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LETTER FROM THE EDITORS

Welcome to the *Journal of Strategic E-Commerce.* We are extremely pleased to be able to present what we intend to become a primary vehicle for communication of e-commerce issues throughout the world.

The Allied Academies is a non-profit association of scholars and practitioners in entrepreneurship whose purpose is to encourage and support the advancement of knowledge, understanding and teaching of e-commerce throughout the world. The *Journal of Strategic E-Commerce* is a principal vehicle for achieving the objectives of the organization. The editorial mission of this journal is to publish empirical and theoretical manuscripts which advance the e-commerce initiatives. To learn more about the Academy, its affiliates, and upcoming conferences, please check our website: www.alliedacademies.org. We look forward to having you share your work with us.

David Wyld
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ARTICLES for Volume 2, Number 1

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B2B E-COMMERCE AND SMALL BUSINESS EXPORTERS

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ABSTRACT

This paper focuses on B2B e-commerce use by small business exporters. When a firm purchases products from or sells its products to other businesses over the Internet, it engages in B2B e-commerce. The purpose of this empirical study is to examine the following small business Internet B2B topics: factors motivating Internet use, strategies, and performance. To obtain information for the study, a sample of Idaho small business exporters was selected. Two key study results were observed. First, it appears that high levels of both collaborative pressure from business partners as well as perceived benefits of B2B e-commerce can be linked with high satisfaction of B2B performance. Second, it appears that high degrees of importance in B2B partnering with other domestic (but not foreign) businesses can also be linked with high satisfaction of B2B performance.

INTRODUCTION

E-commerce is a topic of high interest today. Businesses, both large and small, began exploring the Internet's potential in the early 1990s after the first commercial provider of Internet dial-up access was launched. Prior to this date, advances in information technology (IT) focused mainly on improving the efficiency of individuals and operating departments "inside" a firm. Since the 1990s, IT has centered on building bridges between an

enterprise and key "outside" elements--i.e., between a business and other businesses with which it conducts activities (B2B), and between a business and its end users or consumers (B2C).

At the present time, much of what is written about e-commerce or commercial activity over the Internet is in the popular press--e.g., Wall Street Journal, Business Week, Computerworld, Ecommerce Times, etc. However, more and more texts are being written. In addition, research studies are increasingly being conducted and published to help guide businesses as they explore Internet options. In the B2B e-commerce area, research has sharpened the focus on strategies (Cunningham, 2001; Haig, 2001; Iyer, G.R., 2002) and, in some cases, has tied strategies to performance (Connell, 2000; Subramaniam & Shaw, 2002). Other B2B studies have examined technical complexities that may affect both strategies and performance (Easton & Araujo, 2003; Hubbard, 2001; Kauffman, 2002).

The aim of this study is to help fill the gap in B2B scholarly studies. More specifically, the paper focuses on small businesses exporters that recently began B2B e-commerce activities. The study's purpose is to examine for these firms the following B2B topics: motivation or trigger factors, strategies, and performance. Hopefully, what is learned from these firms' experiences will be useful for other small exporters who are contemplating what B2B e-commerce actions they can/should take.

Background information on e-commerce and B2B e-commerce, including a discussion of the motivation and strategy topics, is covered next. Sections on methodology, results and discussion, and the conclusion follow.

BACKGROUND

Some people associate e-commerce with Amazon.com. As such, their definition of e-commerce is the exchange of retail goods and services for payment over the Internet. But this view overlooks businesses working with other businesses. In its broadest sense, electronic commerce encompasses any commercial activity that takes place directly between a business, its

partners (e.g., suppliers, distributors), or its customers through a combination of computing and communications technologies (Trepper, 2000).

According to Focazio (2001), there are four core e-commerce interactive communications channels for a company:

Business to Business (B2B). The working relationship a company has with suppliers, vendors, business partners, and others. This is a trusted relationship and frequently involves the transfer of products between businesses. Often, these channels are closed and protected. In the interactive space, the channels are typically enabled through extranet projects.

Business to Consumer (B2C). The public interface a company has with the consumer or end user. It includes marketing, advertising, service before and after the sale, and the sales channel. In the interactive space, these channels are typically public Web sites and e-mail.

Consumer to Business (C2B). A relationship made practical by large-scale interactive technologies. In this situation consumers become potential customers through proactive means or as a result of a compensated relationship facilitated by a third party. An example of this channel would be the request from a consumer to a business facilitated by Priceline.com.

Consumer to Consumer (C2C). As with the C2B communications channel, C2C is made practical by large-scale interactive technologies. One such approach is where consumers directly influence other consumers' decisions via one-to-one communications such as e-mail and instant messaging. Another C2C approach is where a third-party organization leverages interactive communications technologies that enable a large number of people with similar likes or needs to communicate. An example of a C2C e-commerce business is eBay.

Of the four communication channels, those involving consumers-i.e., B2C, C2B and C2C--are the most visible and familiar. This does not mean, however, that B2B e-commerce is less important. Consider the following evidence. Gartner research group forecasts that global B2B e-commerce sales will grow from USD 1.93 trillion in 2002 to USD 8.53 trillion in 2005. Further, a Gartner spokesman stated: "B2B has already outperformed initial expectations and will continue to far surpass B2C e-commerce transactions" (Clark, 2002).

Included under B2B e-commerce is a broad spectrum of activities. Two sub-groups of the spectrum are operating resource activities and supply chain activities. Operating resources are the goods and services required to operate a company. Included here are procuring computers, office supplies and travel as well as maintaining and repairing buildings and equipment. These activities are all part of running a business. Managing these operating resources is both costly and time consuming.

A supply chain is the business process used to produce and deliver goods and services. A product supply chain could include: raw material providers, part providers, manufacturers (assemblers), distributors, retailers, and consumers. These entities must work together in a coordinated fashion in order to deliver a product. Each product that is delivered must pass through its supply chain entities and be acted on in some fashion. Managing these activities can be a challenge for a business. Firms with international partners may find the B2B communication channel helpful in reducing communication problems with its operating resource partners and its supply chain partners.

What motivates a firm's leaders to engage in B2B e-commerce activities? Iacovou, Benbasat and Dexter (1995) suggest there are two factors that can motivate/impact Internet use: external pressures and perceived benefits. Examples of external pressures are use of the Internet by competitors and customer demands; examples of perceived benefits are increased productivity and reduced costs.

Competitive pressures can be a strong motivator. In a competitive market, a firm's leaders will often be incited to imitate its rivals because staying current with industry best practices can be associated with successful performance. One example of imitating (or copying) is benchmarking, a technique associated with the total quality management movement. Benchmarking means identifying a rival who is best at something and then duplicating the activity (Daft, 1998).

The perceived benefits associated with using a new idea/innovation can also be a strong motivator for a firm's leaders. Adopting an innovation that has the potential to increase productivity and reduce costs can help a firm create a competitive advantage over its rivals.

Motivation is an important topic because it has been linked to a firm's performance. More specifically, previous studies have suggested a positive relationship exists between the motivation of a small firm's leaders and the firm's performance (Olson, 1986; Olson & Bosserman, 1984). Based on these arguments, one proposition in this study is: B2B e-commerce exporting firms with leaders who have a high motivation to use this technology (i.e., those with either high levels of external pressures or perceived benefits or both), versus those with leaders who have a low motivation, will generally report higher levels of satisfaction with their B2B performance.

Turn next to B2B e-commerce strategies an exporting firm can pursue with its domestic and international partners. Some firms may develop B2B Internet connections with their "domestic" operating resource or supply chain partners. Other companies could generate B2B connections with their "foreign" operating resource or supply chain partners. Even other firms could develop B2B connections with both their domestic and foreign partners. It would appear that an Internet communication channel would be particularly attractive between an exporting firm and its international partners because it can help overcome some of the distance barriers separating the companies.

Given these strategies, a second proposition in this study is: B2B e-commerce exporting firms which attach high degrees of strategic importance to B2B links with their business partners, versus those which attach low degrees of importance, will generally report higher levels of satisfaction with their B2B performance. This proposition is based on Covey, Merrill and Merrill's (1994) research. Their position is that a firm's important activities are those linked to the firm's goals; hence, important activities are those that receive the highest levels of attention and resources. One goal of a firm, in turn, is to achieve high performance. Hence, the link between importance and performance, and the argument that firms which attach more important to their B2B strategies will generally report higher satisfaction levels with their B2B performance.

METHODOLOGY

To obtain information for this study, firms were selected from the Idaho International Trade Directory, 1999-2000. The directory lists Idaho manufacturers, distributors, retailers and service firms which sell both domestically and internationally. Further, to meet study requirements only firms with less than 100 employees and those with at least one year B2B e-commerce experience were chosen.

Information about each business was gathered through a phone interview with the CEO or other knowledgeable person. Forty firms were surveyed of which 22 were mainly manufacturers and 18 were mainly other businesses (e.g., distributors, retailers and service firms).

The 40 interviewees were asked the following questions:

1. What motivated your firm's leader to implement B2B e-commerce activities? (Please respond to the following three reasons using 1 for strongly agree, 2 for agree, 3 for neutral, 4 for disagree, and 5 for strongly disagree).

    1 (a). Your rivals were using B2B e-commerce activities?
    1 (b). Your business partners (e.g., suppliers, distributors, retailers) requested that you use the B2B electronic communication channel?
    1 (c). You perceived B2B e-commerce benefits to outweigh the costs?

2. How important for your firm are the following B2B e-commerce strategies (or ways your firm uses this technology)? (Please respond to the following two strategies using 1 for important, 2 for somewhat important, 3 for neutral, 4 for somewhat not important, and 5 for not important).

    2 (a). Partnering with other "domestic" businesses with whom you work (either operating resource or supply chain partners)?

2 (b). Partnering with other "foreign" businesses with whom you work (either operating resource or supply chain partners)?

3. What is your attitude towards, or degree of satisfaction with, your firm's B2B e-commerce performance? (Use the following scale: 1 for exceedingly above expectations, 2 for somewhat above expectations, 3 for meeting expectations, 4 for somewhat below expectations, and 5 for exceedingly below expectations.)

RESULTS AND DISCUSSION

Results concerning the first motivation-performance relationship are presented in Table 1. More specifically, it focuses on the degree to which rivals incited or "pushed" firms into B2B e-commerce. Using a clustering procedure, the 40 observations of the index were grouped into two categories, those with lower versus higher values. A non-parametric procedure, the Mann-Whitney U test, was utilized to test the relationship. The statistics in Table 1 reveal that there is no significant (.238) difference in satisfaction with B2B performance between the group of exporting firms most motivated to compete with, and imitate, their rivals in B2B e-commerce, versus those firms with lower motivation. This result can be interpreted to mean that pressure from rivals to engage in B2B e-commerce does not appear to impact an exporting firm's satisfaction with its B2B performance.

Table 2 contains information on another motivation-performance relationship. The specific motivation issue is the degree to which a firm's business partners requested that it use B2B e-commerce. Using the same clustering procedure and statistical test, results in Table 2 indicate that the group of firms most motivated to respond to their business partners requests were also significantly (.034) more satisfied with their performance. A high degree of pressure (or push) from an exporting firm's business partners, then, appears to impact the firm's satisfaction with its B2B performance. Note that pressure from a business partner when compared to a rival is a different type

of force for a firm. The former is "collaborative" while the latter is "competitive."

Table 1: B2B E-Commerce Motivation (Measured by Degree to Which Rivals Pushed a Firm) and Performance Satisfaction Results

Motivation	Performance Mean Rank*	n
Stronger levels (indicated by lower scores)	18.11	27
Weaker levels (indicated by higher scores)	22.91	11
U = 111.00		
significance = .238		
*Lower values indicate higher performance satisfaction		

Table 2: B2B E-Commerce Motivation (Measured by Degree to Which Business Partners Requested Firm to Participate) and Performance Satisfaction Results

Motivation	Performance Mean Rank*	n
Stronger levels (indicated by lower scores)	14.65	23
Weaker levels (indicated by higher scores)	22.40	10
U = 61.00		
significance = .034		
*Lower values indicate higher performance satisfaction		

Table 3 contains information on the third motivation-performance relationship. The motivation question covered here concerns the degree to which a firm perceived B2B e-commerce benefits to outweigh the costs. Again, using the prior clustering procedure and statistical test, results in Table 3 indicate a significant (.038) relationship. In this case, exporting firms that perceived, to a high degree, B2B benefits to outweigh the costs also were more satisfied with their B2B performance. To summarize motivation issues, it appears that high levels of both collaborative pressure from business partners as well as perceived benefits of B2B e-commerce can be linked with high satisfaction of B2B performance.

Table 3: B2B E-Commerce Motivation (Measured by Degree to Which a Firm perceived B2B Benefits to Outweigh the Cost) and Performance Satisfaction Results

Motivation	Performance Mean Rank*	n
Stronger levels (indicated by lower scores)	16.80	25
Weaker levels (indicated by higher scores)	24.69	13
U = 95.00		
significance = .038		
*Lower values indicate higher performance satisfaction		

Table 4 displays the first strategy-performance relationship. The particular strategy covered here is the importance of B2B partnering with other "domestic" businesses with whom a firm works. After the clustering procedure, the Mann-Whitney U test reveals an significant (.003) difference. In other words, firms that perceived high degrees of importance in B2B partnering with other domestic businesses, versus those holding lower

degrees of importance in B2B partnering, also were more satisfied with their B2B performance.

Table 4: B2B E-Commerce Strategy (Partnering With Othe Domestic Businesses With Whom You Work) and Performance Satisfaction Results

Strategy Importance	Performance Mean Rank*	n
Higher levels (indicated by lower scores)	12.58	18
Lower levels (indicated by higher scores)	22.30	15
U = 55.50		
significance = .003		
*Lower values indicate higher performance satisfaction		

The second strategy-performance relationship, that of the importance of B2B partnering with other "foreign" businesses and its linkage to performance satisfaction, is examined in Table 5. The test result was not significant (.064). Hence, no difference in satisfaction with B2B performance was found between firms that perceived high degrees of importance in B2B partnering with other foreign businesses versus and those that perceived low degrees of importance in B2B partnering.

Originally it was thought that firms reporting high importance or interest in B2B partnering with foreign businesses would be those reporting high B2B performance satisfaction, because B2B transactions can help reduce communication costs. Different reasons can be used to argue why this result did not occur. First, some firms had limited experiences with B2B e-commerce, only one year. Hence, they might not have been able to observe positive B2B performance outcomes yet. In addition, to further analyze the

foreign partner and performance relationship (in a post hoc sense), it was thought that manufacturing firms using B2B e-commerce might have responded differently than other firms (e.g., retail and service firms). To examine this position, the sample was split into two sets, manufacturing versus other firms. Interestingly, a significant relationship was found for manufacturing firms. Hence, future research should be directed in this area.

Table 5: B2B E-Commerce Strategy (Partnering With Other Foreign Businesses With Whom You Work) and Performance Satisfaction Results

Strategy Importance	Performance Mean Rank*	n
Higher levels (indicated by lower scores)	16.48	21
Lower levels (indicated by higher scores)	23.24	17
U = 115.00		
significance = .064		
*Lower values indicate higher performance satisfaction		

CONCLUSION

The current study has several limitations. First, the exporting firms sampled in the survey were all from Idaho. Second, questions about, and descriptions of, B2B e-commerce are open to misinterpretation. Further, in this study both types of B2B partners for a firm (operating resource and supply chain partners) were not treated separately in the survey motivation, strategy, and performance questions. In future studies, researchers could develop separate questions about these partner types to ask interviewees. Although these limitations exist, the results of this study should stimulate future B2B e-commerce research.

In terms of information from this study for small business exporters, two general conclusions can be drawn concerning the B2B motivation, strategy, and performance topics. First, it appears that high levels of both collaborative pressure from business partners as well as perceived benefits of B2B e-commerce can be linked with high satisfaction of B2B performance. Second, it appears that high degrees of importance in B2B partnering with other domestic (but not foreign) businesses can also be linked with high satisfaction of B2B performance.

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CAN-SPAM ACT OF 2003: HOW TO SPAM LEGALLY

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ABSTRACT

With the growing use of the Internet for unsolicited commercial electronic mail (spam), many individuals and businesses are complaining about the time and effort necessary to delete such material from personal and business computers. Although filtering has been tried, it seems the senders of such unwanted mail have found ways around such blocks. To attempt to meet the growing demand for a legal method to control and discourage the unwelcome growth of unsolicited email, bills were introduced in both the House of Representatives and the Senate of the United States to try to regulate such activities. This paper will examine the Can-Spam Act of 2003 and point out its salient features, which include requirements to send legal spam. It will also discuss the futility of this act in attempting to stop unwanted spam.

INTRODUCTION

Spam is becoming a growing source of concern among legitimate electronic marketers, businesses, and individuals. A study released in 2003 found that spam costs United States corporations $8.9 billion dollars per year, European businesses $2.5 billion per year, and United States and European service providers $500 million per year (Associated Press, 2003).

A New York consulting firm Basex blamed unsolicited e-mail for nearly $20 billion in lost time and expenses worldwide (Lyman, 2003). Spam within an organization can cost between $600 and $1,000 per year in lost productivity for every user. Another study found that spam costs companies $874 per employee per year in lost productivity (Roberts, 2003). The study released by Nucleus Research contains interviews of IT administrators at 76 different US companies. The $874 figure is based on a pay rate of $30 per hour and a work year of 2,080 hours. Findings of the study include:

- *Companies lose approximately 1.4% of each employee's productively each year because of spam.*
- *The average employee receives 13.3 spam messages each day.*
- *Employees spend, on average, 6.5 minutes a day managing spam.*

Table 1 shows current estimates of the volume of email messages from reputable sources such as Google, Brightmail, Jupiter Research, eMarketer, Gartner, MailShell, Harris Interactive, and Ferris Research. As seen in the table, nearly 31 billion emails are sent daily, 56 emails sent daily per email address, at a cost of $255 million to all Internet users

Table 1: Volume of Email Messages

Category	Email Statistics
Daily emails sent	31 billion
Daily emails sent per email address	56
Daily emails sent per person	174
Daily emails sent per corporate user	34
Daily emails received per person	10
Email addresses per person	3.1 average
Cost to all Internet Users	$255 million

Due to the volume of email daily, it is reasonable to expect that clogged e-mail systems due to spam have also been listed as a major cost for Internet access providers and businesses. Annual spam received per person has been estimated to be 2,200 with 12.4 billion spam emails sent daily. Spam currently accounts for about 60 percent of all email activity, which is an increase of over 30 percent since 2001. Through its Logistics and Operations Center, Brightmail.com, an anti-spam software company, has tracked the percentage of total Internet email identified as spam since March 2003. The data is shown in Table 2.

Table 2: Percentage of Email Identified as Spam

Month	Percentage
February 2004	62%
January 2004	60%
December 2003	58%
November 2003	56%
October 2003	52%
September 2003	54%
August 2003	50%
July 2003	50%
June 2003	49%
May 2003	48%
April 2003	46%
March 2003	45%

As seen in the Table 2, the percentage of spam emails has grown by nearly 40% since March 2003. To shed light on spam email received per

person, SpamLinks.net created a Hotmail account in September 2001 and tracked the spam received per month for a year. The data is shown in Table 3 and reflects the tremendous growth in spam from 2001 to 2002.

Table 3: Spam Received on Hotmail Account

Month	Number
September 2002	1262
August 2002	1174
July 2002	899
June 2002	846
May 2002	1023
April 2002	753
March 2002	795
February 2002	546
January 2002	355
December 2001	392
November 2001	337
October 2001	318
September 2001	167

Unsolicited commercial electronic mail poses network security problems to government and businesses via viruses and worms. The increasing amount of spam has resulted in a decline in consumer trust of legitimate email marketers. (Findings, Reduction in Distribution of Spam Act, 2003). The receipt of spam results in costs to receivers who cannot

refuse to accept such mail, incur costs for storage, and for accessing, reviewing, and discarding such items. As seen in Table 4, the content of spam is varied, with spam related to advertising products garnering 24 percent of the total.

