1989, 1996, and Janssen and Moraga, 2001 among others.

From the preceding analysis it is clear that the Internet has had a significant impact on market structure. On the one hand, rivalry and market transparency have increased, making it more difficult to appropriate the value created through the Internet. On the other hand, endogenous entry barriers and new products and pricing mechanisms have opened new opportunities for firms to appropriate the value created by the Internet.

5. Conclusions

New possibilities for value creation and value appropriation not only lead to a redefinition of the price equilibrium due to lower transaction costs, lower search costs, enhanced customization opportunities, increased transparency and its impact on industry rivalry.

More and more, the Internet is fundamentally affecting market structure, as a firm's offering may fundamentally change, thus affecting competitive dynamics. Entering e-channels with the appropriate strategy can create an enormous competitive advantage for traditional and dot.com companies, although the net effect for any given firm will depend on how its competitive positioning is impacted as the Internet comes on to the stage. Hence, although in some cases the Internet has allowed firms to simultaneously increase customers' willingness to pay and, thanks to the significant jump in volume, reduce the cost of providing their products and services, value appropriation may prove to be impossible, as firm rivalry and market transparency may make it impossible to establish a pricing scheme that will allow companies to capture the created value. In this respect, we have highlighted the importance of taking into account the fact that, on the value creation side, both supply and demand are affected, be it through the reduction of transaction costs, in the form of motivation or coordination costs, or through the emergence of new organizational forms and work processes on the supply side, or through the reduction of search costs and the creation of new customization opportunities. On the other hand, value appropriation and pricing strategies depend on rivalry and new entry possibilities, increases in market transparency, and new products and price mechanisms. The changes that the Internet brings about on the value creation and value appropriation sides will define how overall competitive dynamics will change the industry structure.

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