

인터넷 기반의 이비즈니스 시스템이 사업성과 및 재정적 성과에 미치는 영향

Impacts of Internet-Based e-business Systems on Business and Financial Performances

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요 약

끝없이 쏟아지는 이비즈니스 성공담에도 불구하고, 수많은 최고 경영진들은 인터넷 기반의 이비즈니스 시스템 구축에 대한 투자효과를 체감하지 못하고 있다고 주장한다. 대부분의 사업들이 조직의 정보활용역량이나 체감적인 사업성과의 향상을 간과하고, 즉흥적인 재정적 성과에만 치중하는 경향이 있기 때문이다. 본 연구에서는 실증분석을 통해 인터넷을 기반으로 하는 이비즈니스 시스템의 활용이 조직의 정보활용역량, 사업성과, 그리고 재정적 성과에 미치는 영향을 조사하여, 사업목표를 달성하는데 있어서 이비즈니스 시스템의 역할과 가치를 부각시키고자 한다. 본 연구는 인터넷 기반의 이비즈니스 행위가 조직의 정보활용역량을 향상시키고, 정보활용역량이 높아지면 사업성과도 향상됨을 보여준다. 또한, 본 연구는 인터넷을 기반으로 한 이비즈니스 시스템의 활용으로 인한 사업성과 향상은 고객가치 창출로 이어지고, 이는 결국 수익창출을 위한 필요요소임을 암시한다.

Abstract

In spite of proliferating E-business success stories, many executives urge that they have not realized the return expected from investments in Internet-based E-business systems. Most of businesses tend to focus on immediate financial payoffs and overlook the improvements in information capabilities and business performance. The purpose of the research is to investigate the effects of Internet-based E-business systems on organizations' information capabilities, business performance, and financial performance, and to illustrate the roles and values of the systems in achieving business goals. Findings illustrate that when an organization's information capabilities are enhanced by Internet-based E-business systems, business performance tends to improve. In addition, the study implies that the business performance improvement may create consumer benefits, which would be indispensable factors to make a profit.

☞ Keyword : e-business Systems, Information Index, Information Capabilities, Business Performance, Financial Performance

1. Introduction

During the 1990s, continuous business investments in IT are creating rapid advances in information technologies [1]. The evolution of IT enables many companies to constantly

search for new business models and available resources to proactively accommodate the market demands [2]. Specifically, Internet technologies offer opportunities to dynamically leverage Web-based assets, thereby increasing efficiency of business operations and effectiveness of customer price/value combinations [3]. Many companies have used significant resources to replace traditional business processes E-business activity via Internet in the hope of gaining business opportunities through

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the integration of the Internet and internal corporate 'Intranets' [4]. This intensive growth is forcing companies to focus on the use of Internet technologies to ensure survival and success. The companies have begun using web technologies to link suppliers, partners, and customers through dedicated, secure 'Extranets' so that supply and demand chains can be seamlessly coordinated and managed between companies [5]. *Forrester Research* showed that by 2003, the value of electronic commerce in the United States and Europe reached \$3 trillion.

However, many executives have failed to see output efficiency gains as a consequence of their expensive IT investments within their own companies. Baker (1997) notes that the annual rate of productivity for much of the 1990s showed little increase. Conversely, their companies continue to purchase expensive cutting-edge IT components for Internet-based E-business systems and to publicize their E-business success stories [6]. King (2002) points out that US companies invested more than 50 percent of their total annual capital in Internet-based E-business systems in 2001 [7]. Some economists regard these phenomena as the E-business productivity paradox. The productivity paradox, combined with lower return than expected, results in skepticism regarding E-business investments. As a result of the phenomena of the productivity paradox and skeptical viewpoints regarding E-business investments, researchers and IT professionals are being forced to investigate the values of the Internet-based E-business systems in achieving business goals. While economists focus on financial performance improvement as an effect

of Internet-based E-business systems, IT related scholars are endeavoring to identify various types of performance improvements.

The purpose of the study is to investigate the various effects of Internet-based E-business systems on an organization's performances. The theory of information capabilities for effective information use suggests that enhanced information capabilities are likely to improve business performance [8]. This paper presents results of a rigorous research effort designed to assess the sequential impacts of E-business activity via Internet on an organization's information capabilities, business performance, and financial performance.

2. IT & Organizational Performance

To solve the IT productivity paradox, researchers have endeavored to develop frameworks to find potential links between IT management and the various sources of business performance. Strategic information systems were developed to provide early adopters with performance benefits that could lead to sustainable competitive advantages in their industry (Wiseman 1988). Many frameworks were developed to find the elusive links between IT practices and improved organizational decision-making (Keen 1993), between IT enabled support and business transformation (Kettinger and Grover 1995), and between information technology (IT) strategy and business strategy (Chen et al. 1997). However, most researchers have not clearly answered the questions regarding a direct link between increases in IT spending and business profit-

ability [9,10]. Shin (2002) states that questions on the business value of information technology have not settled yet [11].