Table 4: Content of Spam

Percent	Category	Description
24%	Products	Email attacks offering or advertising general goods and services. *Examples: Devices, Investigation services, Clothing, Makeup*
18%	Financial	Email attacks that contain references or offers related to money, the stock market or other financial "opportunities." *Examples: Investments, Credit Reports, Real Estate, Loans*
14%	Adult	Email attacks containing or referring to products or services intended for persons above the age of 18, often offensive or inappropriate. *Examples: Porn, Personal Ads, Relationship Advice*
11%	Scams	Email attacks recognized as fraudulent, intentionally misguiding, or known to result in fraudulent activity on the part of the sender. *Examples: Nigerian Investment, Pyramid Schemes, Chain Letters*
7%	Health	Email attacks offering or advertising health-related products and Services. *Examples: Pharmaceuticals, Medical treatments, Herbal remedies*
6%	Internet	Email attacks specifically offering or advertising Internet or computer related goods and services. *Examples: Web hosting, Web design, Spamware*
6%	Leisure	Email attacks offering or advertising prizes, awards, or discounted leisure activities. *Examples: Vacation offers, Online casinos, Games*

Table 4: Content of Spam

Percent	Category	Description
4%	Fraud	Email attacks that appear to be from a well-known company, but are not. Also known as "brand spoofing" or "phishing", these messages are often used to trick users into revealing personal information such as email address, financial information and passwords. *Examples: Account notification, Credit card verification, Billing updates*
2%	Political	Messages advertising a political candidate's campaign, offers to donate money to a political party or political cause, offers for products related to a political figure, etc. *Examples: Political party, Elections, Donations*
1%	Spiritual	Email attacks with information pertaining to religious or spiritual evangelization and/or services. *Examples: Psychics, Astrology, Organized religion, Outreach*
7%	Other	Email attacks not pertaining to any other category.

Source: Brightmail Logistics and Operations Center (2004)

The alarming increase in unwanted email has shifted costs from the senders of spam to the Internet access service. In order to avoid liability, spam senders are disguising their addresses to prevent recipients from negatively responding (Findings, Anti-Spam Act of 2003). Despite the fact that Congress enacted legislation to regulate spam, there is concern that it will have limited effect because most of the spam is sent by overseas entities, which are beyond the reach of United States jurisdiction (McCullagh, April 10, 2003). For example, OptInRealBig earns 2 million dollars in sales each month by sending out 80 million unsolicited email messages a day. Its owner is not concerned about lawsuits because he can set up in another country within an hour (Stone, 2003). Another example includes the most well-known malicious spam, the Nigerian scam, which seems to make

particular victims of Americans (Wagner, 2002). A report by the U.K. National Criminal Intelligence Service stated that as many as five Americans per day have been seen waiting in London hotel lobbies to meet people connected with the scam. MessageLabs predicted Nigerian scam operations will gross more than $2 billion in 2003.

PROPOSALS

There were two bills in the Senate, two in the House, plus proposals from the Federal Trade Commission to strengthen the ability of the federal government to discourage spam both by civil and criminal penalties. In the Senate, both bills had powerful bi-partisan supporters. The Can-Spam Act was sponsored by Senators Conrad Burns, R-Mont., and Ron Wyden, D-Ore., who serve on the Commerce Committee. The Criminal Spam Act (CSA) was sponsored by Senators Oren Hatch, R-Ut., and Patrick Leahy, D-Vt., who serve on the Judiciary Committee. Both Microsoft and Yahoo supported the Can-Spam bill (McCullagh, D. June 19, 2003). The Can-Spam Act sought to regulate interstate commerce by imposing limitations and penalties on the sending of unsolicited commercial email via the Internet. It gives authority to the Federal Trade Commission (FTC) to enforce its provisions with appropriate regulations. It declares criminal the sending of spam with fraudulent routing information and proposes a fine or imprisonment for not more than 1 year, or both. The use of deceptive subject headings is prohibited. There must be a method for the recipient to opt-out of receiving further spam from the sender which the sender has 10 business days with which to comply. The sender must include in its message a physical postal address. The attorneys-general of the states may enforce the provisions of this act in federal district court in their respective states. The damages may be multiplied by $10 per each separately addressed message with a cap of $500,000, unless the court finds the sender knowingly committed the acts, in which case the court may increase damages up to $1.5 million. Attorney fees may also be assessed if the state is successful in its civil action against the spam sender. The Criminal Spam Act (CSA) would punish repeat spammers

with a maximum of 5 years in federal prison and fines up to $25,000 per day. Can-Spam would jail first offenders with up to 3 years and repeat offenders with up to five year terms. The Senate Commerce Committee approved the Can-Spam Act with the provisions that the FTC and Internet service providers could sue spammers who use false email headers, or do not let recipients opt-out, or send spam to email addresses obtained by crawling the web (McCullagh, June 19, 2003).

The two main House bills in play for controlling spam were the Anti-Spam Act sponsored by 33 Democrats and 20 Republicans and the Reduction in Distribution of Spam Act (RID Spam) sponsored by 19 Republicans and 2 Democrats. The main difference between the two bills was a political one. The Anti-Spam Act would permit class action lawsuits whereas the RID Spam Act expressly prohibited such suits. Trial lawyers favor class action suits and heavily contribute to Democratic candidates. A Common Cause study of the 2000 elections estimated that trial lawyers favored the Democratic Party over the Republican Party by a 40-1 margin for soft money contributions. Since the RID Spam act was sponsored by two Republican committee chairmen, Energy and Commerce - Billy Tauzin and Judiciary - James Sensenbrenner, who control the two committees to which anti-spam legislation was assigned, this was the bill that was favored to make it out of the House. This proposal included criminal sanctions for spammers who use fraudulent headers or send unlabeled pornographic solicitations, but it did not give the FTC as much authority as the Anti-Spam Act. Both bills permitted spammers to send unsolicited bulk email provided an opt-out provision was included. Some critics have noted that this permits email marketers to send spam until the recipient opts-out. So, some liberal Democrats are proposing an opt-in requirement, which is opposed by legitimate commercial marketers, that would forbid any unsolicited commercial email unless a prior business relationship exists (McCullagh, July 9, 2003). This opt-in requirement has been ruled by the Supreme Court in other cases to be an unconstitutional First Amendment violation whereas the court has approved of less intrusive ways to protect privacy such as posting "No Solicitors or Peddlers Invited" (Schaumburg, 1980). This is why the court will probably uphold the federal Do Not Call statute.

Some legislators attempted to broaden these proposals to include unsolicited marketing messages sent to wireless devices and cell phones using means other than email. This expansion of coverage of the acts would necessitate more time in committee for study, testimony, etc. All of the proposed bills exempted from regulation any type of spam from politicians, charitable, religious or nonprofit organizations (McCullagh, July 9).

RESULT

On October 22, 2003, the Senate voted 97-0 to approve the Can-Spam Act (Bridis, 2003). When it reached the House of Representatives it was referred to Representative Tauzin's Energy and Commerce Committee. In short order, it emerged from his committee with amendments that attached the features of his RID Spam bill to the Can-Spam bill. The House voted 392-5 in favor of the bill as amended (Thomas, 2003), and the Senate concurred. President Bush signed the bill into law on December 16, 2003. It became effective January 1, 2004.

As enacted the Controlling the Assault of Non-Solicited Pornography and Marketing Act of 2003 or Can-Spam Act of 2003 provides for criminal penalties of up to five years imprisonment for previous convictions under federal or state law involving multiple commercial electronic mail messages or unauthorized access to a computer system. A fine or imprisonment for up to three years, or both, would be assessed for those convicted of obtaining 20 or more falsified email account registrations, or 10 or more falsified domain name registrations; and the volume of email messages exceeded 2,500 in any 24-hour period, 25,000 during any 30-day period, or 250,000 during any 1-year period. The offender would also forfeit any proceeds, property, or equipment obtained from such offense (Can-Spam Act, Section 4).

Section 5 of the Act (15 U.S.C. 7704) prohibits the transmission of false or misleading information. Thus, header information which includes a domain name or Internet Protocol address which was obtained by false representations is materially misleading. Subject headings which are deceptive as defined by the Federal Trade Commission Act are prohibited.

There must be a return address which enables the recipient of commercial email to submit a request not to receive future messages from the sender. This is the opt-out provision. Once the sender receives the opt-out message, it has 10 business days to act upon the request. The sender may not sell, lease, or transfer the addresses of those recipients who have opted out of its commercial email messages. All commercial email messages must contain clear and conspicuous notice that they are advertisements, an opt-out provision, and a valid physical postal address of the sender. It is illegal for a sender of commercial email to obtain recipient email addresses by automated means from an Internet web site or proprietary online service belonging to another person who includes a notice stating that it does not sell or lease its addresses to others for use in sending email messages. The FTC is given the authority to modify the 10-business day period if it deems it necessary for good faith compliance with the opt-out provision by commercial senders. Senders of sexually oriented material are required to include in the subject heading notices required by the FTC. No warning is necessary if the recipient has given prior consent to receive such material. The FTC in consultation with the Attorney-General has 120 days from January 1, 2004, to issue marks or notices to be included in sexually explicit commercial email. These notices will be published in the Federal Register. Thereafter, anyone who knowingly violates this standard shall be fined or imprisoned for up to 5 years or both.

Section 6 of the act (15 U.S.C. 7705) forbids businesses to send commercial email with false or misleading transmission information knowingly through a third party. It is assumed that the business knew of the wrongful intentions of the sender if the business owns a 50 percent or greater interest in the person that violated this section.

Section 7 (15 U.S.C. 7706) defines violations of this act as unfair and deceptive practices and authorizes the FTC to enforce violations as if they had occurred under the Federal Trade Commission Act (15 U.S.C. 57). Other federal agencies are given authority to enforce these provisions over commercial email senders under their respective jurisdictions. So, national banks are regulated by the Office of the Comptroller of the Currency; savings associations by the Director of the Office of Thrift Supervision; federal credit

unions by the Board of the National Credit Union Administration; brokers and dealers of securities by the Securities and Exchange Commission; insurance companies by state insurance authority; air carriers by the Secretary of Transportation; radio and television stations by the Federal Communications Commission. The FTC may use its usual powers against those who violate this act. Thus, it may issue cease and desist orders and injunctions without having to prove intent of the party charged with a violation. The attorney general of a state may bring a civil action on behalf of the state's citizens in a federal district court in the state. The damages shall be determined by multiplying the number of violations (each separately addressed message received by a state resident) to a maximum of $250. The maximum fine cannot exceed 2 million dollars unless the court finds aggravating circumstances, such as willful violation, in which case the damages may be increased to up to three times the damages. The court may also award attorney fees to the state for a successful action. However, before the state attorney general can bring an action he must notify the FTC or appropriate federal agency. The FTC shall have the right to intervene and to remove the action to another United States district court. If there is an FTC action currently before the court, the state attorney general may not bring an action against a defendant already named in the FTC action. Internet access providers may also bring actions against those who violate section 5 (15 U.S.C. 7704) of this act to enjoin further violations and recover damages up to $100 per each separate address transmitted over its facilities. The court may also find aggravating circumstances and increase the damage award up to three times. Attorney fees may also be recovered by the successful Internet access provider.

Section 8 (15 U.S.C. 7707) exercises the doctrine of preemption. It specifically states that the Can-Spam Act supersedes any state statute or regulation covering commercial email.

Section 9 (15 U.S.C. 7709) orders the FTC to report back to Congress within two years regarding the effectiveness and enforcement of the Can-Spam Act and to make recommendations for any modifications. The Congress specifically wants the report to address changes in devices through which consumers receive email, how to handle commercial email that

originates in other nations, and options for protecting children from obscene email.

Section 10 (15 U.S.C. 7710) orders the FTC to send to the Congress within 9 months from date of enactment (December 16, 2003) a report that sets out a method for rewarding those persons who give information about violations of the act. The reward should be not less than 20 percent of the civil penalty to the person who identifies the wrongdoer and supplies information that leads to the successful collection of a civil penalty by the FTC. Also, within 18 months the FTC shall report to Congress a plan for requiring commercial email to be identified from its subject line by means of compliance with Internet Engineering Task Force Standards the use of the characters "ADV"(advertisement) in the subject line or other comparable identifier.

Section 11 (15 U.S.C. 7711) authorizes the FTC to issue regulations to implement the act. However, the FTC is not authorized under section 5(a)(5)(A) covering identification of advertisement, opt-out provision, and physical postal address of sender to include any specific words, characters, marks, or labels in commercial email or to specify any particular part of the message to include such requirements, e.g., subject line or body.

Section 12 (15 U.S.C. 7712) orders the Federal Communications Commission (FCC) in consultation with the FTC to issue rules within 270 days to protect consumers from unwanted mobile service commercial messages. The FCC shall give subscribers of commercial mobile services a way to avoid receiving commercial messages unless the subscriber has given prior authorization to the sender; allow subscribers to indicate via their mobile service a desire not to receive future commercial messages from the sender; or allow subscribers to opt-out at time of subscribing and in any billing.

CONCLUSION

By its exercise of the preemption doctrine in the Can-Spam Act the federal act nullified state statutes which sought to control spam in some

individual states. The states which had passed spam acts were Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Missouri, Nevada, New Mexico, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin, and Wyoming. These states which had mandated "ADV" on the subject line must now wait for the FTC to publish its regulations(Spam laws).

The Can-Spam Act has legalized unsolicited commercial email by specifying five rules for spammers to follow. First, one may not use false of misleading transmission information, but can use a corporate address. Second, the subject line and content should not mislead the recipient about the purpose or objective of the message. Third, a return address must be included. It must remain valid for 30 days from date of transmission. This address should be where the recipient's reply would go. Fourth, if the recipient replies with an opt-out request, the sender has 10 business days to delete them from its list. Sending a message after 10 days, can result in monetary damage awards of up to 250 dollars per email address. Fifth and last, unsolicited commercial email must contain clear identification that the message is an ad or solicitation. It does not have to be in the subject line. There must be a way for the recipient to opt-out from receiving further messages from the sender. The sender must include a valid physical postal address. If the recipient has given prior consent to receive commercial messages from the sender, the sender does not have to identify its message as an advertisement or solicitation (Kahn, 2004).

After voting in favor of the Can-Spam Act, Senator John McCain said he felt the odds of defeating spam by a legislative act were low. Steve Linford of Spamhaus.org thought the law placed too many duties on the FTC and that the amount of spam would increase because the act basically legalized commercial email (Stone,2003). In reaction, in part, to such pessimism, a movement has been growing in the United Nations to try to regulate spam, cybercrime, and the disparity between the developed world and developing world's access to the Internet and telecommunications

innovations. In December 2003, the UN appointed the International Telecommunications Union (ITU) to propose a plan to solve these issues. The ITU is a 139-year old trade body that established the country code rules for international telephone dialing. At a UN meeting on the Internet in December, delegates from Africa, the Middle East, and Eastern Europe rejected the open market approach to growing the Internet espoused by the International Corporation for Assigned Names and Numbers (ICANN). ICANN was incorporated in 1998 to manage the Internet's addressing system and help resolve domain name disputes. Governments believe the Internet has grown too complex to be governed solely by ICANN. The ITU sees its role as fostering international cooperation in fighting spam, cybercrime, and protecting civil liberties and individuals' privacy.

Since the Can-Spam Act went into effect, there has been no reduction in the volume of spam. Indeed, it appears that the opposite has occurred, with spam rates actually increasing. MX Logic, a spam-filtering vendor, classified 77 percent of its customers' email as spam on January 12, up 6.5 percent from January 1 (Gross, 2004). Further, both MX Logic and Commtouch Software, also a spam-filtering vendor, found that less than one percent of unsolicited commercial email sent to U.S. inboxes during the first two weeks of January complied with the provisions of the law. In a survey of email, a third spam-filtering vendor, Audiotrieve, found just over ten percent of spam email complied with Can-Spam requirements (Gross, 2004). According to Rupert Walmsley, a partner at ITC Internet which offers Web hosting and spam filtering, "Unless there is a globally ratified act it is never going to be very effective" (Bishara, 2004). Based on such gloomy assessments of the Can-Spam Act, it may be time to try for an international accord to regulate this growing menace to the Internet and business productivity.

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ASSOCIATIONS BETWEEN E-BUSINESS MODELS AND THEIR BUSINESS PERFORMANCES

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ABSTRACT

The right selection of e-business model is one of the most critical factors of e-business success and should be chosen carefully. However, little is understood about the association between e-business models and business performance. This study develops e-business models with different strategic positions in the value chain that accommodate unique demands in the e-business environment, then examines the association between e-business models and performance measures.

Five e-business models are developed from 6 strategic factors that are, in turns, derived from 22 strategic variables introduced by Hambrick (1983). Model 1 is an e-business model with the strategic emphases on 'comparative advantage' and 'concentration,' model 2 is that with expansion and low price, model 3 is that with expansion and product improvement, model 4 is that with 'comparative advantage' and process, and model 5 is that with the strategic emphasis on product improvement. These 5 e-business models are compared with their corresponding performance measures using Duncan grouping method.

This paper found that e-business models with dual core strategies outperform e-business model with single core strategy. Among these e-business models with dual core business strategies, the model with the strategic emphases on 'comparative advantage' and 'process' performs best, which is followed by the model with 'expansion' and 'product improvement.'

INTRODUCTION

E-business is the conduct of business on the Internet although it is defined with diverse terminologies, such as Internet business, Internet commerce, or extension of e-commerce (Kalakota & Whinston, 1996; OECD, 1997; Rayport & Sviokla, 1994; Yoo, Choudhary & Mukhopadhyay, 2003). E-business is different from conventional off-line based business in many ways. Not only the buying and selling of goods and services but also the servicing of customers and the collaboration with business partners are done on the Internet in an e-business. Information is accessed and absorbed more easily on the Internet than off-lines. Information is also arranged and priced in different ways on the Internet. Thus, the value generating cycle of a company (called the value chains hereafter) can be managed differently on the Internet. In other words, three elements of the value chains such as content (what a company offers), context (how to offer the content), and infrastructure (what enables the transaction to occur) can be disaggregated and managed differently in an e-business. These differences of an e-business relative to a conventional business create plenty of new opportunities for an e-business that may require different business strategies (Useem, 2000).
Hence, as Rayport and Sviokla (1994) suggested, it is necessary to develop a new business model with different strategy portfolios to seize these opportunities for a business success. The new business model for an e-business should consist of new coherent business strategies that incorporate the different business environment on the Internet, for a strategy is a carefully devised plan of actions to achieve goals of a company (Jutla et al., 1999; Kenneth et al., 1998; Timmers, 1998). The right selection of e-business model is one of the most critical factors of the e-business success and should

be chosen carefully. However, it has been difficult to apply e-business models developed so far to the practices, because little is understood about the association between e-business models and their business performance (Hermanek et al., 2001; Lee & Choi, 2000).

