E-Business Initiatives & Firm Value Assessment using Event Study Methodology

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Abstract

A growing number of firms are competitively entering into e-Business because they see the high potential of e-Business growth as an opportunity. The positive expectation of e-Business market leads most firms to go into e-Business, but it is not clarified what kinds of benefits firms gain through e-Business.

In this paper, we examine whether firms' economic benefits are related to eBusiness activities. For this purpose, we employ event study methodology and assess the cumulative abnormal returns for 782 eBusiness initiatives by firms listed in Korean capital markets.

The well-known *Dot Com Effect* is empirically verified through this study. The results of this study indicate that the e-Business potential is highly evaluated in the capital market, and e-Business firms are expected to create significant benefits in the future period.

1. Introduction

People are getting more interested in Internet and e-Business all over the world. Such interest can be observed in the increasing number of Internet users. According to NUA, an Internet survey investigator in the U.S., the number of home Internet users is estimated to be 379 million users in 2001 [1]. This figure is about twice the 201 million users in 1999. Korea is not an exception in this fast growing trend, and the number of Internet users in Korea was 19 million users at the end of December of 2000 [2]. This huge number of Internet users in Korea, and the world, means a lot of potential customers in the e-Business market.

E-commerce market around the world is forecasted to more than \$500 billion in 2001, and to reach \$1.49 trillion in 2003 according to Forrester Research. LG Economic Research Institute and Andersen Consulting state that the e-commerce market size in Korea is expected to grow about 100% every year [3]. Another reason that firms have been entering the e-Business market emulously is the high stock prices of Internet firms [4]. Korean Internet firms have had very high stock prices compared to other stocks in Korea. The KOSDAQ index was over 290 at one time with annual growth rate of more than 100%, and this number was actually driven by Internet firms. A number of brick and mortar firms, which observed the high stock prices of Internet firms, have been making efforts to enter e-Business, and new Internet start-ups have been increasing.

Although a lot of companies enter the e-Business arena looking at the fast growing number of Internet users and rapid growth of e-commerce market, evidence of the benefits to firms from e-Business initiatives is far from being unequivocal, and the costs of entry are real and overwhelming. Considerable up-front investments in creating e Business capabilities are required to be a viable player in the current e-Business environment. According to a recent report, the construction and engineering industry spent \$1,863 per employee for e-commerce initiative, compared with financial services sector which made e-commerce investments of \$13,628 per worker [5]. The Gartner Group estimates

that the average cost of developing and launching an e-Business web site is \$1 million, and it needs \$5-20 million to achieve market differentiation that sets it apart from the competition [6]. Further, the publicly reported figures for hardware and software expenditures in e-Business ventures comprise only 21% of the overall costs, with the predominant expense being the labor costs for developing the site and implementing interfaces to back-end business applications. This cost of development and implementation of web sites is expected to rise by 25% annually [7].

Once these investments are in place, the company needs to promote its e-Business web site. This effort can include putting banner ads in one of the portal sites, or putting commercials in newspapers, magazines, or on TV. As the number of e-Business firms is growing from day to day, these kinds of costs are inevitable, and it looks as if the amount of money required for such advertising is increasing [8]. Although e-Business requires a lot of such costs, a growing number of firms are making or considering making such investments both in information technologies and in organizational changes related to e-Business. A research question that follows is: *What are the economic returns to firms from engaging in e-Business?*

In this paper, we focus on the market value of firms based on the economic returns they get through e-Business activities. We analyze the impact of e-Business initiatives on the market value of firms in Korea. For this purpose, we employ the event study methodology, which is based on the efficient market hypothesis. In an efficient capital market, investors are believed to recognize future benefit streams from managerial initiatives announced by firms, a judgment subsequently reflected in the stock price of the firm. If e-Business activities enhance future cash flows, the capital market would respond favorably to e-Business announcements by firms, and this would be reflected in a positive movement of their stock price. Event study methodologies are very useful tools for management researchers to examine the consensus estimates regarding the future benefits streams attributable to organizational initiatives [9].

