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Kiel Working Papers

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The Internet's Economic Challenges

by

Andreas Gröhn



Institut für Weltwirtschaft an der Universität Kiel
The Kiel Institute of World Economics

Kiel Institute of World Economics
D — 24100 Kiel

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September 1999

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Abstract

Some observers regard the Internet as the driving force of the recent economic upswing. So far, each innovation has first been used to substitute for old technologies. Only over time people have started to find new applications for a specific innovation. Only gradually they did take full advantage of the new technology. The same might be true for electronic commerce. The first examples of e-commerce might have been very close to the brick and mortar shops they were intended to replace. Only gradually, e-commerce will take full advantage of the Internet's possibilities. The aim of this paper is to describe the characteristics of this new economy and to pinpoint economic challenges.

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Introduction

Many hopes and fears are linked to the Internet. It could guide society to a frictionless economy or into anarchy. So far, about 150 million users are hooked up to the Internet worldwide (OECD 1998). In 1997, they bought goods and services worth \$26 billion over the Internet. This is less than telecommunication companies' investment in the Internet's infrastructure in that same year (OECD 1998: 32). But if the growth of the number of users as well as the growth of purchases on the Internet persists the economic impact of the Internet could be very strong in the early years of the new century. Electronic commerce or e-commerce is the new term for purchases over electronic networks and especially the Internet. Studies estimate the volume of electronic commerce at \$1 trillion in the years 2003–2005 (OECD 1998: 27). This does not include the productivity gain of the use of the Internet (Nevens 1999). Some observers see the Internet as the driving force of the recent economic upswing (Helm 1999).

So far, every innovation has first been used to substitute for old technologies. Only over time people have started to find new applications for the innovation. In its early days, cast iron was mainly used to substitute for expensive stone or marble sculptures. When steam replaced hydro-power as the general engine in production companies first applied steam as they would have applied hydro-power. Only gradually did they take full advantage of the new technology (David 1990). The same might be true for electronic commerce. The first examples of e-commerce might be very close to the brick and mortar shops they were intended to replace. Only gradually, e-commerce will take full advantage of the Internet's possibilities. The aim of this paper is to describe the characteristics of this new economy and to pinpoint economic challenges. To reach this aim the paper has to rely mainly on case studies and on financial data

submitted to the U.S. Securities and Exchange Commission (SEC) as no official statistics on e-commerce exist.

Characteristics of the Internet Economy

The Internet lowers transaction costs significantly and thereby lowers barriers to entry. The cost of setting up an e-commerce site is comparably low. Some companies offer setting up an e-commerce site for \$349 (OECD 1998: 59). Some companies like Intershop offer the necessary software to build a Web site of the shelf. The commodization of Web site software will lower the cost for a basic e-commerce site still further.

Even with ever lower barriers to entry, information costs remain. Finding the right shop on the Web can turn into the proverbial search for the needle in the hay stack. Some companies rely on the word of mouth to promote their service, others sign contracts with heavily frequented sites to promote their service there.

Essentially, a Web site is software. The software describes how a certain information appears on the user's Web browser. Mostly, the Web site relates to a database that contains all the items on offer and their description. Because of its origins in software, a Web site is an information good. Economies of scale and scope hold for Web sites as they hold for software. In many ways, software and Web sites also share the presence of network effects.

Traded Goods

What will be traded on the Internet? The first group of goods that come to mind clearly are intangible goods (see Table 1). Intangibles, such as software,

Table 1: Traded Goods and Services on the Internet

Goods and Services	Category	Companies
Intangibles	Music Software Edited Information, News Online Video Games Gambling Home Banking Internet Brokerage Insurances	RealNetwork, Liquid Audio, Universal Music, Sony Music Software companies, Egghead.com, GameDealer WSJ.com, Slate.com, Bloomberg.com, Reuters VideoPokerZone Interactive Gaming and Communications Security First Network Bank, BankBoston.com, ComDirect, Bank24 E*Trade, Charles Schwab Discount Brokerage, Bank24, Comdirect InsWeb, different insurances
Tangibles with Defined Spectrum of Attributes that Can mostly Be Explained on the Internet	Cars Computers Books CD, Video, DVD Brand Name Goods Pharmaceuticals Travel	Auto-by-Tel, AutoNation, AutoVantage, AutoWeb, Carpoint, Carsdirect Dell.com, Gateway.com Amazon.com, Barnes&Noble, Cdnow, N2K, Amazon.com Bluefly.com drugstore.com Travelocity.com, Expedia
Tangibles with a very thin or volatile Market	Excess Stock Collectibles	Fast Parts, Onsale, First Auction, Surplus Auction, uBid eBay, Amazon Auction, DealDeal and WebAuction
Tangibles with Potential for Privacy	Pharmaceuticals Adult Entertainment	Drugstore.com Playboy.com, Penthouse.com, Porncity.net, Virtual Dreams
Repeated Purchases	Business to Business Business to Consumers	EDI networks, GE TNP Homeruns.com