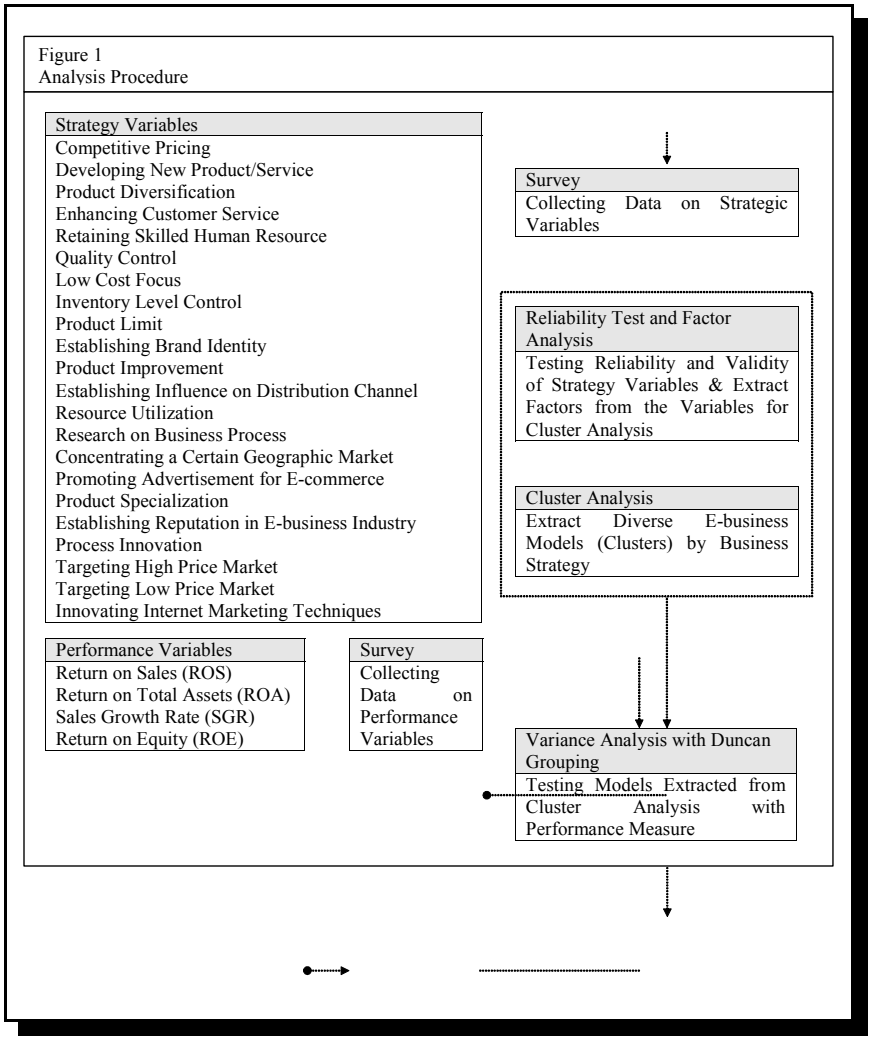
The purpose of this study is to develop e-business models with different strategic positions in the value chain that accommodate unique demands in the e-business environment and then examine the association between e-business models and performance measures.

RESEARCH PROCEDURE

Strategic variables for the business success introduced by Robinson and Pearce (1988) are analyzed using the factor loading method to develop 6 so-called critical success strategic factors with Eigen-values higher than 1. The 6 critical success strategic factors are 'comparative advantage,' 'expansion,' process, 'concentration,' 'low price,' and 'product improvement.' Using the cluster analysis, 5 e-business models with various emphases on the critical success strategic factors were developed. The cluster analysis that is also used in many previous researches (Galbraith & Schendel, 1983; Dess & Davis, 1984) derives the business models in such a way that the distance among those 5 e-business models is maximum in terms of the 6 critical success strategic factors. The five e-business models are as follows: Model 1 is an e-business model with the strategic emphases on 'comparative advantage' and 'concentration.' Model 2 is an e-business model with the strategic emphases on expansion and low price. Model 3 is an e-business model with the strategic emphases on expansion and product improvement. Model 4 is an e-business model with the strategic emphases on 'comparative advantage' and process. And model 5 is an e-business model with the strategic emphasis on product improvement. Then, the association between the 5 e-business models and 4 performance measures are investigated using the Duncan grouping method. As business performance measures, rate of return on sales (ROS), rate of return on total assets (ROA), sales growth rate (SGR), and rate of return on equity (ROE) are used in this study.

We found that business models with dual strategic emphases (model 4, 3, 2, & 1) outperform a business model with a single strategic emphasis (model 5) in terms of all four-performance measures, which is consistent with Robinson and Pearce's findings with manufacturing companies 1988). Research procedures taken in this study are described in Figure 1.

Figure 1
Analysis Procedure



METHODOLOGY

Instrument Administration

We developed a 35-item questionnaire including 22 items for the strategic variables adopted by Robinson and Pearce (1988), 4 items for the performance variables, and 9 demographic and company profile items. As a pilot-test, to improve the validity of the survey instrument, the instrument was reviewed by 12 Information Systems professionals and revised according to their recommendations until there are no further substantive recommendations from the reviews. Then, the revised instrument was pre-tested by 49 executive MBA students. Five demographic and four company profile variables were also measured in the instrument. Size was measured by number of employees, while industry was identified by categorical scale.

Data Collection

Data were collected via a survey questionnaire through on/off-line at the same time. The survey method was adopted to maximize generalizability of the test result by obtaining a statistically testable representation of the various categories of variables. In order to maximize the response rate, the survey questionnaire was carefully designed and pilot-tested. The cover letter was carefully worded and addressed to respondents by name. For those undelivered survey packages, we called those subject firms to obtain correct names or addresses and resent the packages. For those undelivered e-mails, we checked websites of those subject firms and called them later when we could not find the right e-mail addresses to confirm the addresses of respondents. We also mailed/e-mailed confirmation/remind letters four weeks after the first mailing according to Sudman and Bradburn's (1982) recommendation.

Five hundred survey questionnaires were e-mailed and 210 were mailed to those subject firms in the list of 2001 Annual Membership Directory of the 'Association of Internet Enterprise' in Korea. A total of 130

responses were received representing a response rate of about 18.3%. 127 questionnaires were used for analysis after 3 survey questionnaires were discarded for incompleteness.

Subject Characteristics

The collected data show that manufacturing firms practicing e-business make the most and service firms practicing e-business make the second most sample firms. A total of 83 sample firms are manufacturing firms, 65.35% of the total sample. The age of sample firms is widely dispersed. 94 out of the 127 sample firms have been in the e-business for more than 3 years (74.02%), and 20 for between 1 and 2 years. Regarding e-business area, 59 sample firms are involved in B2B e-commerce, 47 firms are in B2C, 16 firms are in B2B2C, and 10 firms are in B2G e-commerce. Demographic data show that 89.89% of the respondents are male and the largest group of employees is in between 30 to 40 years old (57.48%) with average age 31. A total of 94 of the 127 respondents (73.99%) have undergraduate education or higher, which implies firms practicing e-business require more educated people to run e-business with computers. Average work experience of the respondents is 7.7 years. Table 1 shows the profile of the respondents and responding companies.

Table 1: Sample Descriptions

	Frequency	Percent
(a) Sex		
Male	113	88.89
Female	14	11.11
Total	127	100
(b) Age		
Less than 30	30	23.62
30 to below 40	73	57.48

Table 1: Sample Descriptions		
	Frequency	Percent
40 and above	24	18.90
Total	127	100
(*c) Education*		
High School	12	9.45
Community College	21	16.54
Undergraduate	77	60.63
Graduate School	17	13.39
Total	127	100
(*d) Rank*		
Clerk	38	29.92
Supervisor	40	31.50
Manager	20	15.75
Director	11	8.66
Executive	18	14.17
Total	127	100
(e) Years on the Job		
Less than 3	41	32.28
3 to below 6	28	22.05
6 to below 9	20	15.75
9 to below 12	16	12.60
12 and above	22	17.32
Tota1	127	100
(f) Industry		
Manufacturing	83	65.36
Service	23	18.11
Telecommunication	5	3.94
Distribution	2	1.57

Table 1: Sample Descriptions		
	Frequency	Percent
Others	9	7.09
Unanswered	5	3.94
Total	127	100
(g) Years of Company		
Less than 1	8	6.30
1 to below 2	20	15.75
2 to below 3	5	3.94
3 and above	94	74.02
Total	127	100
(h) Type of e-business		
B2B	59	42.45
B2C	47	33.81
B2B2C	16	11.51
B2G	10	7.19
Others	7	5.04
Total	127	100

ANALYSIS AND RESULTS

Reliability and Validity of Strategic Variables

Content validity of the survey instruments was established through the adoption of standard instruments, suggestions in the literature, and pre-testing with professionals in the IS field Construct validity (Kerlinger, 1986) was evaluated by discriminant validity that is the degree to which a construct differs from other constructs and is usually verified through factor analysis, shown in the Table 2. Bold numbers in the Table 2 show strategic variables with factor loading over 0.5.

Table 2: Factor Analysis

Factors & Strategy Variables	C A.	Exp.	Proc	Concent	L P	PI
Comparative Advantage (CA)						
Product Diversification	**0.7371**	0.0967	0.2102	-0.2295	-0.0384	0.1522
New Product/Service	**0.6742**	0.2985	0.1574	-0.1901	0.0357	0.1978
Skilled Human Resource	**0.6091**	0.4871	-0.0300	-0.0118	-0.1462	0.1429
Competitive Pricing	**0.5694**	0.1141	0.2964	0.0275	0.5189	0.1753
Low Cost Focus	**0.5399**	-0.0183	0.2639	0.1930	0.3108	-0.0420
Expansion (Exp)						
Internet Marketing Technique	-0.0251	**0.8202**	0.1199	-0.0368	0.2125	0.0027
Reputation in E-business Industry	0.2180	**0.7664**	0.0496	0.0462	0.1450	0.3077
Distribution Channel	0.1897	**0.6268**	0.1641	0.0681	-0.0872	0.2012
Establishing Brand Identity	0.1836	**0.6084**	0.1160	-0.0935	-0.1266	-0.1350
Enhancing Customer Service	0.5030	**0.5148**	0.1912	-0.1768	-0.0834	-0.0579
Process (Proc)						
Process Innovation	0.0736	0.0440	**0.8036**	-0.0445	0.1438	-0.0807
Resource Utilization	0.1015	0.0460	**0.7080**	0.1140	0.0858	0.3112
Quality Control	0.1790	0.2205	**0.5992**	-0.0420	-0.3252	0.0214
Research on Business Process	0.3782	0.2325	**0.5582**	-0.0792	0.0123	0.1287
Concentration (Concent)						
Inventory Level Control	-0.0310	0.1872	0.2147	**0.7318**	-0.0635	0.0384
Geographic Market	-0.0468	-0.2471	-0.1382	**0.6704**	-0.0240	0.1223
Product Limit	-0.2079	-0.0548	-0.1528	**0.6295**	0.3287	-0.2496
Low Price (LP)						
Targeting Low Price Market	0.1142	0.0960	0.0481	0.0287	**0.8097**	-0.0419
Product Improvement (PI)						
Product Improvement	0.2604	0.1889	0.2169	0.0758	-0.1214	**0.7402**
Cronbach's alpha	0.7683	0.7852	0.6314	0.5252	1.0000	1.0000
Eigen-Value	3.1335	3.1300	2.6971	1.7134	1.6550	1.4243
Percent (%) Explained	14.2431	14.2272	12.2598	7.7883	7.5230	6.4742

From the factor analysis, 6 strategic factors (Comparative advantage, Expansion, Process, Concentration, Low Price, and Product Improvement) with Eigen-value greater than 1 were selected. Since 3 strategic variables such as 'Promoting Advertisement for E-commerce,' 'Product Specialization,' and 'Targeting High Price Market' did not exhibit high discriminant validity (loadings < 0.5), only 19 strategic variables out of the initial 22 were loaded to 6 strategic factors.

To examine the internal coherence amongst determinants of each strategic factor, the Cronbach's alpha coefficient was measured. Coefficients of all 6 strategic factors are larger than 0.5252, indicating that internal coherence among determinants is good (Nunnally, 1978). The results from the reliability and validity analysis of the strategy variables are presented in Table 2. Each strategic factor identified by factor analysis has its own strategic behavior. These different behaviors are described in Table 3.

Table 3: Behavior of Strategic Factors

Factor	Interpretation
Comparative Advantage	Focus on retaining comparative advantage on diverse fields such as product, cost, price, and human resource
Expansion	Focus on distribution channel and marketing effort to establish reputation within an e-business industry and to enhance customer service
Process	Focus on business process by investing research on business process, innovating the process, utilizing material effectively, and applying strict quality control
Concentration	Concentrate on a certain geographic area, a limited number of product, and inventory control
Low Price	Focus on low price to defeat competitors in e-business market
Product Improvement	Focus on continuous product improvement

Cluster Analysis

Using the cluster analysis introduced by Hambrick (1983), 5 e-business models with various emphases on strategic factors were developed. This cluster analysis used in many previous researches (Dess & Davis 1984; Galbraith & Schendel, 1983; Hambrick & Schecter, 1983) derives the business models in such a way that the distances among those 5 e-business models are maximums in terms of the 6 strategic factors. Although each strategic factor has its own portfolio of strategic variables, these factors could be grouped together to form a business model according to Hambrick (1983). Thus, these five e-business models were extracted from 6 strategic factors. These models are different business models that take different strategies to compete with other companies in the e-business industry. The result of cluster analysis shows that 4 models (model 1, 2, 3, & 4) take multiple core strategies, while model 5 takes single core strategy, product improvement. Summary results of the cluster analysis are presented in Table 4.

Table 4: Cluster Analysis

Cluster (Model)	Comparative Advantage	Expansion	Process	Concent.	Low Price	Product Improvemt
1 (n=32)	0.42*	0.09	0.19	0.57*	-0.25	-0.99
2 (n=26)	0.15	0.98*	0.31	0.15	0.78*	0.42
3 (n=15)	0.37	0.77	-1.33	-0.78	-0.40	0.72*
4 (n=20)	0.77*	-1.16	0.56*	-0.69	0.12	0.20
5 (n=33)	-1.16	-0.50	-0.16	0.13	-0.27	019*

* Cluster means selected

Table 5 describes strategic behaviors of each model (cluster) in details. Each model behaves differently for competition. Four of them take multiple core strategies to be in better position in e-business industry. Only one of them focuses on single core strategy to compete with other companies, but this model might have limitation in adaptability to business environment changes.

Table 5: Strategic Behavior of Each Model

Cluster	Strategy	Description
1	Comparative Advantage & Concentration	This model focuses on comparative advantage and concentration strategies. Companies utilizing this strategy involve product diversification, product and service development, skilled human resource arrangement, competitive pricing, low cost focus, advertisement, and low inventory level. They also are interested in providing a limited product to a limited market segment to focus on a market.
2	Expandability & Low Price	This model focuses on expandability and low price. Companies utilizing this strategy invest in Internet marketing to establish name on e-business industry, try to set up powerful influence on distribution channel, and expand customer service. They also focus on low price market.
3	Expandability & Product Improvement	This model focuses on expandability and product improvement. Companies utilizing this strategy rely on the expandability strategy and try to improve its product quality.
4	Comparative Advantage & Process Focus	This model focuses on comparative advantage and business process. In addition to the comparative advantage strategy, companies utilizing this strategy invest in research on innovative business process, quality control process, and better utilization of material.
5	Product Improvement	This model focuses only on product improvement. This strategy is simple and also powerful on the product innovation, but has limitations on environmental changes.

Variance Analysis and Duncan Grouping Test

Since e-business models are developed and performance measures are measured, the relationship between e-business models and performance measures are investigated. First, correlation analysis has been conducted on performance measures to see if there is homogeneity amongst the four performance measures. As shown in Table 6, all correlation coefficients among the performance measures are higher than 0.7 ($P < 0.0001$), which means that the four performance measures are significantly related one another and can be used in variance analysis as variables.

Table 6: Correlation Among Performance Measures

	Mean	Std Dev	ROS	ROA	SGR	ROE
Return on Sales (ROS)	3.07874	1.10989	1.00000			
Return on Assets (ROA)	3.09449	1.10865	0.85820*	1.00000		
Sales Growth Rate (SGR)	3.24409	1.12487	0.72189*	0.73868*	1.00000	
Return on Equity (ROE)	3.29921	1.11494	0.70554*	0.71533*	0.80192*	1.00000

*: $P < 0.0001$

This study conducted MANOVA tests to examine if e-business models affect their business performances. The results from this MANOVA presented in Table 7 show that F-value is 8.98 ($P < 0.0001$), which means that the e-business models affect the business performance.

Table 7:
MANOVA: Overall Impact of E-Business Models on Business Performances

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	35.47894	8.86973	8.98	<.0001
Error	121	119.44964	0.98719		
Corrected Total	125	154.92857			

Finally, the association between e-business models and performance measures is analyzed using Duncan grouping method where each business model is given a letter grade of A, B, and C for its performance in terms of four different performance measures. As shown in Table 8, Model 4 with the strategic emphases on 'comparative advantage' and 'concentration' has the highest performance mean and hence grade of A in all four performance measures. Model 3 with the strategic emphases on expansion and product improvement has the second highest performance mean in all four performance measures but earns 3 A's with 1 B. Model 2 with the strategic emphases on expansion and low price has the median performance mean but earns only 2 A's with 2 B's. Model 1 with the strategic emphases on 'comparative advantage' and 'concentration' has the second lowest performance mean and earns 2 B's, 1 A, & 1 C. Model 5 with the strategic emphasis on product improvement has the lowest performance mean and earns 2 B's with 2 C's.

The result of Duncan grouping method indicates that e-business models with dual core strategies (model 4, 3, 2, and 1) outperform e-business model with a single core strategy (model 5). Among these e-business models with dual core business strategies, the model with the strategic emphases on 'comparative advantage' and process (model 4) performs best, which is followed by the model with expansion and product improvement (model 3),

the model with expansion and low price (model 2), and the model with 'comparative advantage' and 'concentration' (model 1).

Table 8: Duncan Grouping Analysis

Statistic	Value	F Value	Num DF	Den DF	Pr > F
Wilks' Lambda	0.7169	3.48	12	315.14	<.0001

		Return on Equity (ROE)		Return on Sale (ROS)		Return on Assets (ROA)		Sales Growth Rate (SGR)	
Cluster	N	Mean	D/G*	Mean	D/G*	Mean	D/G*	Mean	D/G*
4	20	3.9000	A	3.650	A	3.650	A	4.100	A
3	15	3.8000	A	3.467	A	3.533	A	3.667	B
2	26	3.6923	A	3.192	B	3.346	A	3.462	B
1	32	3.2188	B	3.000	B	3.125	A	3.094	C
5	33	2.5152	C	2.546	B	2.364	B	2.546	C

* Duncan Grouping

CONCLUSIONS AND IMPLECATIONS

The purpose of this study is to develop e-business models with different strategic positions in the value chain that accommodate unique demands in the e-business environment and then examine the association between e-business models and performance measures. To accomplish these objectives, 5 e-business models are developed from 6 strategic factors that are, in turns, derived from 22 strategic variables introduced by Hambrick (1983). Then, these 5 e-business models with different core strategies are

compared with their corresponding performance measures using Duncan grouping method.

This study found that e-business models with dual core strategies outperform e-business model with one core strategy. Among those e-business models with dual core business strategies, model 4 with 'comparative advantage' and 'concentration' as core strategies performs best, which is followed by model 3, model 2, and model 1 in the order of the performance. According to the results of this study, companies should pay attention to the strategies such as 'comparative advantage' and 'concentration' to compete very best with other companies. The strategies that these companies should involve are product diversification, product and service development, skilled human resource arrangement, competitive pricing, low cost commitment, advertisement promotion, low inventory level, and limited product supply to a certain market segment.

The findings of the study have interesting implications for practice. E-business companies that want to compete with other e-business companies should focus on multiple core strategies rather than a single strategy. When they select one of e-business models with a strategic consideration, they should check where they put their emphases. The results of this study may be one of the guidelines in practice when companies choose their strategic e-business model.

Since this research is an empirical study using large sample and validated instruments, the results can be generalized with high degree of confidence. The results of this study have meaningful implications for the development of e-business model, in general. However, due to a relatively short history of e-business industry, a thorough investigation into theoretical and empirical background of e-business strategies could not be performed. It also should be noted that the analysis was based on an 18.3% response rate. Although non-response bias was estimated, it should be recognized that the potential of sample frame error exists. Also, the scope of this study was restricted to the demographic variables of industry and business type.

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ARTICLES for Volume 2, Number 2

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ASSESSING CROSS-INDUSTRY EFFECTS OF B2B E-COMMERCE

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ABSTRACT

The productivity gain that an industry experiences by engaging in B2B e-commerce gets transmitted to other industries through input-output linkages. This paper considers a multi-industry equilibrium model that explicitly incorporates input-output structure to examine the propagation of productivity gain across industries and to provide a framework to quantitatively evaluate the overall impact of B2B e-commerce. This model also helps identify the industries with potential for largest impact on other industries. We also demonstrate how this model can be used to make projections of output growth that would result from the introduction of B2B in selected industries.