The impact of e-commerce initiatives on the market value of firms in USA was investigated by Subramani and Walden [8]. They validated the popular notion of Dot Com Effect by showing that the Abnormal Returns of the e-commerce initiatives were greater than the normal market returns. However, their research interest was confined to e-commerce firms and a small number of e-commerce initiatives. This study differs from theirs in two distinct ways. First, we have expanded the types of e-Business firms investigated as well as these firms' e-Business initiative types so that broader ranges of eBusiness activities can be evaluated. Second, eBusiness initiatives are analyzed in two different capital markets (KSE & KOSDAQ) to investigate whether similar e-Business initiatives result in different firm values in the two markets.

In this paper, we empirically study *Dot Com Effect* in Korea by assessing the value implications of e-Business initiatives announced by firms. We examine if the economic value of e-Business initiatives is linked to the nature of the stock markets, whether the stock market is KSE (Korea Stock Exchange) or KOSDAQ. We also investigate if the economic value of e-Business initiatives is connected to the nature of the e-Business firm layers, whether the layer is Internet infrastructure, application, intermediary or commerce. It is assessed if the profitability of e-Business initiatives is initiatives, whether it relates to business-to-consumer e-commerce or business-to-business e-commerce. It is also examined if the profitability of e-Business is related to the types of e-Business initiatives.

2. Research Hypotheses

2.1 Effect of E-Business Initiatives

Mass media, such as newspapers and TV, report that the number of Internet users is rapidly increasing, and the e-

Business market will grow sharply. This trend brings about the emergence of continuous Internet firm initiatives and changes of conventional firms' operational structure to adjust to Internet environments. Firms that cannot adjust to new managerial environments like Internet, in the long run, should not survive. This trend is also presented in the new terminology of the 'New Economy', as opposed to the 'Old Economy' of manufacture-based economy. Under these circumstances, new e-Business initiatives or changes of operational structures to adjust to Internet environment can be viewed as attempts to take advantage of eBusiness's potential and to improve future benefits for the firms. Furthermore, IT investments related to eBusiness will enhance firms' operational efficiency, and this will likely to lead to operational cost savings and enhanced cash flow [10].

In terms of the resource-based view of the firms [11], [12], [13], firms' investment in e-Business can be regarded as creating diverse resources to perform their own e-Business. Firms initiating e-Business earlier than competitors can learn more quickly about e-Business, better capture diverse resources required for e-Business activities, and have a considerable organizational experience and understanding of the e-Business market. Consequently, the firms engaging in e-Business will achieve a considerably advantageous position, enough to accomplish strategic and operational superiority. If so, investors are likely to respond positively to the e-Business initiatives by firms and consequently positive abnormal stock market returns are yielded. This positive abnormal stock market return is a risk-adjusted return that exceeds average stock market return, which leads to the following hypothesis that e-Business initiatives would consequently improve market valuation of firms.

Hypothesis 1 For firms engaging in *eBusiness activities, the abnormal returns attributable to eBusiness initiatives are positive.*

2.2 Capital Markets

The KSE (Korea Stock Exchange) has expanded greatly after it opened its market in 1956. When it opened its market, there were only twelve listed companies. Now it is the oldest and biggest stock market in Korea, and it is among the top 10 markets of the world in terms of transaction volume and the total market price. To support this fast growth, it moved ahead with computerization of its trading system in 1981, and the KSE's trading system was fully computerized in September 1997. Now it has a stock market, bond market, options market, and a futures market [14].

The KOSDAQ (Korea Securities Dealers Automated Quotation) is a kind of institutionalized off-board market. The examples of these off-board markets are NASDAQ in the U.S., JASDAQ in Japan, and USM in England. The offboard stock market of Korea was first institutionalized in April 1987, and KOSDAQ was inaugurated in July 1996. Since KOSDAQ began, it has expanded greatly in terms of listed companies, and total market price [15].

E-Business has swept both stock markets in Korea, and at that time the stock prices of e-Business firms are rated high. This is shown clearly in 'Internet Bubble' with an apprehensive voice. The cause of this enthusiasm for e-Business related stocks is likely to be found in the expectation of a firm's rapid renovation and remarkable success by Internet technology [4]. It is KOSDAQ that has been taking the lead of this eagerness in Korea.