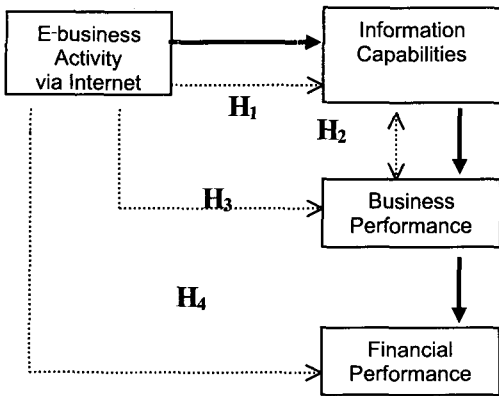
Marchand, Kettinger, and Rollins introduce a comprehensive measure of effective information use that predicts business performance. They examine how the interaction of people, information, and technology establishes an orientation toward the use of information within a company, and how this affects business performance. This new metric, Information Orientation (IO), measures the extent to which senior managers perceive that their organizations possess the capabilities associated with effective information use to improve business performance by determining the degree to which a company possesses competence and synergy across three vital information capabilities [8].

Many past studies linking investments in IT to organizational performance have used single financial performance measure of profitability as their sole measure of business performance. King (2001) notes that the easiest way to measure returns are bottom-line improvements arising out of cost savings [7]. However, by focusing solely on quantifiable and tangible measurements, executives may not appropriately measure organizational performance. Organizational performance should be measured in various ways - in dollars, in time, and in individual perception. Subjective measurements can be quite objective if they are used consistently over the time. To date any single research does not use multiple measures of organizational performances, such as information capabilities, tangible and intangible performances [9,11,13].

3. Research Model

Information Orientation introduced by Marchand et al. (2001) suggests that enhanced information capabilities are likely to predict the improvement of business performance. In addition, the focus group noted that many executives did not realize financial payoffs from the investments in expensive cutting-edge IT components for E-business activity and that they overlooked the improvements in information capabilities and intangible performance. The focus group consists of managers of E-business task force teams and directors of planning and management department at leading E-business enterprises. The Marchand's information orientation and the focus group's observation provide the researcher with the realization that there are potential paths from E-business activity to business performance. This study applied the information orientation to identification of the potential paths from E-business activity to business and financial performance.

The conceptual model is presented to demonstrate the various effects of E-business activity via Internet on an organization's performances and to outline the proposed relationships between variables. As shown in Figure 1, solid lines illustrate the flows of the sequential effects of E-business activity via Internet, and dashed lines represent examinations of the proposed relationships. It illustrates the need to examine the role of Internet-based E-business systems in achieving business goals. The model also includes the assessment of financial performance to determine if the productivity paradox still exists



(Figure 1) Research Model

or if E-business activity has led to better financial performance.

The research variables in the conceptual model are generally or operationally defined. First of all, the term "E-business activity via Internet" is used in this paper, meaning business activity through the implementation of Internet-based E-business systems. In 2001, Marchand, Kettinger, and Rollins [8] defined "information capabilities" as the capabilities of companies to effectively manage information technology, information, and people for effective use of information.

- Information Technology Capabilities – The capabilities of a company to effectively manage information technology applications and infrastructure to support operations, business processes, managerial decision making, and innovation.
- Information Management Capabilities – The capabilities of a company to manage information effectively in support of coordination and control, tactical problem solving and strategic decision making.
- Information Behaviors/Values – The capabilities of a company to instill and pro-

mote behaviors and values in its people for effective use of information.

Generally, business performance covers both tangible and intangible performance measurements. However, the term "business performance" in this study is operationally defined as the intangible performance measurements needed to assist strategic decision-makers in judging the extent to which target goals and achievements are attained. On the other hand, financial performance refers to tangible performance measurements already normalized in ratio forms and available to the public, such as growth rates of total revenues and profits. Thus, it is assumed that the term "business performance" is distinct from the term "financial performance" in this research. While financial performance provides the objective figures for bottom line and market share growth in detail, business performance provides indices of progress toward the achievement of business goals [9,10,12].

The conceptual model sets the stage for research hypotheses dealing with various effects of E-business activity via Internet. The study compared companies currently implementing Internet-based E-business systems and companies currently not implementing any E-business system with respect to their information capabilities, business performance, and financial performance, as described in Table 1.

4. Methodology

4.1 Subject

The study targeted manufacturing com-

<Table 1> Research Hypotheses

H ₁	Companies that are currently implementing Internet based E business systems are expected to achieve higher information capabilities than companies that are not currently implementing any E business system.
H ₂	Companies that are currently implementing Internet based E business systems are expected to achieve higher business performance than companies that are currently not implementing any E business system.
H ₃	Companies that are currently implementing Internet based E business systems are expected to achieve higher financial performance than companies that are currently not implementing any E business system.
H ₄	Information capabilities that companies possess are significantly related to business performance that companies achieve.
H ₅	Information capabilities that companies possess are significantly related to financial performance that companies achieve.

panies. Manufacturing companies are easily identified through the use of address books published by several manufacturing industry organizations, such as the Electronic Industry Association (2004-2005),

Association of Machinery Industry (2004-2005), or Iron & Steel Association (2004-2005). For this study, potential participant companies were randomly selected. Sample companies ranged from small companies to multinational, large corporations. The subjects for the study were the strategic decisions makers in the selected manufacturing companies. Seventy-five percent of the respondents were between 30 and 50 years of age. The medians for years worked ranged from 7-9 years for total experience and 4 to 6 years for IT-related experience. Survey groups were established to compare the organizations' performances based on the organizations' E-business readiness.