music, video games and movies are easily traded on the Internet. Their trade offers instant delivery and benefits from the lower transportation costs. The transportation costs on the Internet depend on the bandwidth. The wider the bandwidth, the more information can be transmitted. The further expected increase in bandwidth will ease the distribution of music and video over the Internet. Additionally, new compression algorithms, like MP3, enable the distribution and broadcasting of music and video on the Internet. This turns formerly tangible products into intangible products. Around 3 million tracks of music are probably downloaded from the Internet every day (*The Economist* 1999a). Every major Internet portal, like Yahoo!, Excite and Lycos, collects links to sites that offer MP3 files. Consumers can buy Walkman like devices that store up to 60 minutes of music in CD-like quality from the Internet. The music industry is still hesitating to distribute their gems over the Internet. The tracks could be bootlegged too easily. The music industry, a \$38.7 billion business (*The Economist* 1999b), is working hard to establish standards that are less copy-prone. There is still not much money being earned with music distribution over the Internet. This will probably not change over the short term. Forrester Research, an industry analyst, estimates that revenue will only take off in 2003, reaching \$1.1 billion or 7% of total music sales (*The Economist* 1999a). In the long run, the advantages of Internet distribution are obvious. Music becomes software that does not need to be linked to any hardware. That makes it easier for consumers to shop around for songs that were hardly available on CD or vinyl record. Consumers all over the world will benefit from global launches. Musicians do not need to find a record label that agrees to publish their music. Instead, the musicians simply offer their music on a Web site.

Some services also transfer to the Internet. Online games and online gambling are examples of this process. Traditionally, gambling is hindered by regulatory limits, but has almost no regulatory limits on the Internet. Several companies offer online gambling. One online gambling company, Interactive Gaming and Communications, Inc., reported for the fiscal year 1998 a net income of \$1.3 million with gambling on the Internet.¹

Edited news is another intangible asset that can be distributed on the Internet. Taking advantage of the Internet, news can be published constantly and without delay. Many newspapers are published on the Internet. There is a wide community of e-zines, electronic magazines. Most of them are for free. Two of the commercial newspapers or magazines are "wsj.com" and "Slate.com". "wsj.com" is the online edition of the Wall Street Journal. It offers the print edition's articles plus market and investing resources, exclusive Internet articles and customization features. wsj.com began charging subscribers in the latter part of 1996. At the end of 1998, this edition had about 266,000 subscribers.² At an annual subscription of \$59 and \$29 for print subscribers, this generates a revenue of at least \$7,714 million. "Slate.com" was founded by Microsoft and is part of the msn network. Slate has attracted a couple of renowned contributors like Paul Krugman who writes a series called "The Dismal Scientist". In the beginning this service was free but later Slate switched to a subscription based scheme. Today, Slate charges \$19.95 per month. Slate is part of Microsoft's

¹ SBET, Form 10-Q, Item 1: Business, for the fiscal quartal ending 9/30/1998, submitted to U.S. Securities and Exchange Commission (www.sec.gov).

² Dow Jones & Co Inc., Form 10-K, Item 1: Business, for the fiscal year ending 12/31/1998, submitted to U.S. Securities and Exchange Commission (www.sec.gov).

Interactive Media Product Group. Microsoft does not disclose financial data on msn or on Slate.

Electronic banking is very successful on the Internet. Already in the predecessors of the Internet, like BTX in Germany or Minitel in France, electronic banking was a featured application. To reach the mainstream, electronic banking still has to overcome the inherent security risks in open systems. Many banks already offer electronic banking, but almost all electronic banks are offsprings of traditional banks. Despite the low barriers to entry, mental barriers to entry seem to remain in against purely electronic banks. So far, there is only one all-Internet bank, Security First Network Bank. Many other banks, like Bank of America, Wells Fargo and Bank of Boston opened branches on the Internet. Electronic banking seems to be more developed in Europe than in the United States. The longer experience with electronic banking on Minitel and BTX made it easier for European banks to open electronic branches on the Internet. A couple of European banks, like Deutsche Bank with Bank24 or Commerzbank with Comdirekt, also opened new subsidiaries without brick and mortar branches, relying solely on electronic banking and phone banking. These electronic banks still take advantage of their mother company's ATM network and reputation.

Most brokerage traditionally has been done by telephone. Trading stock electronically makes it less prone to communication errors. Many of the stock exchanges switched to an electronic trading system or built up a parallel electronic stock exchange, the New York Stock Exchange is just starting to follow this development (*The Economist* 1999d). Electronic stock trading is also very successful on the Internet. Consumers can watch stock quotes online. This gives consumers the edge to online trading that formerly was reserved to

professional brokers. In the beginning, these quotes were typically delayed by 15 min, but competition drives the delay down. Many brokers now offer limited real time stock quotes. That gives online traders the opportunity for intra-day trading. The convenience of online brokerage let the industry boom. In 1999, there were at least 57 online brokers established in the U.S. market (www.gomez.com). These had together now more than 5 million online brokerage accounts in the United States (*The Economist* 1999c). Charles Schwab Corp., an American brokerage firm, raised the share of online trading from none in the early nineties to 54% of total trades in 1998.³ E*Trade, another American brokerage firm, relies entirely on online services. As of September 30, 1998, the company had over 544,000 accounts, representing a compounded annual growth rate in new accounts since October 1, 1994, of 131%.⁴ Recently, Charles Schwab reached a market capitalization of more than \$40 billion, at least a third more than Merrill Lynch, the leading traditional brokerage (*The Economist* 1999c). Merrill Lynch and most of the other investment banks were reluctant to cannibalize their traditional markets by establishing online brokerage. Still, Morgan Stanley Dean Witter introduced its own online broker Discover. Merrill Lynch started to offer online brokerage at Schwab's prices in July 1999 (*The Economist* 1999c). All European banks involved in electronic banking also offer online brokerage at comparable rates to their American counterparts.