INTRODUCTION

The economic impact of the Internet has already been visible: in commodity market, in capital market as well as in labor market. There has been a drop in prices of many consumer items. Online trading of stocks and bonds has increased over the years.[1] A sizeable portion of the labor force is employed in Internet related activities. As we will see shortly, the revenue generated and the number of workers employed by the Internet based economic activities have been so large that they can well be described as constituting an independent economic system. One characteristic feature of

these developments is the speed. This Internet based economy has grown very fast within a very short period of time. Enough time has not elapsed to observe long-run economic impact of the Internet. Nevertheless, speculations abound. Economists are divided between predicting long-run growth and low inflation in one end, and dismissing it as a temporary phenomenon in the other. Although recent dot com bust has produced more skeptics than ever, it is important to recognize that the potential size and overall economic impact of the Internet is larger than what we can imagine today. However, given that the Internet has taken the world, or at least the advanced economies, by storm, it is worthwhile to examine some of the speculations for their substance.

From the point of view of business and economics, trading over the Internet, also known as electronic commerce or e-commerce, is the fastest growing Internet based economic activity in the present time. The phenomenal growth of e-commerce in recent times has the most visible effects on the consumption economy. The consumer items are cheaper online than in conventional stores.[2] Internet cuts down on transaction costs and makes goods available to consumers at lower prices. Moreover, consumers are exposed to a wider range of choices. This proliferation of e-commerce has an indirect effect: competition from the Internet has forced traditional retailers to cut their prices. The speculation among the experts, however, is that the business-to-business (B2B) e-commerce will have the largest impact in the economy.[3] B2B e-commerce can simply be defined as transactions between businesses conducted over the Internet. Since it involves trading of goods in the intermediate stages of the production process the value and volume of transactions will relatively be high. Moreover, the gains from engaging in B2B e-commerce in terms of increased productivity or reduced cost have indirect effects on other businesses through various linkages. This paper examines the cross-industry effects of B2B gain that spill over through inter-industry interactions in the context of a multi-industry equilibrium model. It also identifies the sectors that have the potential for spreading the beneficial effects across industries by reducing costs. In particular, we are interested in direct as well as indirect (which is sometimes referred to as 'second-round effects') impact of B2B e-commerce across industries. The

model provides a framework for quantitatively assessing the impact of B2B e-commerce across industries. From both qualitative and quantitative analysis it appears that some industries hold brighter prospects than others do.

The rest of the paper is organized as follows. In section 2, we provide a discussion on the definition of the Internet economy, its size and growth. We also discuss various aspects of B2B e-commerce. Section 3 discusses how B2B e-commerce benefits industries directly by reducing costs or increasing productivity, and indirectly through various inter-industry linkages. We then present a simple multi-industry equilibrium model[4] to evaluate how inter-industry linkages help the gains from B2B in one industry get transmitted to the others. First we specify the model and then define a competitive equilibrium. By explicitly introducing the input-output structure into the model we theoretically examine the impact of using the Internet for B2B e-commerce on the output and prices of different industries. Then we calibrate the parameters of the model so that we can make quantitative statements about the economy-wide impact of introducing B2B e-commerce in different industries. Section 4 investigates for each individual industry the effects of introducing B2B e-commerce on output of various goods in the economy. Quantitative implications of introducing B2B in a few industries have been worked out and included in this section. Section 5 includes our concluding remarks.

THE INTERNET ECONOMY AND B2B E-COMMERCE

Electronic commerce is an important and integral part of the burgeoning Internet economy, which is loosely defined to encompass all resources related to, and all economic activities based on the Internet technology. The transactions carried out between different agents, i.e., between retailers and consumers, between wholesale traders and retailers, or between firms, over the Internet, constitute what we know as e-commerce. Depending on who are on the two sides of these transactions, e-commerce is given fancy names. For example, when it involves transactions between

business and consumers it is called B2C. Similarly, when such transactions are between firms, i.e., between businesses, it is named B2B. Before explaining the notion of B2B e-commerce and its economic significance we will have an overview of the Internet economy, its size, structure and growth.

The Internet Economy

In a recent comprehensive study conducted by the Center for Research in Electronic Commerce of the University of Texas at Austin, the Internet economy has been defined as 'a complete economic system consisting of (i) ubiquitous, low cost communication networks using Internet technologies and standards, (ii) applications and human capital that enable business to be conducted over this network infrastructure, (iii) interconnected electronic markets that operate over the network and applications infrastructure, (iv) producers and intermediaries providing a variety of digital products and services to facilitate market efficiency and liquidity, and (v) emerging policy and legal frameworks for conducting business over the Internet' (page 7). In this new emerging economic system, information plays the key role, a role that is played by the physical assets in the traditional economy.

According to this study, in 2000 the Internet economy employed 2.476 million workers and generated half a trillion dollars in revenue. Various studies[5] indicate increased use of internet in every walk of life. According to a report from the Online Publishers Association and ComScore, consumer spending on online content in the US totaled USD1.3 billion in 2002, that marks an increase of 95 percent compared to 2001. eMarketer predicts that by 2004, worldwide e-commerce revenues would total USD2.7 trillion. According to this research company's latest report, the US will account for over one-half of worldwide revenues this year. A study by Nielsen-Netratings reveals that the top traditional advertisers increased their share of online advertising by 30 percent by the end of 2002. More than 22 million US Internet users visited an online tax services website during February 2003. New research from Pew Internet and American Life indicates

that two-thirds of politically engaged Internet users during the 2002 election cycle sent or received email related to the campaign. The fact that America's leading cable and DSL providers added a combined 6.4 million high-speed Internet subscribers during 2002 is evidence of continuing expansion of the Internet economy. Leichtman Research Group forecasts that the total number of broadband cable and DSL Internet subscribers in the US will surpass the number of narrowband subscribers in 2005 and will grow to nearly 49 million by the end of 2007. New jobs are being created to cater to the needs of this ever expanding Internet economy. Workers are being shifted from other vocations to take advantage of new opportunities. The convenience, flexibility and efficiency of doing business through the Internet have contributed to this phenomenal growth of this emerging Internet economy. There is no doubt that the Internet economy is going to be a major contributor to the U.S. economy.

What is B2B?

E-commerce is the fastest growing segment of the Internet economy. Within this segment, B2B e-commerce is considered to have the brightest prospect of future growth and expansion. As we have already mentioned, it has been projected that the B2B will soon outpace B2C with its turnover growing up to ten times higher by the end of year 2003. The Goldman Sachs Report on the e-commerce has defined 'B2B' as 'business-to-business commerce conducted over the Internet' (page 2). B2B has two major components: 'e-frastructure' and 'e-market'. Auction solutions software, content management software, and web-based commerce enablers constitute what the report calls 'e-frastructure'. Essentially, these three components provide the infrastructure for conducting electronic commerce. On the other hand, the 'web sites where buyers and sellers come together to communicate, exchange ideas, advertise, bid in auctions, conduct transactions, and coordinate inventory and fulfillment' constitute the marketplace where the e-commerce actually takes place.

HOW DOES B2B AFFECT PRICE AND OUTPUT ACROSS INDUSTRIES?

In addition to the speculation that B2B itself would evolve into a revenue-and-employment generating business, it can as well be argued that it would have beneficial impact on traditional industries. Since B2B e-commerce is directly associated with the production process of the industries the impact could be widespread. By improving flow of information it would ensure allocation of resources to their most productive uses, and thus would make markets more efficient. Efficient allocation of resources would make production process less costly and therefore more productive.[6] Since industries are linked to one another as buyers and sellers of inputs, the productivity gain[7] to an industry that is engaged in B2B e-commerce, will eventually spill over to other industries through various linkages. Thus, B2B e-commerce will have economy-wide effects.[8] However, how the gain in one particular industry affects other industries in the economy depends on which industry experiences these productivity gains, and on the nature of its interactions with other industries in the economy.

Intuitively, a productivity gain in an industry will entail a reduction in unit cost of its production. It implies that the price of its output will fall. If this particular good is used as inputs in other industries then it will lead to a reduction in the cost of production in the downstream industries, which in its turn will presumably lead to a fall in prices and rise in output of various commodities. On the other hand, since industries can now easily procure their intermediate inputs they would not accumulate large amount of inventory at a particular period of time. In other words, the scale of operation in terms of productive capacity will be smaller. Also, as the allocation of resources improves and as a result the resources become more productive, the demand for intermediate inputs or other resources might decrease. It may have negative effects on the upstream industries. Thus B2B e-commerce potentially has both positive and negative effects.

However, we would like to categorize the effects of B2B gain into direct and indirect effects. Direct effects are realized in the industries that purchase intermediate inputs through B2B e-commerce. If this productivity

gain does not affect the demand for its output, these effects are expected to be in the form of rise in output and fall in prices. Indirect effects, on the other hand, are realized in other industries, which have downstream or upstream linkages with the industry experiencing B2B gain. In downstream industries it would look like a supply shock: price would fall and output would rise. In upstream industries it would look like a negative demand shock: both price and output fall. Total effects depend on the nature (whether positive or negative) and relative weights of direct and indirect effects.

In order to help us understand the direct effects, let us consider a partial equilibrium framework. Consider figure 1.a. In the short-run, industry i has an upward sloping supply curve S_i and faces a downward sloping demand curve D_i. Suppose the industry is in short-run equilibrium at E_i with equilibrium price P_i and output Q_i. As productivity increases as a result of B2B e-commerce the supply curve shifts to the right. This is represented in the diagram by S_i'. In the new equilibrium E_i', price declines to P_i' and output increases to Q_i'. Note that in this illustration we have assumed that the B2B has not affected the demand for the output of industry i. B2B has similar indirect effects in the downstream industries. Indirect effects in the upstream industries, on the other hand, would look like negative demand shock. In figure 1.b, the demand curve faced by industry j, which provides intermediate inputs to the industry i experiencing B2B gain, shifts to the left for reasons explained above. The new equilibrium price and output are P_j and Q_j respectively.

However, in a more general framework industries interact in such a complicated fashion that it is difficult to distinguish between downstream and upstream linkages among industries. Two industries may be linked to one another both as downstream and upstream industries. In such cases, it is difficult to infer what the net effect would be for each of these industries. Moreover, the industry that experiences B2B gain could also be a major provider of intermediate inputs to itself. In such a situation, the positive impact of B2B gain could be neutralized by the negative impact of an opposite demand effect. In other words, since the industry now becomes more productive it uses less of its output as intermediate inputs. That is, the demand for its output falls. The net effect would depend on the relative

magnitudes of the positive supply effect of productivity growth and the negative demand effect of fall in inventory accumulation.

Figure 1
Effects of B2B Gain

Figure 1.a
'Direct effects' and 'indirect effects on downstream industries'

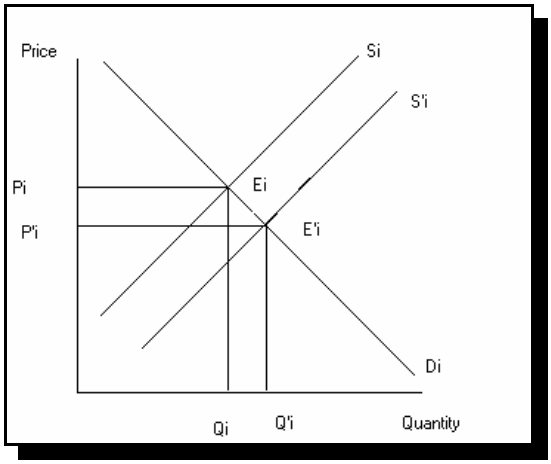
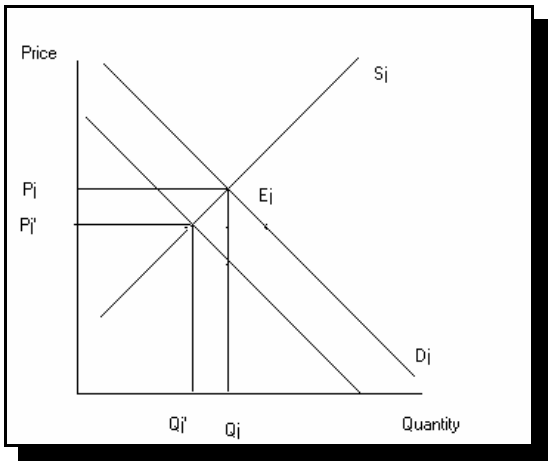


Figure 1.b
'Indirect effects on upstream industries'



In brief, the productivity gain that is induced by the B2B e-commerce would set out a chain of changes that would work out through a complicated network of interactions among industries. Intuitively, it is not clear what the final effects would be. In order to capture the interactions among industries in the form of input-output relationship, we now construct a simple multi-industry equilibrium model that is capable of predicting the cross-industry effects of a B2B gain in individual industries. Note that this is a static model. However, there could well be dynamic effects of this type of productivity shock. After all, it is very likely that these productivity shocks will affect the economy with time lags. Also, there are other factors in the economy, which are important for the behavior of the economic variables. Since our aim is to evaluate short-run direct and indirect effects of B2B gain across industries, we are considering a simple production economy with an explicit input-output structure that captures inter-industry interactions. In the model, it is assumed that introduction of B2B e-commerce is an exogenous factor or a 'shock' that has positive productivity effect on the industries.

A Simple Multi-Industry Equilibrium Model

Model Specification

We assume that there are n industries in the economy. Each industry consists of large number of identical firms. The production technology available to a representative firm in industry i is given by the following production function[9]

$$Y_i = Z_i \prod_{j=1}^{n} X_{ij}^{a_{ij}} \tag{1}$$

where $a_{ij} > 0$ and $\sum_{j=1}^{n} a_{ij} < 1$ for i = 1,2,….n. Y_i is the output of industry i,[10] Z_i is a random variable that denotes a shift in total factor productivity in industry i due to B2B e-commerce.[11] Thus use of Internet will presumably

increase productivity and that will be captured by Z_i s in our model. X_{ij} is the quantity of industry j output used as input in industry i. Since we have not explicitly introduced labor and capital in this production function one can interpret it as a short-run production function. That is, capital and labor do not change while intermediate inputs are the only variable factors. Thus the production function exhibits decreasing returns to scale in intermediate inputs. The firm maximizes its short-run profits subject to a constraint imposed by the technology given by (1). The short-run profit function for firm i is given by

$$\Pi_i = P_i Y_i - \sum_{j=1}^{n} P_j X_{ij} \tag{2}$$

where P_i is the price of industry i output.

A market clearing condition for each industry completes the specification of the model. Thus

$$Y_i = F_i + \sum_{j=1}^{n} X_{ji} \tag{3}$$

where F_i is the amount used for final uses. This implies that available output of industry i is used either for final uses such as consumption, investment and government purchases or as inputs in other industries (including industry i). To highlight the importance of demand and supply of intermediate inputs in determining output and prices, however, we assume that F_i's are fixed. The model is now solved for competitive equilibrium.

First-Order Conditions for Firm's Profit Maximization

$$a_{ij} P_i Z_i X_{ij}^{a_{ij}-1} \prod_{k \neq j} X_{ik}^{a_{ik}} = P_j \tag{4}$$

for all i, j = 1,2,….n

This condition states that the marginal revenue product of input j in industry i is equal to its price. Manipulation of the equilibrium condition (4) yields

$$X_{ij} = a_{ij} \frac{P_i}{P_j} Y_i \tag{5}$$

It is not difficult to see from this equation that as Y_i increases as a result of the exogenous productivity gain, ceteris paribus, P_i decreases. On the other hand, as P_i decreases, demand for ith input in industry k rises, i.e. X_{ki} increases, which in turn leads to an increase in Y_k as we can see from the production function. This will set out another chain of changes in prices and output. Thus it is the constant interactions between demand and supply that lead to cross-industry effects on prices and output.

A Competitive Equilibrium

A competitive equilibrium for this simple economy is defined as the quantity vectors **X** and **Y** and price vector **P** such that for a given vector **Z** of productivity shift,

(i) the firms' profit maximization problems are solved.

(ii) all markets clear.

Let $\bar{X}_{ij}, \bar{Y}_i \; \& \bar{P}_i$ be the competitive equilibrium solutions of X_{ij}, Y_i and P_i's in terms of $Z_i = \bar{Z}_i$'s. Since we are interested in the effects of displacements in total factor productivity from $\bar{Z}_i$'s on the choices variables X_{ij}, Y_i and P_i's, we state the following theorem.

Theorem 1: In a production economy, if industries are inter-linked through input-output structure, then the percentage deviations in X_{ij}, Y_i and P_i's from

these equilibrium values respectively, are given by linear functions of z_i's where z_i's are the percentage deviations of Z_i's from $\overline{Z}_i$'s.

Proof: (see Appendix)

Calibration

In order to make some quantitative statements about the effects of B2B productivity gains across different industries we now calibrate the model for thirty-five industry groups[12] of the U.S. economy. We follow the industry classification scheme of Jorgenson, Gollop and Fraumeni (1987). These thirty-five industries roughly match the 2-digit Standard Industrial Classification (SIC) of U.S. industries. The parameters that we need to calibrate are aij's and sij's. Fortunately, the Input-Output (I-O) Tables provide information on how the industries at various levels of aggregation interact among themselves, which can be used to obtain the values of these parameters. In 1996 annual I-O tables, 95 industries are covered at the two-digit level.[13] We consolidate the 1996 I-O direct requirement table to thirty-five sectors that we are considering here. Note that $a_{ij} = \frac{X_{ij}}{Y_i}$, where X_{ij} is the amount of industry j output used as input in industry i and Y_i is the total output of industry i. On the other hand, we use 1996 I-O use table to calibrate the parameter values s_{ij}'s. $s_{ij} = \frac{X_{ij}}{Y_j}$, where X_{ij} is the amount of industry j output used as input in industry i and Y_j is the total output of industry j.