The 'KOSDAQ Premium' is well known to investors in Korea. It means that the stock prices are far more highly valued in KOSDAQ than in KSE, even if they are the same sized firms engaging in the same business [16]. Because Internet-related stocks and technology-related stocks have a high potential of growth in the future, KOSDAQ, in which many of these stocks are listed, is highly evaluated in the Korean stock market. Certainly, even though KSE has Internet-related stocks and technology-related stocks, the number of them are relatively small and moreover, majorities of those stocks listed in KSE are conventional brick-and-mortar firms. Consequently, stocks listed in KOSDAQ are

expected to be more highly evaluated than in KSE.

In the case of the United States, Internet firms performed better than the conventional brick-and-mortar firms in terms of the stock price returns in the period from June 1998 to June 1999. In this period, the index of Internet firm stocks increased to about the returns of 400% annually. For the returns of the S&P500 or the Dow-Jones Industrial Average based on the conventional firms increased to 18.90% on average [4]. Similarly in Korea, due to the 'KOSDAQ Premium', the stock prices in KOSDAQ are more highly evaluated, where a high number of state-of-the-art Internet firms are centralized. If so, investors are likely to more positively respond to the e-Business initiatives by the firms listed in KOSDAQ than those listed in KSE. This suggests that the abnormal returns of firms listed in KOSDAQ are higher than the abnormal returns of KSE listed firms after new e-Business initiatives. This leads to the following hypothesis.

Hypothesis 2 The abnormal returns attributable to e-Business initiatives of KOSDAQ listed firms are higher than the abnormal returns attributable to e-Business initiatives of KSE listed firms.

2.3 E-Business Firm Layers

The e-Business firm categorization used in this paper is based on the previous research of the University of Texas and Cisco systems [17]. According to this report, there is a natural structure or hierarchy to the Internet economy that can be directly traced to how businesses generate revenues. Based upon this type of structure, the Internet economy is broadly classified into infrastructure and economic activity categories. The infrastructure category is further divided into two distinct but complementary layers: the Infrastructure layer, and the Applications layer. The economic activity category is also subdivided into two layers: the Internetiary layer and the Commerce layer.

Infrastructure layer provides the physical infrastructure for electronic commerce, and includes companies that manufacture or provide products and services that make up the Internet network infrastructure. Applications layer includes software applications, consulting, training and integration services that build on top of the network infrastructure, and which makes it feasible for organizations to engage in online commerce. Intermediary layer involves the role of a third party in a variety of capacities: market maker, provider of expertise or certification that makes it easier for buyers to choose sellers and/or products, search and retrieval services. Commerce layer involves direct transactions between buyers and sellers like manufacturers and e-tailers.

Taking into account the rapidly increasing number of Internet users, the expected rapid growth of the e-commerce market in the future, and the enhancement of firms' operational efficiency attributable to e-Business investments, it is suggested that potential growths and benefits of e-Business firms related to Intermediary or Commerce layer are relatively higher than those related to the other layers. Also, e-Business is likely to substitute for the conventional business domain in these layers. Among the American companies, Amazon.com may be good examples. Amazon.com had encroached on the business of Barnes & Noble, a gigantic bookseller in American book retailing. As a result, Barnes & Noble entered into e-Business.

However, reports indicate that a considerable number of e-Business firms including Amazon.com, will be on the verge of bankruptcy sooner or later due to fund starvation [18]. This analysis suggests that their fund holdings will be finally exhausted because a large number of e-Business firms do not have solid profit structures. Considering this analysis, those e-Business firms in the infrastructure or application layers equipped with solid business basis should be more profitable than e-Business firms in the Intermediary or Commerce layers.

Some analysts predict that the firms, which can earn profits attributable to the growth of e-Business eventually, are

not the ones in the Intermediary or Commerce layers, but are the ones in the Infrastructure or Application layers. Metaphorically speaking, at the time of the 'Gold Rush' in the United States, it was mining equipment providers who actually earned money, not gold mine operators or miners who went to seek for gold in the West. The bright prospect of e-Business growth has driven many firms to enter the e-Business. However, it may be the firms providing e-Business firms with equipment, network, and application that earn money ultimately [19]. Based on the above argument, it is difficult to estimate accurately which firms among the four layers will have a larger effect from e-Business initiatives. Therefore, we first hypothesize that the effects of e-Business initiatives are different according to the layers, and reveal the differences among layers through data analysis results.