³ Charles Schwab Corp., Form 10-K, Item 1: Business, for the fiscal year ending 12/31/1998, submitted to U.S. Securities and Exchange Commission (www.sec.gov).

⁴ E*Trade, Form 10-K, Item 1: Business, for the fiscal year ending 9/30/1998, submitted to U.S. Securities and Exchange Commission (www.sec.gov).

Insurance is also sold on the Internet. Many insurance companies offer quotes on their Web sites. Still, they may require a physical visit by an insurance agent. InsWeb is an online market place for insurances. InsWeb covers auto, term life, individual health, homeowners and renters. Consumers specify their needs and InsWeb then collects quotes from 30 different insurers. In 1998, the company generated a revenue of \$4.31 million. At the same time, net loss was \$22.49 million.⁵

Products with a clearly defined spectrum of attributes will be easily tradable on the Internet. If the buyer knows the specification of the good he can easily shop for it on the Internet. Brand name goods can, therefore, easily be traded on the Internet. This comes at cost for the producer. The producer typically has to rely on the classical distribution network to disseminate information on the brand's spectrum of attributes. Then, selling the same brand on the Internet cannibalizes the market for the distribution network. Companies like Bluefly.com sell branded goods on the Internet. But usually they only sell some brands and only a portion of each product line.

Prices of computer hardware decrease by at least 30 percent per year. Continious depreciating can turn holding an inventory of computer hardware very expensive. Selling computers directly to consumers via the Internet reduces the inventory exposure. Dell has pioneered the selling of computers on the Internet. Recently, the company ported its e-commerce know-how into car retailing by establishing a e-commerce site, called Cardirect.com. In fiscal year 1999, Dell generated \$4.55 billion or 25% of total revenues on the Internet.

⁵ InsWeb Corp., Form S-1, Item 1: Business, for the period ending 5/7/1999, submitted to U.S. Securities and Exchange Commission (www.sec.gov).

Visits to Dell's Web site increased by a factor of 2.5 over the previous year, generated revenues by a factor of 3.5.⁶ The company reports for fiscal year 1999 a net income of \$1.46 billion. The profitability of the electronic commerce is not disclosed. Gateway is one of Dell's competitors in online sales but does not disclose any data on its online business.

The Internet can provide easier access to some products than classical distribution networks. The number of books or CDs on offer on the Internet is vast. A brick and mortar shop typically can only stock some of these products. Often, consumers or shop assistants have to tap into databases to look for a specific book or CD. On the Internet, databases can be presented in a visual way and be combined with other information. This offers e-commerce sites a leverage over classical brick and mortar shops in this field. For example, a CD-shop can provide samples of songs from a CD on the Internet. Interested consumers can then listen to the sample and base their shopping decision on the samples. Netradio offers a full radio broadcast service on the Internet. Once a consumer likes a song she is encouraged to buy the CD on Netradio's Web site. By putting additional information on a CD or a book at the consumer's fingertips the consumer can get a wealth of information she would not have got in a brick and mortar shop. So far, this kind of e-commerce has proven very successful. Amazon.com (see Case I) and other e-commerce sites leverage the advantages of the Internet into commerce.

⁶ Dell Computer Corp., Form 10-K, Item 1: Business, for the fiscal year ending 1/29/1999, submitted to U.S. Securities and Exchange Commission (www.sec.gov).

Case Study I: Amazon.com (www.amazon.com)

Amazon.com could become the rags to riches story of the Internet. Jeffrey P. Bezos founded the company in 1994 to sell books over the Internet. During the last couple of years, Amazon.com expanded from books into music, video games and video tapes. In 1999 the company expanded into auctions, electronics, toys and games. Additionally, the company invested in Drugstore.com, an online pharmacy, Pet.com, an online petshop, Gear.com, a sporting goods discounter and Sotheby's, a classic auction house. Amazon is on track to develop itself further away from classical brick and mortar business substitution. In 1998 Amazon.com acquired Junglee, a provider of Web-based virtual database technology, which allows visitors to access a variety of products sold by other merchants.⁷ After the initial public offering in May 1997 and until the end of 1998, the share price increased twentyfold. In 1998, Amazon.com employed 2100 people and became the Internet's number one book, music and video retailer. In 1998, Amazon.com generated an operating revenue of \$607 million. Over the preceding year, the operating revenue grew 1997 by 9.39 and 1998 by a factor of 4.13. Despite the rising revenues the company has never had any profits. In 1998, the net loss was \$125 million, or 20.4 percent of revenue.⁸

Amazon.com's success in terms of market share bases mainly on its efficient distribution system and the sophisticated user interface. The distribution system can deliver even books out of print in a short period of time and, therefore, has advantages over its mostly slower competitors in the classic bookstore market. The classic bookstores could overcome the slowness of their distribution system. The book order system in Germany shows that independent bookstores can set up a very time efficient ordering system that delivers books in a day. In distribution Amazon.com has to rely on third parties. Some of them are vertically integrated with competitors. Therefore, many analysts believe distribution can not remain Amazon.com's competitive edge (see Morgan Stanley 1997: 8-11).