CROSS-INDUSTRY EFFECTS OF INDIVIDUAL B2B GAIN

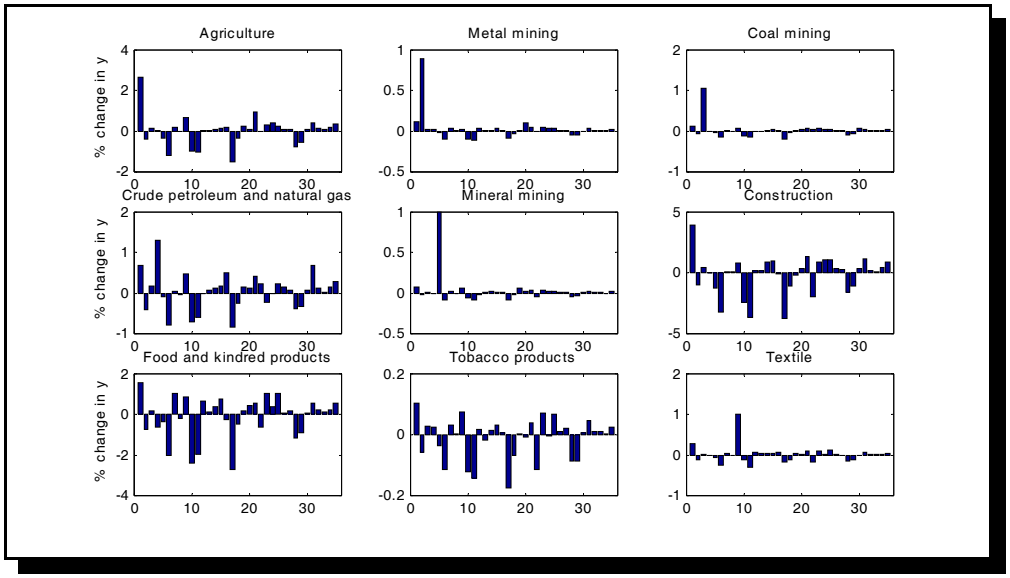
In this section, we examine how a B2B productivity gain gets propagated to other industries. First we look into the effects on real output in

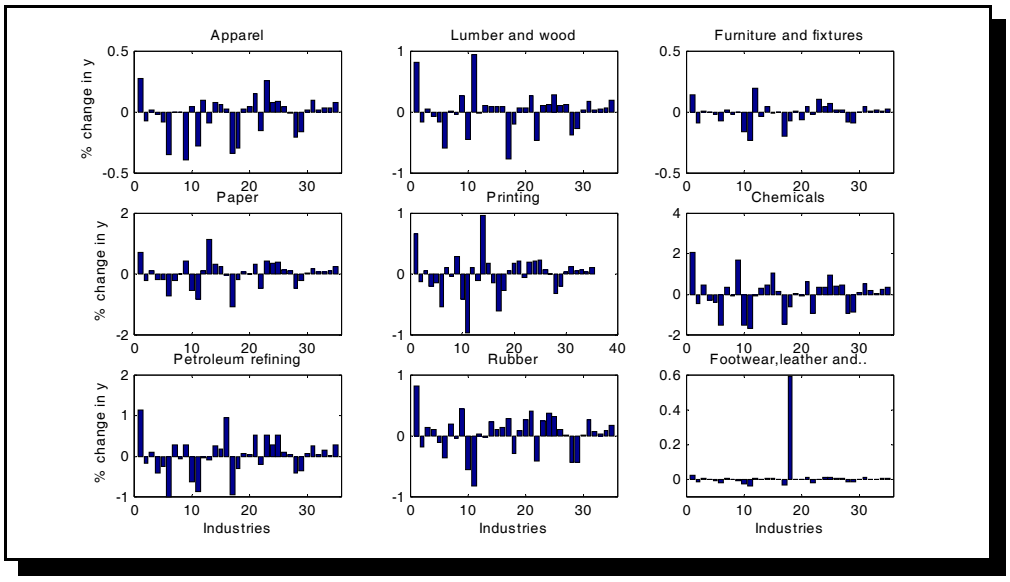
different industries of a one percent increase in productivity in a particular industry. We then use the potential savings and Internet penetration ratios estimated by Goldman Sachs for different industries to estimate the potential output gain in the economy, as implied by our model.

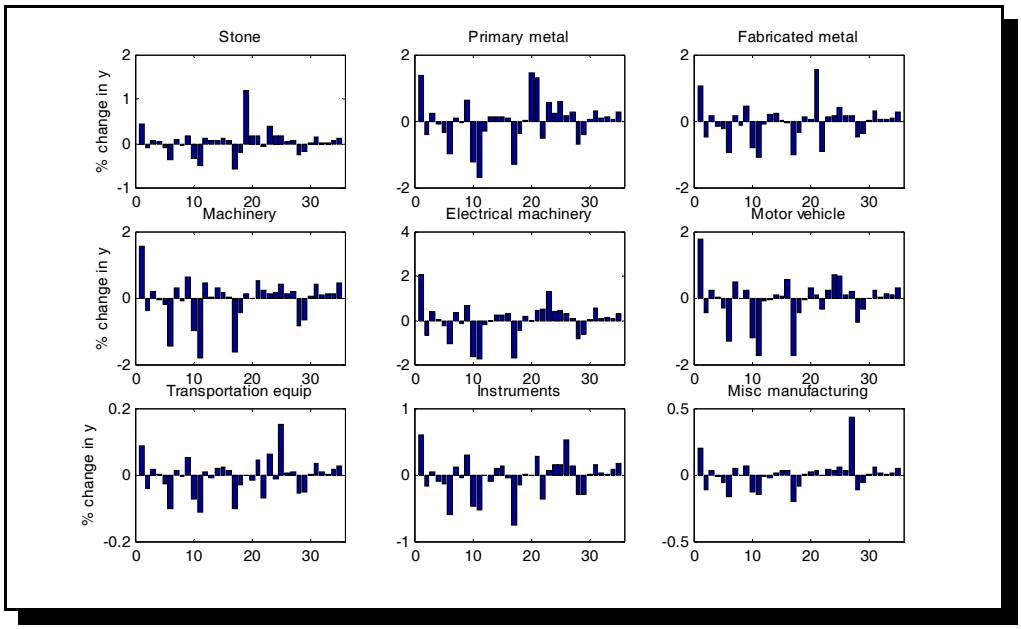
What Does a 1 Percent Productivity Gain in an Industry Imply for Real Output across Industries?

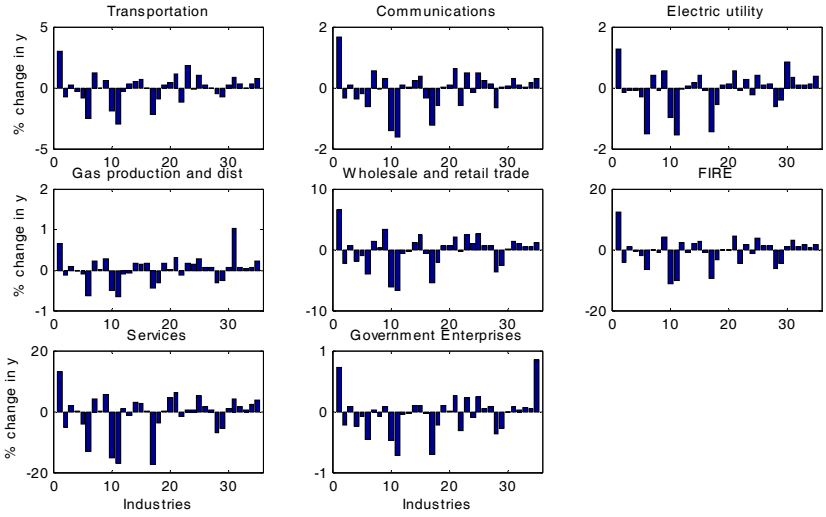
Figure 2 illustrates how a one percent productivity gain[14] in each of the thirty-five industries affects real output across industries. As we can see from this figure, for each industry the effects on other industries are both positive and negative. It is difficult to discern a general pattern. As we have discussed, positive supply shock and negative demand shocks are simultaneously at work to determine cross-industry effects of B2B gain. However, the net effect depends on the relative strength of the demand and supply factors.

Figure 2
Cross-industry effects of 1 percent increase in productivity due to B2B e-commerce




Apparel
Lumber and wood
Furniture and fixtures
Paper
Printing
Chemicals
Petroleum refining
Rubber
Footwear,leather and..
% change in y
Industries


Stone
Primary metal
Fabricated metal
Machinery
Electrical machinery
Motor vehicle
Transportation equip
Instruments
Misc manufacturing
% change in y



From the figure, we can make a few general observations. First, when predominantly intermediate inputs or investment goods producing industries[15] experience B2B gain, the magnitudes of changes in real output across industries are relatively large. For example, B2B gain to intermediate goods producing industries such as 'agriculture', 'crude petroleum and natural gas', 'chemicals', 'petroleum refining', 'primary metal', 'electrical machinery', 'transportation' and 'communications' and investment goods producing industries such as 'construction' and 'machinery' have large impact across industries. Second, three service industries, namely, 'wholesale and retail trade', 'finance, insurance and real estate' and 'services' have the largest impact across industries. As we can see from Table 1, more than half of their output is used for consumption purposes.

Third, direct effects are not always positive. For example, the 'construction' industry and 'transportation' experienced negative direct effects. This implies that in these industries, the demand factors are more powerful so much so that the negative effects outweigh the positive impact of the productivity gain.

Table 1: Fractions of gross output in different uses by industry in 1996

Commodity/ Industry		Inter-mediate inputs	Consump-tion	Gross invest-ment	Govt. purchase	Net Exports Exports -Imports	Total
1	Agriculture	0.835	0.116	0.000	0.009	0.022	1.0
2	Metal mining	0.705	0.000	0.074	-0.023	0.251	1.0
3	Coal mining	0.885	0.002	0.000	0.004	0.098	1.0
4	Crude petroleum and natural gas	1.551	0.000	0.001	-0.004	-0.551	1.0
5	Mineral mining	0.979	0.003	0.000	0.005	-0.021	1.0
6	Construction	0.227	0.000	0.555	0.218	0.000	1.0
7	Food and kindred products	0.384	0.589	0.000	0.024	-0.001	1.0
8	Tobacco products	0.067	0.796	0.000	-0.001	0.131	1.0
9	Textile	0.849	0.134	0.044	0.007	-0.024	1.0
10	Apparel	0.334	1.107	0.000	0.030	-0.475	1.0
11	Lumber and wood products	0.946	0.026	0.080	0.002	-0.058	1.0
12	Furniture and fixtures	0.158	0.512	0.381	0.063	-0.119	1.0
13	Paper	0.876	0.113	0.000	0.033	-0.018	1.0
14	Printing	0.601	0.304	0.000	0.083	0.009	1.0
15	Chemicals	0.673	0.264	0.005	0.049	0.001	1.0
16	Petroleum refining and related products	0.569	0.346	0.000	0.099	-0.024	1.0
17	Rubber	0.897	0.127	0.002	0.023	-0.056	1.0

Table 1: Fractions of gross output in different uses by industry in 1996

Commodity/ Industry		Inter-mediate inputs	Consump-tion	Gross invest-ment	Govt. purchase	Net Exports Exports -Imports	Total
18	Footwear, leather, and leather products	0.481	2.152	0.000	0.031	-1.692	1.0
19	Stone	0.993	0.058	0.000	0.012	-0.070	1.0
20	Primary metal	1.096	0.001	0.001	0.005	-0.112	1.0
21	Fabricated metal	0.920	0.037	0.042	0.019	-0.027	1.0
22	Machinery	0.457	0.038	0.510	0.048	-0.054	1.0
23	Electrical machinery	0.722	0.165	0.175	0.054	-0.118	1.0
24	Motor vehicle	0.321	0.300	0.360	0.104	-0.093	1.0
25	Transportation equipment	0.109	0.421	0.244	0.247	-0.030	1.0
26	Instruments	0.304	0.095	0.408	0.197	-0.005	1.0
27	Miscellaneous manufacturing	0.312	0.949	0.151	0.058	-0.490	1.0
28	Transportation	0.583	0.238	0.020	0.051	0.107	1.0
29	Communications	0.475	0.433	0.021	0.055	0.015	1.0
30	Electric utility	0.489	0.413	0.000	0.102	-0.003	1.0
31	Gas production and distribution	0.628	0.320	0.000	0.048	0.004	1.0
32	Wholesale and retail trade	0.301	0.555	0.068	0.015	0.059	1.0
33	Finance, insurance and real estate (FIRE)	0.374	0.561	0.019	0.018	0.028	1.0

Table 1: Fractions of gross output in different uses by industry in 1996

Commodity/ Industry		Inter-mediate inputs	Consump-tion	Gross invest-ment	Govt. purchase	Net Exports Exports -Imports	Total
34	Services	0.391	0.570	0.037	-0.004	0.006	1.0
35	Government enterprises	0.563	0.377	0.000	0.057	0.003	1.0

Source: Compiled from the 1996 Input-Output Use Table, Bureau of Economic Analysis

This model can be used to quantitatively evaluate the impact of B2B gain. We shall illustrate this with an example. Note that the matrix $\prod_y$ in the appendix describes how B2B gain to an industry affects other industries through input-output linkages. Each column represents the percentage changes in output of different industries as a result of 1 percent productivity gain that a particular industry experiences as a result of B2B e-commerce. For example, the first column represents the percentage changes in output of 35 industries when the 'Agriculture' industry experiences a 1 percent productivity gain due to B2B e-commerce. In order to calculate overall effects in terms of change in total output as a result of 1 percent increase in productivity in each of the 35 industries we follow the following steps:

1) First we calculate changes in output of individual industries by applying the percentage changes along the corresponding column of the $\prod_y$ to respective gross output. For example, when the agriculture industry experience 1 percent productivity growth, we apply the percentage changes along the first column to the gross output of 35 industries in 1996.

2) We then add up the changes in individual industries to obtain the overall effect of B2B gain in the agriculture industry. However, this total effect can be divided into 'direct effect' and 'indirect effect'. Note that the diagonal elements of Π_y represent direct effects of B2B gain. Once we calculate total effects and direct effects, we can obtain indirect effects by subtracting the direct effects from the total effects.

We use 1996 GPO data obtained from the Bureau of Economic Analysis to illustrate how we use the model to calculate the effects. The results are reported in Table 2. As we can see, B2B e-commerce in 'Services', 'Finance, insurance and real estate' and 'Wholesale and retail trade' industry has the largest effects in terms of overall changes in output. These industries also have relatively large direct effects. B2B gain in the 'Construction' industry, on the other hand, has a large negative direct effect.

Table 2: Direct and Indirect Effects of B2B Gain: An Example
(Values in billions of 1996 dollar)

Industry experiencing B2B gain		Direct effect	Indirect effect	Total effect
1	Agriculture	3.48	5.57	9.05
2	Metal mining	0.05	0.62	0.68
3	Coal mining	0.14	0.98	1.12
4	Crude petroleum and natural gas	1.10	7.15	8.25
5	Mineral mining	0.10	0.35	0.45
6	Construction	-10.09	24.79	14.71
7	Food and kindred products	1.19	7.36	8.55

Table 2: Direct and Indirect Effects of B2B Gain: An Example
(Values in billions of 1996 dollar)

Industry experiencing B2B gain		Direct effect	Indirect effect	Total effect
8	Tobacco products	0.00	0.19	0.19
9	Textile	0.25	0.69	0.94
10	Apparel	0.01	1.15	1.16
11	Lumber and wood products	0.37	2.66	3.03
12	Furniture and fixtures	0.04	0.50	0.54
13	Paper	0.65	3.93	4.58
14	Printing	0.90	2.17	3.07
15	Chemicals	1.63	6.60	8.22
16	Petroleum refining and related products	0.28	4.64	4.91
17	Rubber	0.14	4.95	5.08
18	Footwear, leather, and leather products	0.03	0.14	0.17
19	Stone	0.37	3.01	3.38
20	Primary metal	0.75	5.65	6.41
21	Fabricated metal	1.45	3.34	4.79
22	Machinery	0.35	6.78	7.13
23	Electrical machinery	1.85	8.27	10.11
24	Motor vehicle	0.59	4.00	4.58
25	Transportation equipment	0.08	0.40	0.48
26	Instruments	0.29	2.04	2.34
27	Miscellaneous manufacturing	0.11	0.95	1.06

Table 2: Direct and Indirect Effects of B2B Gain: An Example
(Values in billions of 1996 dollar)

Industry experiencing B2B gain		Direct effect	Indirect effect	Total effect
28	Transportation	-1.09	19.30	18.21
29	Communications	0.06	8.39	8.45
30	Electric utility	1.76	5.78	7.54
31	Gas production and distribution	5.34	2.83	8.16
32	Wholesale and retail trade	7.30	24.61	31.92
33	Finance, insurance and real estate (FIRE)	25.01	29.10	54.11
34	Services	40.14	42.06	82.20
35	Government enterprises	8.50	0.44	8.94

Note: The assumption is that there is 100 percent penetration of B2B.
Source: Authors' calculations

How Much Does the Economy Gain if the Cost Savings are as High as Estimated?

In the study '*E-Commerce/Internet*' conducted by Goldman Sachs, the percentage savings made possible by adopting B2B throughout specific industries have been estimated (see Table 2 in Goldman Sachs(1999)). At the end of the report they also provide the Internet penetration ratios for different industries. These are the estimated percentage shares of total sales that are or would be Internet based between 1998 and 2004. These two sets of industries they have studied do not match exactly. However there are a few overlapping industries. We take these overlapping or roughly matching industries from these two tables and match with the industrial categories we are considering

in this paper. We select seven of our thirty-five industries, which roughly match their industries. Table 3 presents the estimated cost savings and Internet penetration ratios for the years 2000, 2002 and 2004 for these industries. We multiply the cost saving figures with the Internet penetration ratios to arrive at total cost saving for each of these industries. Then we calculate the total gain in terms of increase in real GPO for the economy as implied by our model. We take one industry at a time and see the direct, indirect and total effects of introducing B2B e-commerce. The results are presented in Table 4.

Table 3: Estimated savings and penetration of B2B in selected industries for 2000, 2002 and 2004

Industry* with B2B	Estimated savings@	Estimated penetration of B2B (% share of projected sale based on Internet)		
		2000	2002	2004
Coal mining	2.0%	4.5	10.0	16.0
Crude petroleum and natural gas	10.0%	4.5	10.0	16.0
Food and kindred products	4.50%	1.1	1.3	1.6
Paper	10.0%	1.2	6.7	12.2
Chemicals	10.0%	5.0	10.5	20.0
Transportation	15.0%	2.5	6.5	11.0
Communications	10.0%	1.5	5.5	11.0

Notes: * The specific industries studied by Goldman Sachs have roughly been matched with our classification of industries
@ Wherever estimated savings are given by a range we have taken the average.

Source: Compiled from Table 2 and Table 8 of Goldman Sachs(1999)

Table 4: Estimated direct and indirect effects of B2B in selected industries for the years 2000,2002 and 2004: Changes in real gross value added
(millions of 1996 constant dollars)

Industry	2000			2002			2004		
	Direct effect	Indirect effect	Total effect	Direct effect	Indirect effect	Total effect	Direct effect	Indirect effect	Total effect
Coal mining	16	112.8	128.8	39.2	285.6	324.8	68.8	532.1	600.9
Crude petroleum and natural gas	328.8	3839.4	4168.2	577.3	8988.9	9566.2	721.8	14862.7	15584.5
Food and kindred products	41.5	420.6	462.1	42.3	579.4	621.7	44.5	860.5	905
Paper	95.8	559.7	655.5	574.8	3467	4041.8	1112.8	7258.7	8371.5
Chemicals	935.5	3635.7	4571.2	2039	7989.9	10028.9	3987.3	16232	20219.3
Transportation	-467.1	8914.2	8447.1	-1256.6	26153	24896.4	-2176.7	51451.5	49274.8
Communication	7.7	1106.1	1113.8	28.9	4389.9	4418.8	58.8	9694.3	9753.1
Total	958.2	18588.5	19546.7	2044.9	51853.7	53898.6	3817.3	100892	104709
Total effect as % of real GDP	0.01	0.20	0.21	0.02	0.53	0.55	0.04	0.96	1.00
Share of these 7 industries in real GDP			10.00			9.42			8.81

Notes: Gross value-added at 1992 constant dollars by industries are available from BEA until 1997. In order to be consistent with the 1996 I-O tables we converted them into 1996 constant dollars. Then we forecast GPO for the years 1998-2004 using growth rates for 1996.Note that we could have used the average growth rates for the decade of the 1990s. Since the beginning of the 1990s is characterized by recession that would not yield good forecasts.

Source : Authors' calculations

We observe that B2B gain in the transportation industry would have the largest impact in the economy. Interestingly enough, it has negative impact on its own real output. However, the indirect effects are substantial. 'Transportation' is followed by 'chemicals' and 'crude petroleum and natural gas' respectively. The gain from B2B in the 'transportation' industry would grow by more than five times, those from the 'chemicals' industry and the 'crude petroleum' industry by more than four times and more than three times respectively. In case of all industries that we have considered here, the indirect effects are several times higher than direct effects. It may be noted that the increase in the total gain from introducing B2B in the 'paper' industry would grow dramatically over the years. As for the overall impact, we see in last two rows that the total increase in output due to B2B in these seven industries accounts for only 0.21 percent of the US real GDP in 2000 whereas these seven industries together account for 10 percent. In 2004, this increase would account for 1 percent of real GDP whereas the projected share of these industries is only about 9 percent. However, one should keep in mind that these estimated numbers are not actual projection of the output gain in the economy. Nevertheless, given the data limitations this is the best we can do. Moreover, they give a very good idea of potential gain from B2B.