Hypothesis 3: The abnormal returns attributable to e-Business initiatives are different depending on the layers to which the e-Business firm belongs.

2.4 B2B vs. B2C e-Business Firms

Electronic Commerce is classified roughly into two categories: one is Business-to-Business Electronic Commerce (B2B), and the other is Business-to-Consumer Electronic Commerce (B2C) [20]. B2B is commerce where transactions between firms are performed or supported on-line. Typical examples include manufacturers who purchase raw material on-line, or who sell their products for retailers on-line. B2C is commerce where consumers are provided with products or services via the Internet, and most of the Internet shopping malls and portal site services are the examples.

According to Forrester Research, the B2B e-commerce market will rapidly grow from \$251 billion in 2000 to \$1,331 billion by 2003. In contrast, the B2C e-commerce market is growing from \$33 billion in 2000 to \$108 billion by 2003. Many market research estimates consistently claim that the B2B market scale is much bigger than that of the B2C. Similarly, it is expected that the increase in the B2B e-commerce market is likely to far exceed that of the B2C e-commerce market in Korea. According to Anderson Consulting, the B2B e-commerce market in Korea is estimated to grow from \$300 million in 2000 to \$7,100 million by 2005. For the B2C e-commerce market in Korea, it is estimated to grow relatively small from \$150 million in 2000 to \$1,000 million by 2005 [3].

However, B2B e-Businesses inherently have risks. In order to activate e-commerce between firms, it is required to integrate the processes between the participating firms. Establishing effective managerial processes between firms is also challenging [21]. These tasks cannot be easily accomplished and thus B2B eBusiness inherently involves complexity and high risk.

B2B firms tend to be relatively large-sized. In other words, their sales volume and the number of employees are relatively large. In contrast, B2C firms tend to be small-sized. According to CAPM (Capital Asset Pricing Model), the expected returns of a stock are only evaluated by the systematic risk, regardless of the scale of the firm that issues stocks. In reality, however, it has been observed that higher abnormal returns are created in small-sized firms, which is termed "firm size effect" [22]. Considering this effect, it is suggested that the abnormal returns created by relatively small-sized B2C firms are higher than those of larger B2B firms.

Considering the inherent complexity and high risk of B2B e-Business, and the firm size effect in actuality, it is estimated that the market valuation associated with e-Business initiatives is higher in B2C firms than in B2B firms. This leads to the following hypothesis.

Hypothesis 4 The abnormal returns attributable to eBusiness initiatives of B2C firms are higher than the abnormal returns attributable to e-Business initiatives of B2B firms.

2.5 E-Business Initiative Types

Public announcements are intended to inform the stakeholders of any changed conditions about the firm. Legally, the public announcement system imposes duties on companies requiring them to announce information essential to stakeholders' judgments, such as financial statement or new business initiatives. Major information about the company is disclosed to the public with public announcements, which can help investors' judge investment decisions rationally, can help securities circulate smoothly, and can help the practice of fair trading to be established [23]. Public announcements on a legal basis can be divided into two groups: legal, an enforced public announcement, or autonomous, an optional public announcement. The former is an announcement by the commercial law, the securities exchange law, and KOSDAQ managerial regulations (public announcements in a narrow sense), and the latter is an announcement by the press (public announcements in a broad sense) [24].

In this paper public announcements are limited to autonomous optional public announcements made by firms through the press (Public announcement in a broad sense). We are mainly interested in the public announcements associated with new e-Business initiatives or the expansion of an existing e-Business. We classify them into three categories: (1) e-Business initiatives related to the alliances between firms, (2) e-Business initiatives related to the expansion of conventional offline firms by entering into e-Business, (3) e-Business initiatives related to the business expansion of e-Business initiatives related to the business expansion of e-Business initiatives related to the business expansion of e-Business firms.

Because these categories have different natures, market valuations are likely to vary according to the categories of e-Business initiatives. For instance, when a brick and mortar firm enters into new online markets, its impact might differ from when an Internet shopping mall expands its business within online markets. Thus, we hypothesize that the effects of e-Business initiatives are different depending on the types of announcements.