The user interface at Amazon.com is highly sophisticated. The user interface provides searching capabilities in a database with more than 4.7 million books, music CD, video DVD, computer game and other titles.⁹ The different products of the Amazon stores are cross marketed heavily. The user interface also provides access to reviews by professional staff and other consumers. Once a consumer has signed on to Amazon.com, the initial Web site is personalized giving access to recommendations based on previous purchases and purchases by similar customers. Once the consumer has decided on the purchase she is only one mouse click away from actually buying it. Amazon.com encourages consumers to send in reviews and commentaries. This builds a customer community to promote the value added by Amazon.com.

Amazon.com is now the fifth largest US bookseller (OECD1998: 41), but its long-term position is not secure. Barnes & Noble, the biggest US bookseller, together with Bertelsmann, invested heavily in an electronic business. Barnes & Noble could leverage its physical and Internet presence. Worldwide, there are at least 40 Internet bookshops that compete with Amazon.com. Many other e-commerce sites offer CDs and Videos.

⁷ Amazon.com, Form 10-K, Item 1: Business, for the fiscal year ending 12/31/1998, submitted to U.S. Securities and Exchange Commission (www.sec.gov), p. 5.

⁸ Amazon.com, see above.

⁹ Amazon.com, see above, p. 4.

The global approach of the Internet makes it easier to match supply and demand for products with a thin market. It also increases the market size for these products. Collectors often travel far distances to meet at a fair where they typically auction their collectibles. Auctions become increasingly successful on the Internet (Case II). Generally, auctions are used for items with unknown value or high volatility in demand and supply. The stock exchanges work as auctions trading stocks with volatile willingness to pay and volatile willingness to supply. The flower auctions in the Netherlands are well known and infamous for its speculative bubble when in the 17th century, prices in tulip bulbs first exploded and then burst. Precious antiques have been traded at auctions for a long time creating famous auction houses like Sotheby's. Telephone and mail bidding is common at some auction houses but most auctions have been based on the presence of the bidders. This implies high transaction costs as potential bidders have to travel to the sight of the auction. The Internet provides a cheaper medium for auctions. Items can be assessed beforehand and bidding is independent of the physical location of the bidders. There are indisputably increasing returns in market size and scope and network effects in the auction market. The more buyers frequent a Web site the more bids any seller will get. The more sellers offer their products on a particular Web auction the more value is it to buyers who have a preference for variety. The larger the market the lower will be the price volatility. Additionally, it is more convenient to adapt to one user interface and providing the necessary personal information only once. This could lead to a market concentration, but the market dominance of the biggest online auction could easily be overcome by the introduction of new intermediaries. Bidder's Edge (www.biddersedge.com) already offers a meta search over different auctions. The meta search engine could be even more helpful if it stored the users' personal and financial information. Then buyers

would only need to register with the meta search engine and not every single auction site.

Case Study II: eBay (www.ebay.com)

eBay was founded in 1995, pioneering online person-to-person trading. On eBay's Web site sellers and buyers are brought together to bid on items such as antiques, coins, collectibles, computers memorabilia, stamps and toys.¹⁰ The company only provides the platform on which 2.1 million registered users bid in 13.6 million auctions during the last quarter of 1998. Whereas the service is free to buyers, sellers pay a nominal placement fee ranging from \$0,23 to \$2,0 and an additional success fee that steps down from 5% to 1,25% of the transaction value.

In 1998, eBay generated an operating revenue of \$47,352 million.¹¹ The net income was \$2,398 million. The annual growth rate in terms of operating revenue was 824 percent. Net income grew at a slower pace, at 274 percent. Still, eBay is remarkable for its business performance as it is one of a few e-commerce companies that actually generate profits with their business model.

eBay's competitors include similar person to person services like Amazon Auction, DealDeal and WebAuction. Business-to-consumer online auction services such as Onsale, First Auction, Surplus Auction and uBid. Global portals like Yahoo! and Excite, local niche services and traditional auction services like Sotheby's are also expanding into online auctions. So far, eBay is the largest online auction service in the world.

In economic terms, cheating and fraud are the major challenges of an online auction. Both, buyer and seller do not know each other and have only a communication by electronic means. Hit and run is possible. The buyer might take the purchased item but not pay the agreed amount, the seller might not deliver the promised item or the promised quality. eBay tries to overcome these imminent problems by introducing a setting with repeated games. Sellers build up a record of historic transactions. Buyers can post their ratings of their

¹⁰ eBay Inc., Form 10-K, Item 1: Business, for the fiscal year ending 12/31/1998, submitted to U.S. Securities and Exchange Commission (www.sec.gov), p. 1.

¹¹ eBay Inc., see above.

business relation with the seller on the Web site. Buyers and sellers can present themselves on homepages linked to the auction's Web site. These measures help building up a reputation that makes hit and run strategies inferior. At the same time it increases the value of the auction site to buyers. But meta search engines could overcome this increasing returns effect. The consumers who post comments would probably prefer to reach the widest audience possible. This is on the meta search engine and not on the particular auction.