CONCLUDING REMARKS

In this paper, we examine cross-industry effects of the productivity gain that emanates from B2B e-commerce in various sectors. Within the simple framework of a multi-industry equilibrium model we introduce B2B e-commerce as an exogenously given productivity gain. Then we let the sectors interact among themselves to see how this exogenous productivity gain leads to change their input decisions, which eventually change price and output in each sector, by changing supply and demand. We observe that a B2B productivity rise in industries that mainly supply intermediate inputs or investment goods leads to fall in prices in a wider range of industries. In case of consumption goods industries, on the other hand, the effects are industry specific.

Given the simplistic nature of our model, the scope of our analysis is very narrow. However, in future research we would like to consider a more general setup and also to introduce dynamics. This will allow us to examine broader issues like effects of the Internet on long-run growth and inflation.

ENDNOTES

1. As various surveys indicate, online brokerage in the United States has slowed down since the recession while in Asia and Europe it has increased substantially. See various articles at www.nua.ie/surveys/

2. 'Prices of goods bought online, such as books and CD s, are, on average, about 10% cheaper (after including taxes and delivery) than in conventional shops.' *The Economist,* April 1, 2000.

3. Gartner Group forecasts that global B2B turnover could reach $4 trillion in America in 2003, compared with less than $400 billion of online sales to consumers.

4. This model qualifies to be a general equilibrium model in a very limited sense. It represents a production economy that does not have consumers and other agents. Nevertheless, it captures what we intend to analyze in this paper.

5. These studies are cited and reported at www.nua.ie/surveys/

6. It is easier and more obvious to argue in terms of cost saving effect of B2B e-commerce rather than in terms of productivity gain. However, in order to help explain the specification of our model, we would stick to the productivity gain argument. But they are essentially the same.

7. We will refer to it as 'B2B gain'. In the business cycle literature it would have been referred to as a positive technology shock. In our exposition B2B gain is essentially a positive technology shock.

8. In fact, there is evidence of productivity gain from e-commerce in the U.S. economy in recent times. For example, as Oliner and Sichel (2000) have pointed out, if e-commerce enables goods and services to be produced and delivered using fewer resources, it could be one factor that has pushed up MFP (multi-factor productivity) growth in recent years'.

9. The Cobb-Douglas production function is the most widely used production function in economics. Its wider acceptance is rooted in the fact that one of its inventors Paul Douglas inferred its properties from empirical observations of the US manufacturing during 1899-1922. Even now empirically, Cobb Douglas form well represents the production technology. In addition to the empirical appeal it has nice properties such as convexity, twice differentiability and homogeneity. For detailed discussion see Heathfield and Wibe (1987) and Johansen (1972). In recent times, most of the business cycle literature uses CD production function. For example, see King, Plosser and Rebelo (1988).

10. Actually this is the output of a typical firm in industry i. Since firms are identical we will use industry and firm interchangeably.

11. It could be any technological change that affects productivity.

12. A list of these thirty-five industries along with the uses of their output is provided in Table

13. I-O classification is slightly different from SIC classification.

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APPENDIX: PROOF OF THEOREM 1

Firm i maximizes short-run profit given by

$$\Pi_i = P_i Y_i - \sum_{j=1}^{n} P_j X_{ij} \tag{A.1}$$

subject to the constraint imposed by the technology

$$Y_i = Z_i \prod_{j=1}^{n} X_{ij}^{a_{ij}} \tag{A.2}$$

The resource constraint for each sector i is given by

$$Y_i = F_i + \sum_{j=1}^{n} X_{ji} \tag{A.3}$$

Substituting (A.2) into (A.1) and taking first-order derivative of i with respect to X_{ij}, we obtain the following first-order condition

$$a_{ij}P_iZ_iX_{ij}^{a_{ij}-1}\prod_{k\neq j}X_{ik}^{a_{ik}}-P_j=0 \qquad (A.4)$$

for all i, j = 1,2,….n

After algebraic manipulation and substitution of (A.2), we can rewrite (A.4) as

$$a_{ij}P_iY_i=P_jX_{ij} \qquad (A.5)$$

Note that (A.2), (A.3) and (A.5) provide a system of $n^2 + 2n$ non-linear equations in $n^2 + 2n$ unknowns. This system can be solved for X, Y and Ps as functions of Zs. Let $\bar{X}_{ij}, \bar{Y}_i \;\&\; \bar{P}_i$ be the solutions of X, Y and P in terms of $Z_i = \bar{Z}_i$.

However, in this model we are interested in the effects of displacements in total factor productivity from $\bar{Z}_i$'s on the choices of variables X, Y and Ps. Let us define

$x_{ij}=\frac{X_{ij}-\bar{X}_{ij}}{\bar{X}_{ij}}, y_i=\frac{Y_i-\bar{Y}_i}{\bar{Y}_i}, p_i=\frac{P_i-\bar{P}_i}{\bar{P}_i} \;\&\; z_i=\frac{Z_i-\bar{Z}_i}{\bar{Z}_i}$ where lower case letters denote percentage deviations from the equilibrium solutions.

Now in order to obtain linear solutions of these transformed variables in terms of z's we first take logarithmic transformation of (A.5)

$$\log(a_{ij})+\log(P_i)+\log(Y_i)=\log(P_j)+\log(X_{ij}) \qquad (A.6)$$

Using first-order Taylor series expansion around $\bar{X}_{ij}, \bar{Y}_i \;\&\; \bar{P}_i$ on both sides we obtain

$$\log(a_{ij})+\log(\bar{P}_i)+\log(\bar{Y}_i)+\frac{1}{P_i}(P_i-\bar{P}_i)+\frac{1}{Y_i}(Y_i-\bar{Y}_i)$$
$$=\log(\bar{P}_j)+\log(\bar{X}_{ij})+\frac{1}{P_j}(P_j-\bar{P}_j)+\frac{1}{X_{ij}}(X_{ij}-\bar{X}_{ij})$$

Using (A.6) and notations we have already introduced we can rewrite this as

$$p_i+y_i=p_j+x_{ij} \qquad (A.7)$$

Similarly, logarithmic transformation of the production function (A.2) first-order Taylor series expansion yield,

$$y_i = z_i + \sum_{j=1}^{n} a_{ij} x_{ij} \tag{A.8}$$

Taking logarithm of the resource constraint, we obtain

$$\log(Y_i) = \log(F_i + \sum_{j=1}^{n} X_{ji}) \tag{A.9}$$

Using first-order Taylor series expansion around $_iY$ and $\overline{X}_{ji}$ we now obtain

$$\frac{1}{\overline{Y}_i}(Y_i - \overline{Y}_i) = \frac{1}{F_i + \sum_{j=1}^{n} X_{ji}} \cdot \frac{\partial(F_i + \sum_{j=1}^{n} X_{ji})}{\partial X_{1i}}\Bigg|_{X_{ji}=\overline{X}_{ji}} (X_{1i} - \overline{X}_{1i}) + ...$$

$$..... + ... + \frac{1}{F_i + \sum_{j=1}^{n} X_{ji}} \cdot \frac{\partial(F_i + \sum_{j=1}^{n} X_{ji})}{\partial X_{ni}}\Bigg|_{X_{ji}=\overline{X}_{ji}} (X_{ni} - \overline{X}_{ni})$$

After algebraic manipulation, we can rewrite the above equation as

$$\frac{(Y_i - \overline{Y}_i)}{\overline{Y}_i} = \frac{\overline{X}_{1i}}{\overline{Y}_i}\frac{(X_{1i} - \overline{X}_{1i})}{\overline{X}_{1i}} + ... + \frac{\overline{X}_{ni}}{\overline{Y}_i}\frac{(X_{ni} - \overline{X}_{ni})}{\overline{X}_{ni}}$$

or,

$$y_i = \sum_{j=1}^{n} s_{ji} x_{ji} \tag{A.10}$$

where $s_{ji} = \dfrac{\overline{X}_{ji}}{\overline{Y}_i}$. Now substituting for y from (A.8) into (A.7) and (A.10), we obtain

$$p_i + z_i + \sum_{j=1}^{n} a_{ij} x_{ij} = p_j + x_{ij} \tag{A.11}$$

and

$$z_i + \sum_{j=1}^{n} a_{ij} x_{ij} = \sum_{j=1}^{n} s_{ji} x_{ji} \qquad \text{(A.12)}$$

for all i, j = 1,2, ……,n

In matrix form we can write equations (A.11) and (A.12) as follows

$$\mathbf{M}_v = \mathbf{E}_z \qquad \text{(A.13)}$$

where **M** is a (n^2+n)x (n^2+n) matrix containing parameters a's, s's, 1's and 0's; **v** is a (n^2+n)x1 vector of x's and p's; **E** is a (n^2+n)xn matrix of 1's and 0's and **z** is an nx1 vector of exogenous productivity displacements. Rewriting (A.13), $v = M^{-1} E_z$

or, $v = \prod_z$ (A.14)

We can partition the vectors and matrix to derive the explicit solutions as follows:

$$\begin{pmatrix} \mathbf{x} \\ - \\ \mathbf{p} \end{pmatrix} = \begin{pmatrix} \Pi_x \\ - \\ \Pi_p \end{pmatrix} \mathbf{z} \qquad \text{(A.15)}$$

where **x** is an $(n^2$ x 1) vector of intermediate inputs (in percentage deviation form) and **p** is an (n x 1) vector of prices. $\prod_x$ is an $(n^2$ x n) matrix that describes how B2B gain affects intermediate inputs and $\prod_p$ is an (n x n) matrix that describes how B2B gain affects prices.

Thus, $\mathbf{p} = \Pi_p \mathbf{z}$ (A.16)

and from (A.8) we obtain

$$\mathbf{y} = \left(\mathbf{I} + \mathbf{A}\Pi_x\right)\mathbf{z} = \Pi_y \mathbf{z} \qquad \text{(A.17)}$$

where $\Pi_y = \mathbf{I} + \mathbf{A}\Pi_x$ is an (n x n) matrix. Note that A is an (n x n^2) matrix of a_{ij}s and 0s.

A HYBRID WEB-CENTRIC AND PEER-TO-PEER ARCHITECTURE FOR CONSUMER-TO-CONSUMER E-COMMERCE

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ABSTRACT

An exciting area of growth in the world of E-Commerce has been the rapid rise of the Peer-to-Peer (P2P) architecture. While popular, as witnessed by the widespread use of file sharing programs such as KaZaa and Morpheus, this architecture has not yet been leveraged into a profitable business model. This paper proposes a new architecture for Consumer-to-Consumer E-Commerce that combines the flexibility of the P2P architecture, with the more stable web-centric architecture. These two architectures are analyzed from the perspectives of their relative information usefulness and mercantile activities they will support. After a discussion of the tradeoffs of each architecture, a C2C business model that takes advantage of the relative strengths of a hybrid P2P and Web-Centric architecture is presented.

INTRODUCTION

This paper analyzes the tradeoffs between a distributed peer-to-peer (P2P) architecture and a web-centric architecture (the dominant e-commerce

architecture) for consumer-to-consumer (C2C) online market makers. The analysis is used to compare the relative utility of both P2P and Web-centric architectures to support C2C transactions from information usefulness and mercantile activities perspectives. The paper then suggests a potential C2C business model based on a hybrid P2P and Web-Centric architecture.

The analysis of architecture and its fit to business processes is important because the alignment of architecture with user processes is relevant to the success of organizational goals (Carleton, 2002; Eisenmann 2002). Since C2C mercantile interactions are fundamentally the transfer of information, goods and services, and payments between consumer peers, it makes sense that P2P based information architectures be considered for C2C interactions and business models.

This paper addresses online market makers - electronic intermediaries that provide market services to participants by providing an infrastructure and place to trade along with rules to govern trading. Specifically, we address the online market maker business model for P2P C2C.

There are numerous business models supporting online market makers that can be categorized by product focus, transaction type, and affiliation as outlined in Table 1 (Eisenmann, 2002). The last column of Table 1 categorizes the scope of this paper.

Table 1. Online Market Maker Business Models

Category	Characteristics	Scope of this paper
Participants	*Consumers (C*): Consumers represents one or more of the transaction participants (e.g., B2C, C2C, G2C, etc.)	Consumer-to-Consumer Participants
	Business (B): A business entity represents one or more of the transaction participants (e.g., B2B, B2C, B2G, etc.)	
	Government (G): A governmental entity represents one or more of the transaction participants (e.g., G2B, G2C, G2G, etc.)	

Table 1. Online Market Maker Business Models

Category	Characteristics	Scope of this paper
Product Focus	*Customized:* Nonstandard products that require a significant amount of communication to satisfy buyer	Standardized Products
	Standardized: Well understood products that do not require extensive discussions	
Market Paradigm	*Horizontal*: Diverse customer base purchase the products	Horizontal Markets
	Vertical: products restricted to a specific buyer pool	
Product Kind	*Direct:* Items incorporated into a product	Indirect Products
	Indirect: Items used to support activities	
Transaction Type	*Catalog*: Lists of standardized products from multiple sources	Catalog Transactions
	Auctions: Buyers (or sellers) bid for products	
	Exchanges: Continuous auctions for standardized products with fluctuating supply, demand, and price	
Affiliation	*Buyer:* Biased exchange terms towards buyers.	Neutral Affiliation
	Seller: Biased exchange terms towards sellers	
	Neutral: Unbiased exchange terms.	

As shown in Table 1, this paper addresses the market for C2C participants, standardized, horizontal, and indirect products, catalog transactions, with a neutral affiliation. A good example of this type of

market is the traditional newspaper classified consumer advertisements for well understood products such as cars or appliances. The classified section of the newspaper provides a forum for catalog information for sellers for a fee. This same type of consumer classified market is available online for web-centric architectures. For example, see Figure 1.

Figure 1. Cars.Com Provides A Web-Centric C2C (and B2C) Classified Car Marketplace

We chose this market segment because it is less complex than many other markets and it is essentially P2P once the buyer and seller find one another. In other markets, a variety of complex services may be necessary to accompany the transactions. For example, in auction markets, bidding must be tracked over time using relatively complex rules. In B2B markets, a variety of more exotic business support services can be required, such as request for information (RFI) document generation, requisition and routing approval, financial settlement of orders, controls over who can see information, assurance that transactions are in accordance with regulations, laws, and pre-negotiated contracts, etc. (Katerattanakul, 2002; Smaros, 2001).

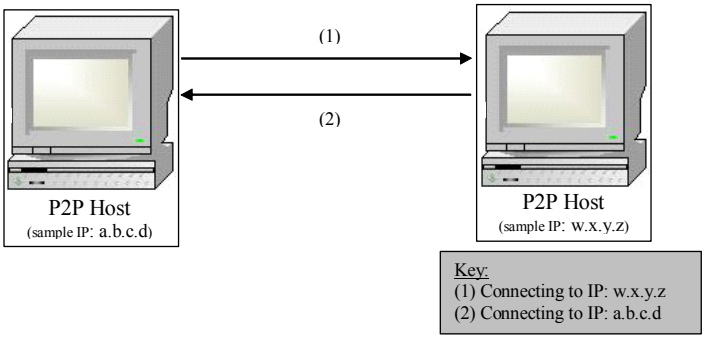
For our tradeoff analysis, we assume that the P2P architecture is not centrally controlled or managed whereas the Web-centric architecture

institutes centralized control over user information and activities. We also assume that C2C sellers have an always-on connection (such as Digital Subscriber Line (DSL) or cable modem), as opposed to a dial-up connection. If the user does not possess an always-on connection, then the analysis becomes trivial because the 24/7 availability of a Web server dominates any tradeoffs.

OVERVIEW OF P2P AND WEB CENTRIC ARCHITECTURES

According to WhatIs.com, "…peer-to-peer is a communications model in which each party has the same capabilities and either party can initiate a communication session." (TechTarget, 2003). This means that there is no intermediary between the parties (except for their internet service providers). For P2P connectivity to function on the Internet, users connect to each other via the other party's IP address. Since every device (computer, PDA, etc.) or service (routing, bridging, etc.) connected to the Internet has a unique IP address, it (IP address) is very helpful in identifying and locating these devices/services. As displayed in Figure 2, since both parties in a P2P connection have the capability of being clients and servers, they are termed "hosts" or "nodes".

Figure 2. Sample of Direct Peer-to-Peer Connectivity



It is the decision of the user to provide services or consume them. If the user chooses to be a provider then he or she can determine limits on services/resources that can be used. These limits can be based on a variety of factors such as security privilege and usage history of connected peer, and also on system load, bandwidth usage, network throughput, time of day, etc.

A Web-Centric Architecture is a type of client/server architecture. In such an architecture, one (or many) machine(s) produce and provide the services and one (or many) machine(s) acquire and consume these services. According to Webopedia.com, client/server architecture is, "a network architecture in which each computer or process on the network is either a client or a server. Servers are powerful computers or processes dedicated to managing disk drives (file servers), printers (print servers), or network traffic (network servers). Clients are PCs or workstations on which users run applications. Clients rely on servers for resources, such as files, devices, and even processing power" (Webopedia.com, 2003). A Web-Centric architecture is the architecture that defines the World Wide Web. In such an architecture, there is a clear demarcation between the producer and the consumer of the services that interact with each other over the Internet. In a Web-Centric architecture, some computers are dedicated to providing services to others. In most cases, applications implemented over the client/server architecture, such as WWW websites, are meant to serve many clients at the same time.

ANALYSIS OF PEER-TO-PEER AND WEB-CENTRIC ARCHITECTURE TRADEOFFS

Our framework contrasts the general architectural tradeoffs of P2P and Web-centric (client-server) architectures. We recognize that these tradeoffs will vary depending upon the specific application context, so we provide an explanation of how these tradeoffs apply. Using this information, the reader can adjust the analysis to fit their specific context.

Alter (2002) has proposed a series of criteria for evaluating E-Commerce models using an information perspective. These are

summarized in Table 2 and are used as a basis for comparing the relative advantages of the P2P and Web-centric architectures from an e-commerce consumer perspective. This evaluation also assumes that the user interface criteria (such as usability, user friendliness, responsiveness - etc.) can be made equivalent between the two architectures by proper design of the user interface layer. Since the transactions between buyer and seller over the Internet largely involve information exchange, the criteria are discussed in information terms.

Table 2. Evaluation Criteria from an Information Perspective

	Web-Centric	P2P
Information Quality		
Accuracy	+	
Precision		+
Age	+	
Completeness		+
Timeliness		+
Source	+	
Information Availability		
Availability	+	
Admissibility	+	
Information Expense		+
Information Security	+	
Information Presentation		+
Information Standardization	+	

Information Accuracy: This criterion measures how well the information represents what it is supposed to represent. In centralized systems, a single master copy of the data can be maintained and enforced. Any replication is performed explicitly (usually for backup purposes), so there is little chance that alternate inconsistent files exist. In a distributed P2P system, the same file can exist in several different places. For example, P2P users can download a product information file from the originator. If that downloaded file is modified, then two different files will exist that purportedly refer to the same product - which can breed inconsistencies and errors (Seltzer, 2002; Killdara Corp, 2001). Thus for this measure, the Web-centric architecture has the advantage. Additionally, because information is centrally monitored and controlled in a Web-centric system, inaccurate data can be removed from the system. In a truly distributed system, no such enforcement mechanism exists.

Information Precision: This measure addresses how well the information detail meets user requirements. In a Web-centric architecture that is centrally controlled, the user is restricted to supplying information in the format prescribed by the management authority. This may not allow for the level of information precision desired by the users. For example, a user may wish to provide a high resolution image of a product that exceeds the allowed web server file size. On the other hand, a distributed P2P system allows any desired data to be presented by the user, from videos of the product to detailed images with narration. The buyer and seller select the amount of information, along with the associated bandwidth and storage requirements, that best meet their transaction needs. Thus for this measure, the distributed P2P architecture has a relative advantage over the centralized web architecture.

Information Age: This criterion concerns how old the information is relative to the requirements of the task. In a Web-centric system, information can be controlled and removed from the system by centralized management when it expires (such as when the client sells the product). In a distributed P2P system, the architecture places that responsibility on each user. If users do not remove information from the network, then old, irrelevant information

may still be available to users. Thus, the Web-centric architecture has an advantage for this measure.