Hypothesis 5: The abnormal returns attributable to e-Business initiatives are different depending on the types of e-Business initiatives.

3. Research Design

3.1 Event Study Methodology

The event study methodology has begun to be used as a powerful tool that can help IS researchers assess the business performance of IT investments such as e-Business initiatives. We take the event study methodology that estimates AR (Abnormal Return) of firm activities as a method for evaluating the market values of e-Business firms. AR represents the estimated future return of firms forecasted by many investors related to e-Business initiatives in capital market. This method has been successfully used in previous studies [8], [25], [26]. If investors speculate that the company announcing the start of a new e-Business can create future profit through this e-Business initiative, they would respond positively to the company's new e-Business activities. This will be represented by "positive abnormal stock market return" after the event day.

Selection of the length of an event period and an estimation period is based on previous event studies. We select five days before and after the event announcement (for a total of 11 days) as an event period to observe the effect of e-Business initiatives (t=[-5, 5]). For the estimation period, we used 45 days before the event (t= [-50, -6]) to estimate the expected return. For a detailed discussion of how to calculate the abnormal returns in event studies, see

3.2 Data Collection

Korean firms related to our research were collected and categorized in order to examine the AR (Abnormal Returns) attributable to e-business initiatives of these firms. This was done by referencing some guidebooks¹ which contain information about the publicly traded firms, searching the Internet, and visiting the web-sites of those firms. We selected the firms from those listed in the KSE and KOSDAQ, and categorized them into four layers. This categorization of four layers was done according to the previous research [27]. Through this investigation, we identified 215 firms, with 119 firms listed in KSE and 96 firms listed in KOSDAQ.

In the next step, we collected new e-business initiatives released by these firms for six months from October 1, 1999 to March 31, 2000. The collected public announcements are related to the beginning of new e-business or the expansion of established one. The number of public announcements by those selected firms was 388 in KSE and 394 in KOSDAQ for the predetermined six months. Thus, total of 782 e-business initiatives were used in the analysis of data.

In order to test the research hypotheses, we classified these ebusiness initiatives according to the research variables. These research variables included KSE & KOSDAQ, e-business firm layers, B2B & B2C, and e-business initiative types. Table 1 shows the distribution of e-business initiatives used for each hypothesis test. To maintain consistency through the analysis, we have excluded some sample data if they do not belong to relevant categories. Thus, three hypotheses (hypothesis 3, 4, and 5) use parts of the 782 data points.

¹ Korean Credit Information, Analysis of Listed Firms, Maeil Business Newspaper, Korean Credit Information, 2000. Shinhan Jeungkwon Investment, 2000 Stock Investment <u>List@KOSDAQ</u> Companies, The Korea Economic Daily, Seoul, 2000.

| type Distinction | | KSE | KOSD AQ | T otal |
|-----------------------------------|---------------------------------------------------------------|-----|------------|-----------|
| Capital Market | KSE | 388 | | |
| | KOSDAQ | | 394 | |
| Total (Hypothesis 1 and 2) | | 388 | 394 | 7 82 |
| e-Business Firm Layers | Layer 1 (Infrastructure) | 165 | 172 | 3 37 |
| | Layer 2 (Application) | 30 | 81 | 1 11 |
| | Layer 3 (Intermediary) | 48 | 19 | 6 7 |
| | Layer 4 (Commerce) | 65 | 25 | 9 0 |
| Total (Hypothesis 3) | | 308 | 297 | 6 05 |
| B2B/B2C | B2B | 132 | 111 | 2 43 |
| | B2C | 128 | 125 | 2 53 |
| Total (Hypothesis 4) | | 260 | 236 | 4 96 |
| e-Business Initiative Types | Alliance-related | 105 | 98 | 2 03 |
| | Business expansion from non-Internet into e- Business | 38 | 61 | 9 9 |
| | Business expansion of the established e- Business firms | 49 | 48 | 9 7 |
| Total (Hypothesis 5) | | 192 | 207 | 3 99 |

Table 1 The Number of E-Business Initiatives

4. Analysis and Discussion

4.1 Returns from E-Business Initiatives

Fig.1 presents the effect attributable to e-Business initiatives of all e-Business firms listed in KSE and KOSDAQ. In this figure, bars in the graph present CAR² for 782 e-Business initiatives. The graph shows that the CAR for the five days after the event day are higher than the CAR for the five days before the event as the event day is the turning point. The biggest increase of CAR is on the day of the event, which increases from 2.17% to 3.50%. We observe that CAR slowly increases except for day (t+2) (2 days after the day of the event), and it reaches at 4.74% on day (t+5), which is the impact of e-Business initiatives on firm value.