A last category of products that benefits from the advent of the Internet is the category of all products with a potential for privacy. Adult material or certain pharmaceuticals that might be embarrassing to purchase from the pharmacy next door benefit from the anonymity of the Internet. Adult material already pioneered electronic commerce on Minitel and BTX in Europe. On the Internet, words with a relation to sex are the most widely used keywords in all search engines (www.searchterms.com). The market for adult entertainment on the Internet can hardly be assessed. There are numerous new commercial Web sites. Two brands in adult entertainment that could diversify into e-Commerce are Playboy and Penthouse. According to estimated information from Media Metrix, approximately 1.2 million unique visitors accessed Playboy.com in December 1998.¹² In 1998, Playboy had revenues of 7.1 million in online sales or 2,3% of total revenues. Revenues increased by a factor of 2.5 over the preceding year. Still, the revenue does not correlate with profits. Playboy reports a net operational loss of \$6.5 million on its electronic business unit.¹³ At

¹² Playboy Enterprises Inc., Form 10-K, Item 1: Business, for the fiscal year ending 12/31/1998, submitted to U.S. Securities and Exchange Commission (www.sec.gov).

¹³ Playboy Enterprises Inc., see above, p. 17.

Penthouse, net revenues from the Internet for 1998 were \$11.9 million, about 10% of the total net revenues of \$114.6 million. Its net revenue from Internet related business increased by a factor of more than 2.5 over the previous year.¹⁴

Business to Business vs. Business to Consumers

The seemingly distanceless world of electronic commerce on the Internet is prone to defection. The risk of defection is smaller for repeated transactions. Also, the risk of a failure of the initial trading is relatively small and both parties engage more voluntarily in a trade. The advantage of repeated purchases holds for many goods. A customer at Amazon.com will probably start with an initial purchase and only continue if this purchase is satisfactory. Repeated purchases increase the utility of electronic commerce. Transactions are less defection prone and can be automated. It is to be expected that business to business commerce implies more repeated purchases than business to consumers. Already in the traditional world, businesses trade many goods on the phone. Transferring these transactions to the Internet makes transactions safer, more reliable and more efficient. The OECD estimates that about 80 percent of e-commerce is actually business to business commerce. (OECD 1998: 36). This business to business commerce was estimated at \$8 billion in 1997. Electronic commerce on private value added networks added another \$150 billion (Margherio et al. 1998: A3-1). These private value added networks were developed over the last decade and are usually referred to as Electronic Data Interchange (EDI). Mostly, a large company took the initiative and linked surrounding companies in the value chain in a network with proprietary

¹⁴ General Media Inc., Form 10-K, Item 1: Business, for the fiscal year ending 12/31/1998, submitted to U.S. Securities and Exchange Commission (www.sec.gov), p. 9.

standards. For the joining parties this often meant bearing specific investment costs. Often, they could not afford to join different EDI networks tying them closer to the nucleus company. The Internet with its open standards and nonproprietary technology opens up the EDI networks and links the different proprietary islands.

Still, large companies or government agencies with much at stake in procurement stand at the center of the business to business commerce. The United States government probably is the largest player in procurement. It tries hard to increase its procurement over electronic networks.

Boeing is a renowned example of business to business e-commerce and its benefit for supply chain integration. The company established a Electronic Data Interchange (EDI) network with all of the 300 key suppliers and 10 percent of the customers (Margherio et. al. 1998: A3–17). The network is still proprietary but will probably switch to the Internet over time. When the company developed its 777 aircraft, it relied entirely on Computer Aided Design (CAD). In addition, the company highly integrated with its supply chain. This ensured that every piece of equipment from suppliers fitted into the aircraft (*The Economist* 1998).

General Motors procures information technology (IT) worth approximately \$4 billion a year. GM brought its procurement of IT to the Internet. GM opened this procurement system to other other suppliers and buyers. The Web site (www.tpn.geis.com) allows vendors to place customized product catalogs. It then manages bids from suppliers around the world.

General Electric (GE) introduced an online procurement system (TPN) in 1995. Labor costs in procurement declined by 30 percent. Time consumption was reduced to one third of the initial time. In 1997, the company bought \$1 billion

worth of goods and supplies over the Internet. By the year 2000, GE aims to have all business units purchasing their nonproduction and maintenance, repair and operations materials worth \$5 billion via the Internet. GE estimates the savings due to the online procurement at \$500–\$700 million annually (Margherio et al. 1998: A3–27). GE opened up this Web site to other suppliers and buyers establishing a virtual market place for business to business commerce. Both fill out forms on the Web site (www.businessgateway.com) detailing their offers or requests. The software than matches the two and notifies the related parties in the case of a match.

Many marketplaces dedicated at specific industries are mushrooming on the Internet. About 300 Internet-based marketplaces have been launched to date (Berst 1999). PaperExchange.com is one of them. It tries to establish a global market place and community for the paper industry. On PaperExchange.com businesses can offer their products and buyers can bid for these. In addition, many marketplaces offer industry specific news, billboards, statistics or job fairs.

Several companies offer software for business to business commerce that are intended at integrating the supply chain. Netscape developed CommerceXpert, a software package that automates almost every facet of a business's purchasing and supply. SAP is a leading developer and supplier of integrated business application software. The major product, SAP R/3, enables companies to integrate enterprise-wide processing of business workflows and gives in real-time data at the management's hands. Once the data model of a company is established, the logical next step is to link the companies along the value added chain. This integration is the easier the more companies already use the SAP R/3 software. With over 10,000 customers and 10 million users, SAP can create

a giant electronic business community. SAP tries the vertical linkage with its business-to-business procurement solutions, Mysap.com. Through the tight integration with SAP R/3, customers always have the latest information on pricing and availability. Orders can be processed throughout the organization speeding up the time to delivery.