Information Completeness: This criterion addresses how adequate the amount of information is for the task at hand. The Web-centric architecture, which is centrally managed, can limit the amount and format of information provided by the seller or buyer. The P2P architecture only limits information to that which can be handled by the bandwidth, storage, and format constraints of the buyers and sellers. Thus, the P2P architecture can provide better information completeness due to its scalability (Smaros & Framling, 2001). As an example, the amount of information stored and available to users of KaZaA, a popular P2P application is huge. For example, at 8pm on 16 March, 2004 the following statistics applied to Kazaa:

Over 2.5 million users online
Over 1.4 billion files
Over 4 petabytes (4 million gigabytes) of information
Information formats included audio, video, images, documents, software, and music playlists

Information Timeliness: This measures whether the information is provided quickly enough to meet user needs. In the P2P architecture, the information is available immediately (Merkow, 2000) as soon as the user moves the files into the shared folder. For the Web-centric system, the user must explicitly communicate information to the administrators (Smaros & Framling, 2001) and may need to wait until the user and/or information is approved for posting, which may reduce the timeliness of the data. Therefore, the P2P architecture has an advantage for information timeliness.

Information Source: This measure addresses the credentials of the supplier of the information. Is the source credible, trustworthy, and free from bias? Web-centric systems, with their centralized control, can institute trust mechanisms to verify system users. For example, Ebay provides various utilities for providing feedback on sellers and also for filing more formal complaints. These same types of verification methods are not as robust in a

distributed P2P system. Thus, the Web-centric architecture has an advantage for this measure.

Information Availability: This measure addresses the extent to which the necessary information is available to the people that need it when it is required. In practical e-commerce terms, it is expected that data will be available 24 hours per day, 7 days per week (24/7). Web-centric systems can explicitly manage the replication of data and system redundancies to cope with a failure or error. In a P2P system, redundancy can, but does not necessarily, occur. For example files may be copied by prospective buyers, but this may not necessarily happen. Thus, if the file is copied by many users, it is possible that redundancy could be quite good (at the possible expense of information consistency). However, since there is no centralized management, replication of files is not explicitly required. Thus, it is also possible that redundant files may not exist in a P2P system. In a centrally controlled system, redundancy can be enforced. Additionally, 24/7 availability requires that the information source be continuously operating. A centralized web server has people dedicated to keeping the web server operating. This level of reliability may not be available to your average P2P user (Note that this analysis assumes that the P2P users have an always-on internet connection). For these reasons, the Web-centric approach has an advantage over P2P when it comes to information availability.

Information Admissibility: This criterion focuses on whether the information provided is socially, culturally, or legally appropriate. In a Web-centric system, management can remove objectionable information, whereas this does not occur in a distributed P2P system. For example, Ebay management removed items by individuals attempting to sell debris from the Space Shuttle accident. This problem with P2P has also been heightened by the wide press coverage of P2P sites such as Napster, which may be involved in intellectual property thefts (Carleton, 2002). Thus, the Web-centric system has an advantage for this criterion (unless the seller or buyer are specifically interested in exchanging inappropriate information).

Information Expense: This measure deals with the cost of executing transactions. In the P2P architecture, client software interacts directly with other client software. The expenses associated with data storage and

bandwidth are borne by the client. With a Web-centric architecture, these expenses are borne by the manager of the Website. It is assumed that these bandwidth and storage costs, plus any profit, are then passed on to the users as fees (Smaros & Framling, 2001). If one assumes that a significant portion of user bandwidth and storage stands unused and idle, then the marginal costs of adding the P2P functionality will be small. Thus, from a user perspective the P2P architecture has an advantage.

Information Security: This measure addresses the level of protection against unauthorized information access or alteration. Centrally managed security can be more attentive and sophisticated than security that relies on each user. It is well recognized that security is the Achilles heel of P2P applications because of the average user's limited awareness of security issues (Kalakota, Susarla, & Parameswaran, 2001). The Web-centric approach has an advantage over P2P which has more places where security can be breached (Killdara Corp, 2001).

Information Presentation: This measure addresses how the information is presented and how appropriate it is for the desired application. Since P2P allows users to provide information in any format desired (Framling & Holstrom, 2000), it has an advantage of the centrally controlled Web-centric architecture.

Information Standardization: This criterion measures how consistent information is across similar files. Standardization can help users because it supports a consistent view of information and easier information exchange. Since the Web-centric architecture supports the centralized management of standardization and can also provide translation services between different information formats (Smaros & Framling, 2001), it has an advantage over the P2P architecture.

C2C TRANSACTIONS AND SUPPORTING E-COMMERCE SERVICES

In this section we compare the P2P and Web-centric architectures from the perspective of a consumer mercantile model. In C2C e-commerce,

the mercantile activities of the buyer and seller are listed below (Kalakota & Whinston, 1996).

- Product/service search
- Comparison shopping and selection
- Negotiation of terms
- Placement of order
- Authorization of payment
- Receipt of product
- Customer service and support

Table 3 compares the ability of the P2P and Web-centric architectures to support e-commerce implementations of each of the consumer mercantile activities. For each mercantile activity, Table 3 lists the activities from both the buyer and seller perspectives and the electronic implementations of services that support those mercantile activities.

Table 3. Mercantile Activities Electronic Services

C2C Transaction					
Buyer	Seller	EC Services Provided	Web-Centric	Peer-to-Peer	Other Internet Tools
Product Search	Provide Info	Electronic Product Search	Website Search Engines	P2P Search Engines	Web Search Engines
		Electronic Product Advertising (Push, Pull)	Website catalog	Peer catalogs	Email (solicited and unsolicited) Newsgroups
Compare Alternatives	Provide Comparison Information	Online Reviews and ratings Comparison Charts Seller Database	Website user groups Website reviews Seller ratings database		Usenet Newsgroup reviews Web periodical reviews

Table 3. Mercantile Activities Electronic Services

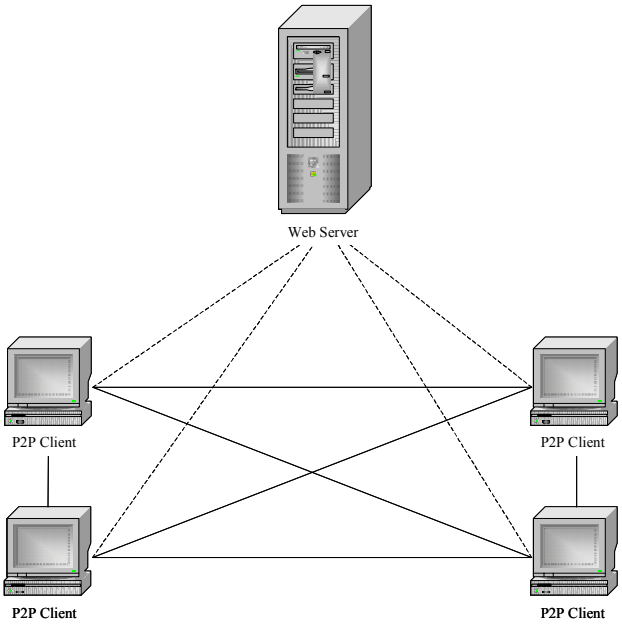
C2C Transaction					
Buyer	Seller	EC Services Provided	Web-Centric	Peer-to-Peer	Other Internet Tools
Negotiation	Negotiation	Communication Channels (email, voice chat, text chat) Terms Information Tax/fee Calculation	Terms information Tax/Fee Calculators Information Web chat	Terms Information Tax/Fee Information P2P Chat	Email
Provide Payment	Accept Payment	Electronic Credit	Online credit cards		
		Electronic Debit	Online payment system (e.g., paypal)	Online payment system (e.g., paypal)	
		Escrow Services			Electronic Escrow
Accept Shipment	Fulfillment	Shipping Information			
Request Service and Support	Provide Service and Support	Knowledge Base Electronic Communication	Online Knowledge Base, FAQ Web Page Email, Chat	Email, Chat	

For example, during the negotiation phase, Table 3 shows that during the product search phase, the buyer can search web pages and web catalogs in a Web-Centric architecture or specialized P2P search engines in the P2P environment. Additionally, the buyer can review all the offerings provided by a specific peer site by reviewing all the files in the seller's shared folder.

A PROPOSED HYBRID ARCHITECTURE

If one examines the relative advantages and disadvantages of Web-centric and P2P architectures in Table 2, and their respective services in Table 3, it is evident that the architectures have different strengths and weaknesses. Given this, we propose that a hybrid architecture can best meet the needs of the C2C buyers and sellers. Figure 3 diagrams such an architecture. This hybrid architecture allows one to place C2C services at either the peer clients or the web server depending upon the nature of the service.

Figure 3. Hybrid Web-centric and P2P Architecture for C2C Applications



To show the relative utility of this hybrid model we can apply the same information-centric perspective suggested by Alter (Alter, 2002) that was discussed earlier. Table 4 summarizes the various services that could be provided by the two parts of the hybrid model.

Table 4. Services provided by Hybrid Model

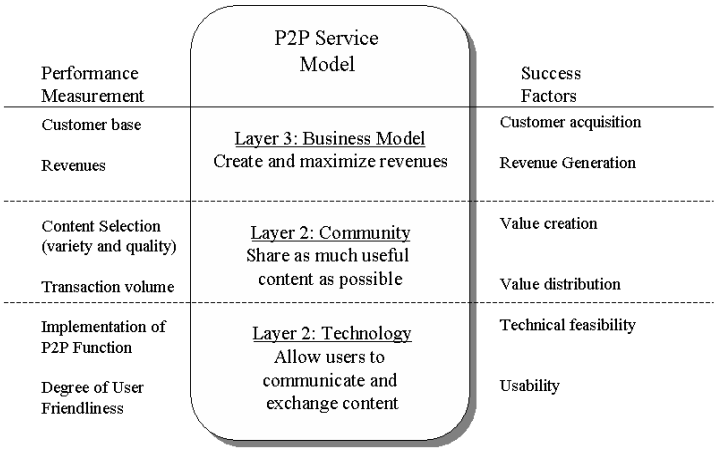
	Web Server Services	P2P Services
Information Quality		
Accuracy	Provide summary information and refer to more accurate peer client information	Provide accurate information
Precision	Provide summary information and refer to more precise peer client information	Provide precise information
Age	Provide valid timeframe of peer information	Provide valid timeframe of peer information
Completeness	Provide summary information and refer to more complete peer client information	Provide complete information
Timeliness	Provide summary information and refer to more timely peer client information	Provide timely information
Source	Provide ratings/reviews of seller	Provide ratings/reviews of seller
Information Availability		
Availability	Provide 24/7 summary information	Provide 24/7 detailed information

Table 4. Services provided by Hybrid Model		
	Web Server Services	P2P Services
Admissibility	Verify that information is admissible	Provide admissible information
Information Expense	Provide summary information and reference to peer clients for free; charge for additional value-added services	Provide detailed information and refer to Web server for additional value-added services
Information Security	Provide security patches and tips to users	Refer to Web-Server for security patches and tips to users
Information Presentation	Provide summary information and refer to peer client information	Present information in variety of appropriate formats
Information Standardization	Provide summary information in standard format and refer to additional peer client information	Provide information in standard and other appropriate formats

Kwok, et. al. provide a three layer framework for P2P business and service models (Kwok, Lang, & Tam, 2002) as diagrammed in Figure 4. The bottom two layers define the technology and community service application layers. These bottom layers provide the infrastructure to support the business model of the top layer. It could be argued that the first two layers of the Kwok model are being successfully addressed by some current P2P applications given the large user participation levels. For example, a survey of Cornell student usage of bandwidth found that on average 55% of the bandwidth was used by Kazaa inbound and outbound traffic (Cornell

University, 2001). This is far more than any other type of activity on campus.

Figure 4. Summary of the P2P Business and Service Model (Kwok, et.al.)



Assuming that the infrastructure and first two layers are being adequately addressed by current P2P communities, then it may be possible to develop the revenue to support a business model layer by providing a combination of free and paid value-added services. For example, one could place those services that require unbiased third party and/or centralized control at the web server. Bandwidth intensive, storage intensive, and rapidly changing information could be placed at the P2P client locations. Basic services such as search and referral services could be provided free of charge, while premium support such as escrow services could be provided for a fee. Table 5 summarizes ideas about how free and charged services could be split between the P2P and Web-Centric portions of the architecture.

Table 5. Consumer-to-Consumer Services on the Hybrid Architecture		
	P2P Client	Web-Server
Basic Free Services	Information search and presentation capability Referrals to value-added P2P Chat capability	Web-Server services Summary information with aging information and search Referrals to P2P site information Seller ratings
Value-Added Pay Services	Advertising	Electronic credit/debit payment acceptance Escrow services Knowledge base Comparison charts Advertising

SUMMARY AND CONCLUSIONS

This paper has examined the relative advantages and disadvantages of the P2P and Web-Centric architectures for C2C transactions. Based on this analysis, a hybrid architecture was proposed along with suggestions on how the hybrid P2P and Web-Centric architecture might be leveraged to support a profitable business model.

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A LONGITUDINAL ANALYSIS OF THE PRIVACY POLICIES OF THE FORTUNE E-50 FIRMS

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ABSTRACT

We examine the online privacy policies of the Fortune e50 firms to determine the extent to which online firms are committed to protect online consumer privacy. In addition, to determine the extent that the "dot.com bust", increasing consumer awareness of online privacy issues, and government regulations related to consumer privacy have impacted the privacy policies of U.S. firms engaged in ebusiness, we re-examine the privacy policies of the Fortune e50 firms two and one-half years after our initial investigation.

Our results suggest that most e50 firms provide basic information about online consumer privacy and that the disclosure of such information seems to be increasing. However, certain important aspects of online consumer privacy are lacking in the privacy policies of the e50 firms, particularly those related to the ability of online consumers to control how their data is used, how data collected via email is used, and how the online privacy of children is ensured. Given the sensitive nature of much of this information and the rise in computer crimes, unless online firms increase the ability of consumers of direct how their personal information can be used, the Federal Government may introduce more legislation to further protect online consumer privacy by forcing online firms to offer consumers this option.

INTRODUCTION

Online privacy is an important issue in today's digital economy. Of the many challenges facing the Internet, privacy has risen above them all as the number one concern (and barrier) voiced by web users when going online. Privacy advocates and consumer groups caution online consumers that personal information may be collected by web sites and used in ways that may compromise their privacy. Numerous events involving violations of consumers' privacy also have served as a catalyst to increase interest in online privacy (Stellin 2000; Electronic Frontier Foundation 2001; Gill 2001; Guernsey 2001). The Federal Trade Commission has targeted traditional firms such as Microsoft, The Ohio Art Company, and Eli Lilly, online firms such as Toysmart.com, Worlwidemedicine.com, Focusmedical.com, ReverseAuction.com, and GeoCities, as well as other firms with consumer privacy violations. As a result of the publicity generated from these cases, attention directed toward online privacy has increased dramatically, and several online privacy groups have emerged, e.g., the Center for Democracy and Technology; the Online Privacy Alliance; the Personalization Consortium; and the Privacy Foundation; independent privacy policy verification programs that attest to the quality of online privacy policies and practices have been formed, e.g., TRUSTe; BBB Online; WebTrust; and eSure; and the federal government has become involved in the protection of consumer privacy through the implementation of various laws and regulations, e.g., Gramm-Leach-Bliley Act, and The Children's Online Privacy Protection Act.

A question that must be asked, however, is "Are online companies listening to the issues surrounding online consumer privacy and implementing and enforcing appropriate privacy policies?" One way to determine if online companies view online consumer privacy as an important issue is to examine their online privacy policies. A privacy notice is a written statement advising the public of the collection and use of personally identifiable information and security practices of a firm. A good privacy notice is easy to find, easy to read, and comprehensively explains all of the firm's online information practices. This notice provides online visitors an

opportunity to make informed decisions about the collection and use of their information. In this study, we examine the online privacy policies of the Fortune e-50 firms, fifty firms that are representative of the Internet economy, to determine the extent to which online firms are committed to protect online consumer privacy.

Due to the significance of the on-line components of these companies, online privacy issues should be very important to the Fortune e-50 firms. Companies that want to be successful in conducting business on the Internet must be responsive in promoting the trust and confidence of on-line commerce. A privacy policy allows consumers to know that the business follows ethical practices in the treatment of their personally identifiable information, and helps increase consumer confidence in the Web as a safe place to shop.

The terms of a privacy notice are very important because they substantially determine an individual's understanding of how information will be used and what steps the individual may take to protect his or her privacy. A good privacy notice is tailored to the specific information practices of an organization and should not be merely copied from another source. When developing a privacy policy, it is necessary for a company to take an in depth look at what information their web site collects, how the information collected is being used, and its internal protocols and policies as they relate to information collection and use.

Although privacy issues relate to consumers, employees, suppliers, distributors, etc., our study focuses on consumer online privacy because individual consumers have little influence on the privacy policies and practices of the online firms with which they do business. Consequently, consumers must rely on online firms to develop, implement and maintain adequate policies and practices to protect their privacy online.

Currently, the government has relied on self-regulation by online firms to protect online consumer privacy. However, if online firms do not take steps to adequately safeguard online consumer privacy, then the government may intervene and pass additional legislation designed to protect online consumer privacy. In fact, the federal government already has determined a need to protect the privacy of consumers using financial

institutions (the Gramm-Leach-Bliley Act and the Fair Credit Reporting Act) and the online privacy of children under the age of 13 (The Children's Online Privacy Protection Act). Online firms should have incentives to adequately protect online consumer privacy because violations of government privacy legislation can result in:

1. Government fines: Violations can result in fines of up to $11,000 for each infraction. Infractions can range from not applying a customer preference for the use of their personally identifiable information throughout the enterprise to the accidental sharing of a single customer record.
2. Litigation costs: Firms that are defendants in lawsuits alleging unfair and deceptive practices relating to online consumer privacy face potentially huge litigation costs and legal fees.
3. Marketing sanctions: Firms found to be in violation of privacy regulations can be issued with cease-and-desist orders, which can paralyze their consumer marketing operations.
4. Brand damage: Negative publicity from consumer privacy violations could erode customer loyalty and shareholder confidence (Acxiom.com 2000b).

Although these government sanctions exist, they have been applied only in extreme cases. As a result, the government has relied primarily on self-regulation by online firms to protect online consumer privacy. However, if online firms do not take steps to adequately safeguard online consumer privacy, then the government may intervene and pass additional legislation designed to protect online consumer privacy. Our longitudinal examination of the privacy policies of the Fortune e50 firms should provide an indication of the level of and any shifts in the commitment of online firms to protect online consumer privacy.

ISSUES SURROUNDING ONLINE CONSUMER PRIVACY

Many issues are related to online consumer privacy, including the type of information that is collected, how that information is used, and if that information should be shared with others. The Online Privacy Alliance, an organization of online firms that is committed to the protection of online

consumer privacy, has issued a document that outlines five issues that online firms must address to protect the online privacy of their users. Creating Consumer Confidence Online: Five Essential Elements to Online Privacy (Online Privacy Alliance 2000) asserts that the following five items are issues with which online firms must contend in order to adequately protect online consumer privacy:

1. the adoption and implementation of a privacy policy,
2. the notice and disclosure of significant privacy policies,
3. the choice and consent of online consumers as to how online consumer data is used,
4. the security of online consumer data, and
5. the quality and access of online consumer data

Our study investigates these five issues to determine the extent to which online firms are committed to protect online consumer privacy and the extent to which they have modified their online privacy policies to achieve this objective. Specifically, we examine the web sites of the Fortune e50 firms for the following items:

1. disclosure and listing of an online privacy policy,
2. disclosure of information regarding the independent certification of the online privacy policy, including what online privacy policy certification service is used,
3. disclosure of what consumer information is collected online (Please see Appendix A for a listing of the general types of consumer information that are gathered online.),
4. disclosure of how consumer information collected online is used (Please see Appendix B for a description of how online consumer information may be used.),
5. disclosure of whether consumer information collected online is shared, with other companies,
6. disclosure of whether consumers have a choice as to how their online data is used,
7. disclosure of information regarding the privacy policies of linked web sites,
8. disclosure of whether consumer information collected online is shared with affiliated companies,

9. disclosure of whether information collected via email is retained for use,
10. disclosure of whether "cookies" are used,
11. disclosure of information about the security of consumer information collected online,
12. disclosure of separate information regarding the online privacy of children,
13. disclosure of whether consumers can review, change or correct information gathered online,
14. disclosure of whether consumers can "opt out" of online or email programs,
15. disclosure of information about the revision of online policies, and
16. disclosure of contact information regarding online policies.