The graph also includes a significance test of Hypothesis 1. The shaded region represents the outer limits of the 95% confidence interval over the time window for the hypothesis that CAR is positive (CAR > 0). Therefore, all bars rising above the shaded region are statistically significant at the 0.05 level. As for all bars remaining below the shaded region, CAR is not statistically significant at the 0.05 level. As shown in the graph in Fig.1, Hypothesis 1 is accepted and consequently abnormal returns attributable to e-Business initiatives are positive.

 $^{^2}$ CAR (Cumulative Abnormal Return) is the return that adds up cumulatively abnormal return at each time. Abnormal return is an excess stock return resulting from e-Business initiatives.



*Shaded region represents the critical value of the test CAR = 0, with $\alpha = 0.05$

Fig.1 CARs for e-Business initiatives

4.2 Returns to KSE listed Firms vs. KOSDAQ listed Firms

Fig.2 presents the results for the test of Hypothesis 2. CARs for KOSDAQ listed firms and KSE listed firms are presented in Fig.2(a) and 2(b) respectively, and 2(c) depicts the differences in the CARs between KOSDAQ listed firms and KSE listed firms ($CAR_{KOSDAQ} - CAR_{KSE}$). We can observe that the CAR in both 2(a) and 2(b) are considerably increasing since the event day. The difference shown in 2(c) is positive, which is the same direction as we postulated on the hypothesis. This is the effect difference between KOSDAQ listed firms and KSE listed firms attributable to e-Business initiatives. The null hypothesis is rejected because the bars rise above the shaded region (95% of confidence level). Consequently, we accept Hypothesis 2 that the abnormal returns attributable to e-Business initiatives are higher than those in KSE.



*Shaded region represents the critical value of the test CAR = 0, with $\alpha = 0.05$

Fig.2 CARs for KSE listed firms vs. KOSDAQ listed firms

Time

4.3 Returns According to E-Business Firm Layers

KSE and KOSDAQ are different markets, and the nature of them is distinct, as revealed in the test of Hypothesis 2. From now on, we analyze remaining hypotheses (Hypothesis 3, 4, and 5) by separating the firms listed in KSE and KOSDAQ. With clear difference of KSE and KOSDAQ, hypothesis testing with combined data from both markets may lead to wrong conclusions.

We employ ANOVA ³ to test Hypothesis 3. For KSE, the *p-value* which indicates the CAR difference according to e-Business firm layers is 0.037. This result is statistically significant at the 0.05 level. Consequently, Hypothesis 3 is accepted that the abnormal returns attributable to e-Business initiatives are different depending on the layers to which the e-Business firm belongs. To find out reasons for this result, we have performed post hoc analysis⁴ to examine in which layers there is a difference. We have found that CAR in layer 2 has negative (-) value, and is significantly different from CARs in other layers.

In KOSDAQ, the *p*-value which indicates the CAR difference according to e-Business firm layers, is 0.940, which is not significant at the 0.05 level. No matter which layer firms in KOSDAQ belong to, their CARs of e-Business initiatives remain high. So, there is no difference in CAR according to layers in KOSDAQ listed firms. Consequently, Hypothesis 3 for KOSDAQ is rejected that the abnormal returns attributable to e-Business initiatives are different according to the layers.

It is interesting to note that large software firms listed in KSE (application layer firms) do not enjoy "Dot Com Effects," while firms in KOSDAQ have significant impacts of e-Business initiatives on their firm value regardless of the layers. One possible explanation for this difference is that investors consider the proliferation of e-Business as significant opportunities for relatively small software firms (mostly listed in KOSDAQ) but threats to large software firms (mostly listed in KSE). For large application layer firms, the focus on traditional software may serve as a liability in new digital economy, where small and fast moving software venture firms have advantages.