Future Economic Challenges

If one uses the stock market as an indication, the Internet seems to provide the business model for the future (Table 2). Share prices of all companies that are in any way related to the Internet soared. Naming companies with an "E" for Electronic or ".COM", the suffix of commercial Internet addresses, promised a warm reception of every initial public offering at the stock market. Companies with virtually no physical capital overtook classic brick and mortar businesses

Table 2: Market Capitalization of Major E-Commerce Sites Compared to the Real World (in Billion \$US)

Net World	Market Cap	Real World	Market Cap
America Online	149.8	Pfizer	149,8
Yahoo!	34.5	Allied Signal	34.7
eBay	24.0	JP Morgan	24.3
Amazon.com	23.0	Alcoa	23.0
Priceline.com	17.9	FedEx	17.7
@Home	16.8	Lockheed Martin	16.9
E*Trade	12.9	American Airlines	13.5
Excite	8.4	Mattel	8.0

Source: Fox (1999).

in terms of market capitalization. This boom created many new billionaires like Michael Dell, 34 years old and owning \$13.92 billion in Dell's stock or Jeff Bezos, 35 years old and owning \$12.35 billion in Amazon.com's stock (Colvin 1999: 107).

There is still no sign whether this boom is sustainable. The market for Internet stocks is highly volatile and only small volumes of stock are traded. Most importantly, no one can tell if investment in Internet business will ever pay off. Too many of Internet companies features could be copied by other companies. Network effects could be exploited by other companies and contestability could drive margins down. This section tries to assess these future challenges.

Battle over Leverage of Real World and Electronic Business

In the United States, e-commerce has a tax advantage over most brick and mortar stores. A few states like Delaware, Montana, New Hampshire and Oregon have no state sales tax. Many online retailers enlisted in these states as did direct retailers before. Because of the state based tax system, the retailer is not required to deduct any state sales tax for consumers in other states. Theoretically, the consumer should deduct the state sales tax in his state, but this rule is not enforced. This adds up to a cost advantage of up to 8 percent for consumers living in California or New York city. Goolsbee (1998) estimates that e-commerce spending would decrease by 30 percent once the deduction of sales taxes would be enforced. The effective tax subsidy hinders classic brick and mortar stores to establish an Internet outlet. Barnes & Noble for example, created an independent company, registered in Delaware.¹⁵ In its stores, Barnes

¹⁵ barnesandnoble.com, Form S-1/A, Item 1: Business, for period ending 3/18/1999, submitted to U.S. Securities and Exchange Commission (www.sec.gov), p. 2.

& Noble does not give any hint on its Internet retailing. If they did the company would have to charge the sales tax for every sale to any customer in a state where Barnes & Noble had a brick and mortar store.

Without competition from new e-commerce sites most traditional businesses are reluctant to establish an e-business as this could cannibalize their own market. Barnes & Noble created its online business only after Amazon.com took away market share. This holds also for online brokerage market where Stanley Morgan Dean Witter only established an online brokerage after the newcomers were very successful in this market.

Successful examples of companies that leverage their brick and mortar presence into the Internet are banks with homebanking. Homebanking is so convenient regarding banks' opening hours, especially for high income workers with less time to go to banks. There, having an online presence improves the standing with clients. Additionally, the cost saving on the side of the banks is so strong that they are willing to leverage into electronic banking.

Increasing presence of e-commerce will force even more classic brick and mortar business into the Internet. General Motors for example established an e-commerce site, GMBuyPower.com, that essentially reduces dealers to distribution points. GMs efforts follow the success of auto-by-tel.com and carpoint.msn.com. Both companies select offers from brick and mortar car sellers to consumers' specifications bringing transparency to a market that, especially in the U.S., was formerly known for its secretiveness.

Battle over Eyeballs: How to attract customers to one's offer

The Internet lowers the cost of setting up a business on the Web significantly. But buyers still have to beat their path to the offer. The more attractions the

Internet offers the less likely are buyers to find their way to a particular offer. The best offer does not succeed if consumers are not attracted to the site. For example, music can easily be offered on the Web but musicians still have to become known to their audience. This will raise demand for intermediaries that attract consumers to particularly useful Web sites. Search engines like Yahoo! or Excite do this job and therefore have become darlings of the stock market. Typically, search engines index Web pages. This technology has its drawbacks. First, the vast amount of data on the Internet can only be partially indexed. Second, it is hard to assess the importance of a particular Web site automatically. The next generation of search engines, like Google! and AllTheWeb.com, hopes to overcome both drawbacks. Scalable computer power will allow to index ever more pages on the Internet. The importance of pages can be assessed automatically by recording the number of pages referring to the page in question and by recording the number of people going from the search page to different pages that contain the indexed word or phrase.

E-Commerce sites can attract audiences by advertising on search engines or by other sites showing links to the e-commerce site. Advertising on search engines is the major source of income for all search engines. Some of them offer paying customers a premium presentation. InsWeb, the online insurance market, received approximately 21 percent of its Web site traffic from its online partnership with Yahoo!.¹⁶ Showing links to e-commerce sites also becomes popular and generates revenue for the referring Web site. Typically, the e-commerce site would share a certain percentage of a purchase with the Web site

¹⁶ InsWeb Corp., Form S-1, Item 1: Business, for the period ending 5/7/1999, submitted to U.S. Securities and Exchange Commission (www.sec.gov).

that presented the reference. Amazon.com offers an associate program. Under the associates program, Amazon.com pays for linking to its e-commerce site. Participating Web sites get up to 15 percent of the generated revenues. In a similar program, Barnesandnoble.com offers 7 percent commission to Web sites that hold a link to Barnesandnoble.com.