We think that these 16 items allow us to adequately assess how well the privacy policies of the Fortune e50 firms incorporate the five elements essential to online consumer privacy as delineated by the Online Privacy Alliance.

DATA

The data used in this study was gathered from the online privacy policies of the Fortune e50 firms in 2000 and 2003. The Fortune e50 firms are fifty firms that are representative of the Internet economy and, in this study, proxy for online firms in general. The Fortune e50 firms are selected from the following subsectors:

1. E-Company Firms,
2. Net Communications Companies,
3. Net Hardware Companies, and
4. Net Software and Services Companies.

Our initial sample of firms consists of 18 e-company firms, 12 net hardware companies, 15 net software and service companies, and 5 net communication companies. Privacy policy data on these firms was gathered in December 2000. See Table 1 for a list of firms in our initial sample.

Table 1 - Samples of Firms Used in Study	
Initial Sample	Follow-Up Sample
ECOMPANY FIRMS	ECOMPANY FIRMS
Amazon.com Inc	Amazon.com Inc
Ameritrade	AOL Time Warner Inc
America Online	Charles Schwab Corporation
Charles Schwab Corporation	CheckFree Corporation
CMGI	DoubleClick Inc
CNET	E Trade Group Inc
DoubleClick Inc	EarthLink Inc
EarthLink Inc	eBay Inc
E*Trade	FreeMarkets
EBay Inc	InterActiveCorp
FreeMarkets	Knight Trading Group Inc
Healtheon	Monster Worldwide Inc
InfoSpace	Overture Services Inc
Knight Trading Group Inc	RealNetworks Inc
Priceline.com	Sabre Holdings Corporation
RealNetworks Inc	United Parcel Services
VerticalNet	Yahoo! Inc
Yahoo! Inc	NET COMMUNICATION COMPANIES
NET COMMUNICATION COMPANIES	AT&T Corporation
AT&T Corporation	Bell South Corporation
Global Crossing	Comcast Corporation
Qwest	SBC Communications Inc
SBC Communications Inc	Verizon Communications
WorldCom	NET HARDWARE COMPANIES
NET HARDWARE COMPANIES	Broadcom Corporation
Broadcom Corporation	Cisco Systems Inc
Cisco Systems Inc	Dell Inc.
Dell Inc	EMC Corporation
EMC Corporation	Intel Corporation
International Business Machines	International Business Machines
Intel	Juniper Networks

Table 1 - Samples of Firms Used in Study	
Initial Sample	Follow-Up Sample
JDS Uniphase	Network Appliance Corporation
Juniper Networks	Qualcomm Inc
Lucent Technologies	Sun Microsystems Inc
Network Appliance Corporation	Tellabs Inc
Qualcomm Inc	Texas Instruments Inc
Sun Microsystems Inc	NET SOFTWARE & SERVICE COMPANIES
NET SOFTWARE & SERVICE COMPANIES	BEA Systems Inc
Ariba	Check Point Software Technologies
BroadVision	Citrix Systems Inc
Cambridge Technology Partners	Intuit Inc
Citrix Systems Inc	Macromedia Inc
Exodus	Microsoft Corporation
Inktomi	Network Associates
Intuit Inc	Oracle Corporation
Macromedia Inc	PeopleSoft Inc
Microsoft Corporation	S1 Corporation
Network Associates	Siebel Systems
Oracle Corporation	Symantec Corporation
Razorfish	TIBCO Software Inc
Security First Technologies	Verisign Inc
TMP Worldwide	Veritas Software Corporation
VeriSign Inc	

In August 2003, we gathered the same privacy policy data for the Fortune e50 firms. Because the composition of the Fortune e50 is not static, our follow up sample of firms differs from our initial sample. Our follow up sample contains 16 e-company firms, 12 net hardware companies, 16 net software and service companies, and 6 net communication companies. See Table 1 for a list of firms in our follow-up sample.

Because a change in composition of the Fortune e50 could bias our results when comparing privacy policy disclosures over time, we also

examine changes in the online privacy policies of the surviving e50 firms. See Table 2 for a list of firms included in both our initial and follow-up samples.

The web site of each of the firms in the study was examined for an online privacy policy. Most firms had privacy policies listed online. However, if no privacy policy was found on a firm's web site, an email was sent to the firm stating that we were conducting research on online privacy policies and were unable to find a privacy policy on their web site. The email then requested that any information regarding their firm's online privacy policy be emailed to us.

RESULTS

Results from Initial Sample

The results from our initial sample show that 84% of the Fortune e50 firms have online privacy policies with all of the ECF and NCC having privacy policies, 73% of the NSSC providing privacy policies, and 67 % of the NHC listing privacy policies. Most e50 firms opt not to use privacy policy verification services, e.g., TRUSTe, with certification ranging from 44% (ECF) to 25% (NHC). The most prevalent verification service is TRUSTe (used by 30% of e50 firms), while the least used are WebTrust and eSure (each used by 2% of the e50 firms). The only other privacy policy verification service used by the e50 firms is BBB Online which is used by 8% of e50 firms. Very few firms use multiple certification services (4%).

The majority of e50 firms disclose what information is collected by their websites (68%), how collected information is used (80%), how information is shared (76%), whether or not cookies are used (68%), how collected information is secured (68%), how consumers can opt out of online programs (64%), how consumers can review, change or correct their information (60%), and how the company may be contacted with questions about their privacy policy (60%). However, most of the e50 firms do not disclose information about consumer choices regarding data use (18%), a

separate privacy statement for children (18%), privacy policies of linked sites (34%), whether information disclosed by email is collected or used (36%), or revisions to their privacy policy (48%). See Table 2 for a listing of the types of information provided by firms within each subsector in our initial sample.

Table 2 - Privacy Policy Results Summarized by Sector - All Firms

	Initial Sample					Follow-Up Sample				
Items of Interest	Total	ECF	NCC	NHC	NSSC	Total	ECF	NCC	NHC	NSSC
Disclosure of Privacy Policy	84.0%	100.0%	66.7%	73.3%	100.0%	92.0%	94.1%	83.3%	93.8%	100.0%
Use of Privacy Policy Certification	36.0%	44.4%	25.0%	33.3%	40.0%	36.0%	23.5%	25.0%	50.0%	60.0%
BBB Online	8.0%	0.0%	16.7%	0.0%	40.0%	8.0%	5.9%	16.7%	0.0%	20.0%
TRUSTe	30.0%	44.4%	16.7%	33.3%	0.0%	32.0%	23.5%	16.7%	50.0%	40.0%
WebTrust	2.0%	5.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
eSure	2.0%	5.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
What Information Collected	68.0%	77.8%	66.7%	53.3%	80.0%	88.0%	82.4%	83.3%	93.8%	100.0%
How Information is Used	80.0%	88.9%	66.7%	73.3%	100.0%	90.0%	94.1%	75.0%	93.8%	100.0%
Disclosure of Data Sharing	76.0%	94.4%	41.7%	73.3%	100.0%	82.0%	82.4%	58.3%	100.0 %	80.0%
Consumer Choice About Data Use	18.0%	11.1%	25.0%	13.3%	40.0%	24.0%	17.7%	8.3%	43.8%	20.0%
Privacy Policies of Linked sites	34.0%	27.8%	25.0%	46.7%	40.0%	64.0%	52.9%	58.3%	68.8%	100.0%
Data Sharing with Affiliated companies	58.0%	88.9%	25.0%	46.7%	60.0%	58.0%	82.4%	41.7%	50.0%	40.0%
Privacy of Data Collected Via Email	36.0%	44.4%	33.3%	26.7%	40.0%	24.0%	41.2%	8.3%	12.5%	40.0%
Use of Cookies	68.0%	88.9%	66.7%	53.3%	40.0%	76.0%	70.6%	66.7%	81.3%	100.0%
Security of	68.0%	77.8%	50.0%	66.7%	80.0%	82.0%	82.4%	75.0%	81.3%	100.0%

Table 2 - Privacy Policy Results Summarized by Sector - All Firms										
	Initial Sample					Follow-Up Sample				
Items of Interest	Total	ECF	NCC	NHC	NSSC	Total	ECF	NCC	NHC	NSSC
information										
Children's Privacy	34.0%	44.4%	16.7%	20.0%	80.0%	42.0%	47.1%	41.7%	25.0%	80.0%
Review, Change or Correct Information	60.0%	66.7%	58.3%	46.7%	80.0%	64.0%	76.5%	66.7%	62.5%	20.0%
Ability to Opt Out	64.0%	61.1%	58.3%	66.7%	80.0%	70.0%	70.6%	50.0%	87.5%	60.0%
Revisions of the Privacy Policy	48.0%	61.1%	33.3%	40.0%	60.0%	66.0%	58.8%	50.0%	75.0%	100.0%
How to Contact Us	60.0%	66.7%	50.0%	60.0%	60.0%	68.0%	70.6%	66.7%	68.8%	60.0%

Results from Follow-Up Sample

The results of our follow up sample indicate that more firms have online privacy policies than in our initial sample (92% vs. 84%); however, fewer of the firms chose to utilize a third-party, privacy certification service (34% vs 36%). Significantly more firms chose to disclose important information about online consumer privacy. Some of the more important increases in privacy disclosures are related to what information is collected (88% vs 68%), how information is used (90% vs 80%), the privacy policies of linked web sites (64% vs 34%), how consumer information is secured (82% vs 68%), and how to determine if the company's privacy policy has changed (66% vs 48%). The only area where disclosure declined is related to how information collected via email is used (24% vs 36%). Also it is notable that less that the majority of firms in the follow-up sample disclosed information related to consumer choice of information use (24%), online privacy and children (42%), and how information collected via email is used (24%). See Table 2 for a listing of the types of information provided by firms within each subsector in our follow-up sample.

Results from Surviving Firm Sample

Because the composition of firms in the initial sample and follow-up sample differ, results from comparing the contents of the online privacy policies of these two samples may be partially driven by the differences in sample composition. Consequently, in order to better understand how ebusiness firms have modified their online privacy policies in response to consumer and government pressure, we examine the temporal differences in the online privacy policies of firms in both the original and follow-up samples (surviving firms). See table 3 for a listing of the surviving firms and table 4 for data related to the surviving firms' information.

TABLE 3 - SURVIVING FIRMS	
ECOMPANY FIRMS	NET COMMUNICATION COMPANIES
Amazon.com Inc	AT and T Corporation
AOL Time Warner Inc	SBC Communications Inc
Charles Schwab Corporation	NET HARDWARE COMPANIES
DoubleClick Inc	Broadcom Corporation
E Trade Group Inc	Cisco Systems Inc
EarthLink Inc	Dell Inc.
eBay Inc	EMC Corporation
FreeMarkets	Intel Corporation
Knight Trading Group Inc	International Business Machines
RealNetworks Inc	Juniper Networks
Yahoo! Inc	Network Appliance Corporation
NET SOFTWARE COMPANIES	Qualcomm Inc
Citrix Systems Inc	Sun Microsystems Inc
Intuit Inc	
Macromedia Inc	
Microsoft Corp	
Network Associates	
Oracle Corporation	
Verisign Inc	

Table 4 - Privacy Policy Results Summarized by Sector										
	Initial Sample - Surviving Firms					Follow-Up Sample - Surviving Firms				
Items of Interest	Total	ECF	NCC	NHC	NSSC	Total	ECF	NCC	NHC	NSSC
Disclosure of Privacy Policy	86.7%	90.9%	100.0%	70.0%	100.0%	90.0%	90.9%	100.0%	80.0%	100.0%
Use of Privacy Policy Certification	46.7%	45.5%	50.0%	30.0%	71.4%	43.3%	27.3%	100.0%	20.0%	85.7%
BBB Online	10.0%	0.0%	50.0%	20.0%	0.0%	10.0%	0.0%	50.0%	20.0%	0.0%
TRUSTe	40.0%	45.5%	0.0%	20.0%	71.4%	40.0%	27.3%	50.0%	20.0%	85.7%
WebTrust	3.3%	9.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
eSure	3.3%	9.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
What Information is Collected	70.0%	63.6%	100.0%	70.0%	71.4%	86.7%	81.8%	100.0%	80.0%	100.0%
How Information is Used	83.3%	81.8%	100.0%	70.0%	100.0%	86.7%	90.9%	100.0%	70.0%	100.0%
Disclosure of Data Sharing	76.7%	90.9%	100.0%	40.0%	100.0%	80.0%	81.8%	100.0%	60.0%	100.0%
Consumer Choice About Data Use	26.7%	18.2%	50.0%	30.0%	28.6%	23.3%	9.1%	50.0%	10.0%	57.1%
Privacy Policies of Linked sites	30.0%	18.2%	50.0%	30.0%	42.9%	53.3%	36.4%	100.0%	60.0%	57.1%
Data Sharing w/Affiliated companies	60.0%	81.8%	100.0%	20.0%	71.4%	53.3%	72.7%	0.0%	30.0%	71.4%
Privacy of Data Collected Via Email	50.0%	54.6%	50.0%	40.0%	57.1%	33.3%	63.6%	0.0%	10.0%	28.6%
Use of Cookies	76.7%	81.8%	0.0%	70.0%	100.0%	76.7%	72.7%	100.0%	60.0%	100.0%
Security of	76.7%	81.8%	100.0%	60.0%	85.7%	76.7%	72.7%	100.0%	70.0%	85.7%

Table 4 - Privacy Policy Results Summarized by Sector										
	Initial Sample - Surviving Firms					Follow-Up Sample - Surviving Firms				
Items of Interest	Total	ECF	NCC	NHC	NSSC	Total	ECF	NCC	NHC	NSSC
information										
Children's Privacy	36.7%	36.4%	100.0%	20.0%	42.9%	53.3%	54.6%	100.0%	40.0%	57.1%
Review, Change, Correct Information	70.0%	63.6%	100.0%	70.0%	71.4%	63.3%	63.6%	0.0%	60.0%	85.7%
Ability to Opt Out	76.7%	63.6%	100.0%	70.0%	100.0%	73.3%	72.7%	100.0%	50.0%	100.0%
Revisions of the Privacy Policy	53.3%	63.6%	100.0%	30.0%	57.1%	70.0%	72.7%	100.0%	50.0%	85.7%
How to Contact Us	73.3%	72.7%	100.0%	60.0%	85.7%	73.3%	63.6%	100.0%	70.0%	85.7%

Performing a temporal comparison of the online privacy policies of the surviving firms yields the following results. Slightly more firms have an online privacy policy in the follow-up sample of surviving firms (91%) compared to the original sample of surviving firms (87%). This is due to an increase of online privacy policies among the NHC firms (80% vs 70%). The percentage of surviving firms using privacy policy certification services experienced a slight decline across time (47% vs 43%). However, it is interesting to note that a decline in privacy policy certification services was experienced in the ECF (27% vs 45%) and NHC (20% vs 30% firms while an increase was experienced among the NCC (100% vs 50%) and NSSC firms (86% vs 71%). Additional investigation is required to explain this phenomenon. Also, no surviving e50 firms use the WebTrust or eSure services in the follow-up sample. This is partially due to the fact that eSure was a service of Arthur Andersen whose business and reputation were devastated as a result of the Enron scandal. The reason for a drop in the percentage of firms using WebTrust is unknown; however, since only one

firm used WebTrust in the initial sample, further investigation is needed to clarify this issue.

Significantly more firms in the follow-up sample disclose what information is collected (87% vs 70%) compared to the initial sample; however, only slightly more firms in the follow-up sample disclose how collected information is used (87% vs 83%) compared to the initial sample. Although significantly more NSSC firms disclosed information regarding consumer choice about data use (57% vs 29%), the overall percentage of firms disclosing such information declined (23% vs 27%). This is due to declines in disclosures of this information in the ECF (9% vs 18%) and NHC (10% vs 30%) sectors. The decline in overall disclosure of consumer choice information is counter to the results from the samples composed of all e50 firms.

Many more firms in all four sectors disclosed information about the privacy policies of linked sites (53% vs 30%) while a slight decrease in firms disclosing information regarding data sharing with related companies was noted (53% vs 60%). The latter result is driven by the fact that fewer firms in the ECF (73% vs 82%) and NCC (0% vs 100%) sectors and is counter to the result obtained using the samples composed of all Fortune e50 firms. A large decline was noted in the number of firms disclosing information related to the privacy of data collected via email (33% vs 50%). All of the sectors except ECF experienced declines in the disclosure of this information.

Significantly more firms disclosed information related to children's privacy in the follow-up sample compared to the initial sample (53% vs 37%). However, a decline was experienced in the percentage of firms disclosing information regarding the ability of consumers to review, change or correct their personally identifiable information (63% vs 70%). This result is counter to the result obtained from the full samples of firms and is due to a large decline in the reporting of this information in the NCC sector (0% vs 100%) a small decrease in the NHC sector (60% vs 70%) and an increase in the NSSC sector (86% vs 71%). Finally, slightly fewer firms reported information about consumer ability to opt out of specified programs (generally email) (73% vs 77%), which is counter to the result from the full

samples of firms, while significantly more firms disclosed information about changes in their privacy policies (70% vs 53%).

CONCLUSIONS

Online privacy is a major concern of individuals spending time on the Internet. Most Fortune e50 firms provide basic information about online consumer privacy. However, certain important aspects of online consumer privacy are lacking in the privacy policies of the Fortune e50 firms. Surprisingly, most of the Fortune e50 firms do not have independent certifications of their online privacy policies. Our results also indicate that the percentage of overall firms disclosing information regarding what information is collected and how it is used. We also find that the reporting of information related to data sharing and consumer choice about data use has increased in the overall samples of firms; however, the number of surviving firms that disclosed information about consumer choice about data use declined, as did disclosure of information about data sharing with affiliated companies.

Significantly more firms report information about the privacy policies of linked sites but the disclosure of information about the privacy of data collected via email declined. More firms report information regarding the use of cookies, the security of consumer information, and online privacy of children. And although more firms overall report information related to consumer ability to review, change or correct their personally identifiable information and the ability of consumers to opt out of online or email programs, fewer surviving firms do so. Finally, significantly more firms disclose information about changes in their privacy policies.

In summary, it appears that disclosures in the online privacy policies of the Fortune e50 increased from 2000 to 2003. However, several areas of disclosure are still in need of improvement, particularly information related to consumer choice about data use, the privacy of data collected via email, and children's online privacy. Also, declines in the disclosure of certain information among the surviving firms were noted. If online firms fail to

continue to adopt more comprehensive online privacy policies, possible implications are that more consumers may elect not to shop online, and that the Federal Government may introduce more legislation to protect online consumer privacy. Either of these situations will exacerbate the difficulties many online firms currently are experiencing and may result in further disillusionment with and capital flight away from online companies. Also, the fact that identity theft and online fraud continue to grow is putting additional pressure on online firms to disclose more information regarding online consumer privacy.

Difficulties that online firms may experience in developing privacy policies are that consumer expectations regarding privacy policies may shift, requiring online firms to modify their privacy policies accordingly. Another difficulty of developing and maintaining an online privacy policy is related to the number of countries that have enacted laws to protect consumer privacy. Because online firms engage in transactions around the world, ideally their privacy policies would address the concerns of the consumer privacy laws of the countries in which they have customers. However, hundreds of consumer privacy laws have been enacted in numerous countries across the world and, consequently, it would be virtually impossible to incorporate the requirements of all of these laws into a single online privacy policy. A possible solution to this dilemma is to have multiple online privacy policies for different regions of the world; however, ensuring compliance with all of these privacy policies would be very time consuming and expensive.

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