4.4 Returns to B2B Firms vs. B2C Firms

Fig.3 represents the test results for Hypothesis 4 about KSE listed firms. In this figure, 3(a) depicts B2C firms, 3(b) depicts B2B firms, and 3(c) depicts the difference between B2C firms and B2B firms (CAR $_{B2C}$ – CAR $_{B2B}$). It indicates that the direction of difference is the same as what we hypothesized. In 3(a), the CAR of 2.96% on the day of the event continuously increases enough to reach 4.80% at day (t+5). In 3(b), the CAR gradually decreases at the turning point of the day (t+1) with the exception of 0.86% CAR on day (t+5). In 3(c), the CAR of B2C firms are higher than that of B2B firms all over the event window, and the CAR differences between them are positive. Consequently, Hypothesis 4 is supported in KSE. The abnormal returns attributable to e-Business initiatives of B2B firms.

 $^{^{3}}$ This is to test if there is a difference between the mean for six days after the event day and the mean for five days before the event day according to layers.

⁴ Duncan method is used in the post hoc analysis.



*Shaded region represents the critical value of the test CAR = 0, with $\alpha = 0.05$

Fig.3 CARs for B2B firms and B2C firms in KSE

Fig.4 depicts the test results of Hypothesis 4 about KOSDAQ listed firms. In this figure, 4(a) depicts B2C firms, 4(b) depicts B2B firms, and 4(c) depicts the difference between B2C firms and B2B firms (CAR $_{B2C}$ – CAR $_{B2B}$). In 4(a), the CAR of 2.74% on the event day increases to reach 4.25% at day (t+5). In 4(b), the CAR of 5.59% on the event day increases to reach 7.44% on day (t+5). In 4(c), the CAR differences between B2C firms and B2B firms listed in KOSDAQ (CAR $_{B2C}$ – CAR $_{B2B}$) are the opposite of what we hypothesized in Hypothesis 4, and they are not significant across the event window at the 0.05 level. Consequently, Hypothesis 4 is rejected in KOSDAQ. The abnormal returns attributable to e-Business initiatives of B2C firms are higher than the abnormal returns attributable to e-Business initiatives of B2C firms.

It should be noted that Hypothesis 4 is supported in KSE, but rejected in KOSDAQ. Although the reason for this difference is not clear, we have a plausible explanation. The period during which data is collected for this study was when e-Business theme was transferring from B2C to B2B. Investors in KOSDAQ tend to be swift in absorbing new trends in Internet economy. Thus, B2B firms are highly evaluated in KOADAQ which is sensitive to new trends in e-Business. In contrast, B2B firms are less valued in KSE which is slow to respond to the new e-Business movement. B2C firms have enjoyed scale effects (B2C firms are smaller than B2B firms, thus gaining more stock returns than B2B firms) in KSE and this results in supporting Hypothesis 4.



region represents the critical value of the test CAR = 0, with $\alpha = 0.05$



4.5 Returns According to the e-Business Initiative Types

ANOVA ⁵ is performed to test Hypothesis 5. In KSE, the *p-value* which indicates the CAR difference according to the types of eBusiness initiatives is 0.021. This result is statistically significant at the 0.05 level. Consequently, Hypothesis 5 is accepted in KSE that the abnormal returns are different depending on the types of eBusiness initiatives. Again, post hoc analysis⁶ is performed to investigate in which type there is a difference. It is revealed that the business expansion from non-Internet into e-Business yields significantly different from the other categories.

We test Hypothesis 5 for the firms in KOSDAQ with the same ANOVA analysis done for the firms in KSE. According to the results, in KOSDAQ, the *p-value* which indicates the CAR difference according to the categories of public announcements is 0.265, which is not statistically significant at the 0.05 level. Consequently, Hypothesis 5 is rejected in KOSDAQ that the abnormal returns attributable to e-Business announcements are different according to the categories of public announcements.

These results are similar to those of Hypothesis 3. Whereas there are significant CAR differences according to e-Business firm layers and categories of public announcements in KSE, there are no significant CAR differences in KOSDAQ.