Once consumers have been lured to a Web site, the difficult task is how keep consumers at the Web site and how to induce them to come back repeatedly. Building a community around a Web site and establishing a brand name could be successful strategies in this sense. Amazon is very active in both. Consumers are invited to share their comments on books with other consumers. Amazon also invests a large share of its revenue in marketing to increase the value of its name. These efforts seem to bear fruit as Amazon is now one of the more expensive bookshops on the Internet but still holds a strong market share. Additionally, companies will want to attract consumers to repeatedly visit by offering coupons, lotteries or additional information on the Web site.

Battle over Interfaces

Every e-commerce site needs a user interface, the interface between its databases and the consumer. The online community is still struggling over the right interface. This is an obvious analogy to the software industry. Since the advent of personal computers, software companies have been trying to outcompete each other by creating a better user interface. The competition between Apple Macintoshes and IBM compatible PCs was partly a competition over graphical versus text based user interfaces. On IBM-compatible PCs, a newcomer could often overcome the market leader because of a new superior user interface. In word-processing for example, over a ten-year period, WordStar with its key oriented user interface was overtaken by WordPerfect

and its menu driven user interface. Then, Microsoft Word for Windows overtook WordPerfect with its Windows-based design. Once a company established its user interface in one market segment of the PC software industry, it tried to leverage this market power into other segments. This gave consumers the same user interface for several software applications. For a long time these attempts did not succeed because user interfaces were highly specific to the first application they were designed for. Only the advent of IBM's SAA interface and Microsoft Windows enabled more general user interfaces that could be used for several applications. In another effort, many companies copied the user interface or Look and Feel of the market leader to ease switching to their product.

The easy to use browsers are the interface that made the World Wide Web so successful and turned the Internet into a mass market. In e-commerce the user interfaces are still very different between e-commerce sites. For example, searching for cheap airline tickets over the Internet can be painful as every electronic travel agency has its own interface and every site has an advantage in one field but falls back in another. This creates switching costs between Web site but also increases incentives to use different Web sites for different tasks. Overall, user satisfaction in online travel shopping remains low. In an analogy to the software industry it can be expected that successful interfaces will be used over several product categories. Buying books, videos, CDs and software offers at Amazon.com provides a one-stop shopping experience with an easy to use interface for all four categories. Still, the competitive edge will not last long. The Look and Feel of e-commerce sites can easily be copied as was the Look and Feel of computer software before.

Battle over Value Added

In the new electronic world goods and their prices become instantaneously comparable. The competitor's Web site is only one mouse click away. The shopping search is also facilitated by new Internet specific technologies. compare.net and other Web sites compare goods for their attributes. Web sites like DealPilot (Case Study III) or Amazon's Junglee compare prices at different locations. For every e-commerce site this raises the question how they can generate a value added that distinguishes them from their competitors and gives them a competitive edge over these.

Offering additional services, like greeting cards on Amazon.com or chat rooms on eBay.com, can be expensive. Building up a base of loyal consumers who do part of the work seems very promising. Some companies already try to build up a community around their Web site and generate a network effect. eBay created chat rooms where consumers can meet to exchange written notes. Publishing consumers' commentaries gives Amazon.com an edge over its competitors. The more consumers comment on a book at Amazon.com's Web site, the more value it offers. The problem is that consumers could easily use Amazon.com's information and shop at another store or compare prices with the new shopbots, like DealPilot or Junglee. Other companies could also try to copy the commentaries from a successful Web site to theirs. This seems to be a common practice in job résumé databases (Useem 1999). If no monetary incentives are involved, consumers will prefer to publish their commentaries to the widest audience possible. They probably reach the widest audience at the shopbots. If companies like Amazon.com do not start to give monetary incentives to contribute commentaries the commentators will prefer to publish their comments on the shopbots.

Case Study III: DealPilot (www.DealPilot.com)

DealPilot was founded in 1997 by two students in Germany. Since late 1998 Bertelsmann Ventures, a subsidiary of Bertelsmann AG, provides venture capital to the company. DealPilot is part of a new generation of shopbots, automatic software agents on the Internet. The company signed contracts with several Internet shops like Amazon.com that allow DealPilot to scan their databases for prices on particular items. On DealPilot' Web site, consumers search for items like books videos or CDs. Different Internet shops' offers for this item are presented in a table on DealPilot' Web site, sorted by the total purchase price. Consumers can then directly choose an offer from this table and order the item. The shopbots provide a transparency never witnessed before. With one mouse click a consumer visits several Internet shops seemlessly and can compare their prices easily.

At the beginning, the company concentrated on books but in 1999 expanded into music CDs and movie videos. DealPilot' shopbot is free to consumers. Revenue is generated by advertisement banners on the Web site and by electronic commerce sites' commissions once a transaction takes place. Obviously, the commissions are a weak point. Instead of buying from DealPilot' Web sites consumers could enter the Web site of their preferred supplier and order the item directly. DealPilot would be unable to monitor this transaction and claim any provision for this transaction. Therefore purchasing from Acces's Web site must be as easy and convenient as possible. The company has contracts with 40 bookshops, 10 CD shops and 10 video shops. The Web site generated 100.000 unique host visits in February 1999, 80 percent of which come from the United States. In 1999, the number of unique host visits increased at a rate of 25 percent per month. There is no public data on the company's financial status available yet.

DealPilot main competitors in terms of technology are AddAll, BestBookBuys, BookFinder, Bottomdollar and Junglee. Amazon.com recently acquired Junglee. This shopbot's technology is now used on Amazon's main Web page. Additionally, the technology is licensed to other Web entrepreneurs. Sidewalk, a US town magazine by Microsoft, compares prices at local stores and lists the prices on a Web site with a strongly local connection. Portals like Yahoo! Lycos and Hotbot also offer price comparision.

Battle over Data: How to generate profits from proprietary data

Every Internet user's browsing through the Web can easily be tracked: Every Web server protocols automatically the IP address or domain of a visitor, the time of the visit and the link the user follows to. The Web site can also generate a file, called cookie, with personalized information that is left on the user's hard disk. Cookies can be read by anybody who knows their file name and what kind of information they contain. The cookies and the Web servers' protocol allow

sites to track how often any user returns. Typically, a user has to link to the Internet through an Internet Service Provider (ISP). The ISP with the largest market share on a worldwide basis is AOL. The ISP is able to log what each user does on the Internet. All the logging produces a wealth of information that can be used for one-to-one marketing. Thanks to the generated data, when a consumer looks for a book on Amazon.com the Web site names other books consumers have bought in addition to the one this consumer is considering right now. Amazon.com also gives suggestion that match previous purchases. Some music stores on the Internet try to gather information on their consumers to match their preferences with new CDs on sale. It is also possible to compare consumers and to suggest items that were bought by consumers with a similar profile. The possibility of giving suggestions based on consumers' profiles is not restricted to a category of items. E-commerce sites with multiple categories of products could suggest goods that are somehow related to a consumer's first purchase. A consumer who books a flight could get offers on guide books or the right outfit for his destination. There are virtually no limits to this matchmaking process.

The closer to the consumer the data tracking gets the easier it is. Being a bottleneck through which a consumer has to go repetitively provides the best opportunity for data gathering. This creates an advantage for the ISPs as they can log every single virtual step their clients do on the Internet but also for the companies that provide the credit cards or electronic cash. Instead of the e-commerce sites integrating all kind of items as observable at Amazon.com, the ISP or the payment provider would log a consumer's purchases and provide additional suggestions or sell data on the consumer's purchasing behavior to companies that want to sell their products.

So far, no ISP seems to use their data to track consumers' purchases on the Internet. But some intermediaries have discovered the opportunities of tracking the purchases of consumers. Lumeria (www.lumeria) collects data consumer voluntarily give to the company. With the help of this data the company can then target consumers more effectively. The Auto-by-tel.com Mabalist Rewards Program (<http://www.mobalist.com>) allows purchasers to earn their way towards their next car through everyday purchases using the Autobytel.com Web site or the Mabalist Visa. First USA issued a Platinum Visa credit card that offers a 5 percent cash back for all purchases made from select online merchants. The financial sector also tries to leverage its knowledge and comparative advantage into business to business e-commerce. MasterCard recently announced plans to develop an Internet based payment system suited for business to business e-commerce (Cone 1999).

Battle over Prices: Increasing Price Differentiation

In the real world every price change entails menu cost. Additionally, prices are usually quoted publicly and therefore reach a wide audience. Internet technology reduces menu cost and allows more price differentiation. The decreased menu cost are evident in e-commerce. Bailey (1998: 9) found prices in Internet stores changing twice as often as in classic stores. Many Web sites have country specific Web sites with different prices. The computer online retailer Dell maintains 44 country specific Web sites.¹⁷ Additionally to its Web site in the U.S., Amazon.com has country specific Web sites in the United Kingdom and for German speaking consumers. Consumer specific tracking data

¹⁷ Dell Computer Corp., Form 10-K, Item 1: Business, for the fiscal year ending 1/29/1999, submitted to U.S. Securities and Exchange Commission (www.sec.gov).

together with knowledge on personal information like age or income will allow a more accurate price differentiation by geographic location, buying history and financial status. It could also lead to an increasing importance of auctions that allow more accurately to determine equilibrium prices.

Another attempt to get closer to consumers' willingness to pay is Priceline.com. This company holds a patent on a purchasing system where buyers post their willingness to pay. Companies then try to match these prices. The company already covers as diverse products as airline tickets, new cars, home mortgages, home refinancing and home equity loans. In May 1999, the company sold 6000 air tickets per day.

Conclusion and Outlook

The Internet and especially electronic commerce are still in their infancy. New ways of doing business on the Web are still being discovered. The Internet is an open system, and so probably will be e-commerce. Most likely there will be more than one site for any item. This will develop into a variety of e-commerce offers in every category. Airlines, specialized agencies, databases and meta search engines will compete for customers to shop for airline tickets. The databases will probably be accessed by different user interfaces that are tailored to heterogeneous preferences. The same most likely will happen in the book industry. Press companies will offer books on their sites, online stores like Amazon.com or barnesandnoble.com will provide databases over several press companies and shopbots will compare prices over different suppliers. The shopbots will be pure software companies without many physical assets or any distribution system. This open system with competition between different layers of the formerly closed system might increase competition. It could also end the

gold rush for some companies. But new companies or companies that move on will find new business opportunities.

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