5. Conclusion

Overall, the results of this study suggest that e-Business initiatives contribute to the considerable creation of future benefits for firms, which is reflected in an enhancement of the market values of firms. Similarly to the results of the previous study [8], the results of this study suggest that firms' competitively entering into eBusiness may be considered more than a simple bandwagon effect or a managerial action mimicking other firms. E-Business announcements enhance the market values of firms and lead to the creation of values for the firms' stockholders.

 $^{^{5}}$ This is to test if there is a difference between the mean for six days after the event day and the mean for five days before the event day according to layers.

⁶ Duncan method is used in the post hoc analysis.

Our main results are:

(1) Capital markets respond positively to the e-Business initiatives of firms, which leads to the enhanced market values of firms. The CAR (Cumulative Abnormal Return) for e-Business initiatives is 3.50% on the day of the event, and is 4.74% over the five day time window around the event date.

(2) This positive effect is observed more strongly in KOSDAQ listed firms than in KSE listed firms. The CAR difference (CAR $_{\text{KOSDAQ}}$ – CAR $_{\text{KSE}}$) of e-Business announcements is 2.93% on the day of the event and 4.36% over the five day time window.

(3) Firms in KSE classified into e-Business firm layers, the abnormal returns attributable to e-Business initiatives are different according to the layers that firms belong to. In contrast, for KOSDAQ, the abnormal returns attributable to e-Business initiatives are not significantly different according to the layers that firms belong to.

(4) In the case of KSE, positive effects of e-Business initiatives are observed more strongly in B2C firms than in B2B firms. The CAR difference (CAR $_{B2C}$ – CAR $_{B2B}$) is 2.18% on the day of the event and is 3.98% on the five day time window around the event date. For KOSDAQ, the positive effects of e-Business initiatives are not significantly different between B2C firms and B2B firms.

(5) In case of KSE, the abnormal returns attributable to e-Business initiatives are observed to be different according to the types of e-Business initiatives by firms. For KOSDAQ, the abnormal returns attributable to e-Business initiatives are not significantly different according to the activity types. In particular, the CAR of public announcements related to business expansion from non-Internet into e-Business is 8.58% on the day of the event, and records the highest figure at 14.77% on the five day time window around the event date.

The effects of e-Business initiatives by firms were already academically verified in the United States, and are also observed in KOSDAQ. However, this study highlights the different effects of eBusiness initiatives according to capital markets, layers, and types of eBusiness activities, in addition to examining if the effects of eBusiness announcements exist. Furthermore, this study implies how eBusiness firms in a variety of circumstances can take advantage of public announcements as a sound tool to manage their own stock prices according to their conditions or opportunities.

This study is different from Subramani and Walden's study [8] in three distinct aspects. First, the types of e-Business firms investigated and these firms' e-Business initiative types are defined in the broader context. Second, e-Business initiatives are analyzed in two different capital markets (KSE and KOSDAQ) to examine if similar e Business initiatives result in different firm values in the two markets. Third, the data collection periods are different.

Taking into account these differences, there are some interesting comparisons between this research result and the previous one. First, like the US capital market, Korean capital markets react positively to firms' announcements of e-Business initiatives, leading to a significant enhancement of the firm value. Second, B2C e-Business initiatives have greater impacts on firm value than B2B e-Business initiatives in the US capital market. However, this phenomenon was observed only in KSE in Korea. In KOSDAQ, B2B e-Business initiatives have greater impacts on firm value than B2C e-Business expansion from non-Internet into e-Business" initiatives have greater impacts on the market value of the firm than "business expansion of the established e-Business firm" initiatives in Korea. This is opposite to the findings of the USA. From these differences, we can postulate that the capital market condition and investors' responses to e-Business actions differ in the USA and Korea.

In this paper, we collected various e-Business announcements that could affect the market values of firms. Due to the fact that diverse e-Business initiatives were targeted, however, we could not obtain enough data samples for some categories of e-Business initiatives. For instance, the number of e-Business initiatives by firms of layer 2 in KSE is only 30. To gain greater implications from this study, it is necessary to accumulate research findings through continuous follow-up studies, with which it is possible to compare and analyze Dot Com Effect according to time flow.

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