4.2 Instrument

To test the hypotheses, objective financial data was collected along with survey data

<Table 2> Research Variables

Variable	Sub factor / Indicator	Measurement Item	Data Source	Measurement Scale
E-business Activity via Internet	Status of E business Readiness	Self-developed	Survey	Nominal
Information Capabilities	Information Technology Capabilities	Likert Scale Item	Survey	Interval
	Information Management Capabilities			
	Information Behaviors and Values			
Business Performance	Level of Cost Saving	Likert Scale Item	Survey	Interval
	Level of Innovation			
	Level of Customer Satisfaction			
	Level of Reputation			
Financial Performance	Revenue Growth Rate (2000 ~ 2004) (Market Share Growth)	Already normalized in ratio forms.	Annual Report	Ratio
	Profit Growth Rate (2000 ~ 2004) (Bottom Line)			

used to capture the respondents' subjective judgment. The principle focus on the survey was to determine the respondents' perceptions concerning the deployment of IT, information and people to achieve their business goals. In addition, financial data was collected from the annual reports and companies' websites.

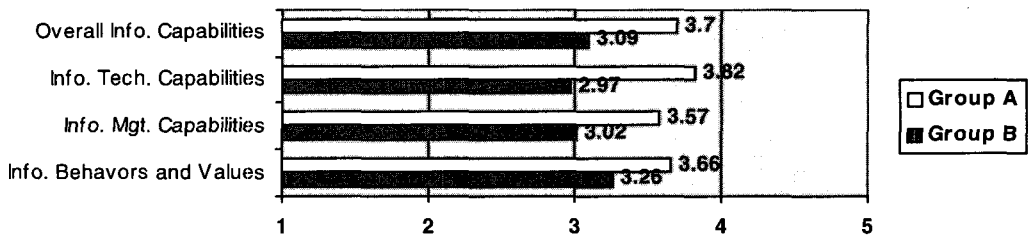
Various measurement scales were used to quantify the research variables, as illustrated in Table 2. The organization's E-business readiness was measured using a nominal scale. In 2001, Marchand et al. proposed seventy-four items to measure all dimensions of information capabilities [8]. Through a confirmation factor analysis (CFA), they determined that 53 of the 74 items showed reasonably strong validity and reliability. In addition, 4 items for business performance measure were prepared based on common long-term objectives of leading E-business companies. These 57 items, with some additions, were incorporated into a self-developed survey

instrument for this study.

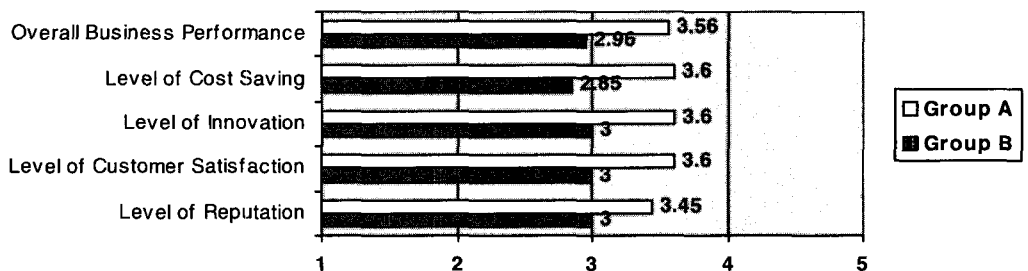
4.3 Data Analysis

The study used a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree) to gauge the sub-factors of information capabilities. Another 5-point Likert scale (1 = extremely disappointing, 2 = disappointing, 3 = not different, 4 = improved, 5 = extremely improved) was utilized to measure indicators of business performance, as illustrated in Figures 2 and 3. Tables 3 depicted financial performance data. Higher numbers indicated higher capabilities or higher performance.

However, the differences between these scores or means do not guarantee that there are significant differences between groups. Instead, *t*-tests were performed to identify significant differences of information capabilities, business performance, and financial perform-



〈Figure 2〉 Average Scores of IT Capabilities



〈Figure 3〉 Average Scores of Business Performance

<Table 3> Financial Performance Data

Financial Performances	Revenue Growth		Profit Growth	
	Groups A	Group B	Group A	Group B
Mean	3.31	0.478	4.18	1.57
Standard Deviation	11.8	0.701	30.0	8.01
Average Absolute Deviation from Median	3.22	0.505	11.5	3.42

<Table 4> Summary of Outcomes for Significance Tests

No.	Relationship Between		Significance Test	Test Value	P ($\alpha=.05$)
1	E-business Activity via Internet	Information Capabilities Info. Tech. Practices Info. Mgt. Practices Info. Behaviors and Values	t-test	t = 4.28	> 2.04 (df=38)
2	E-business Activity via Internet	Business Performance Cost Saving Product/Service Innovation Customer Satisfaction Reputation	t-test	t = 4.04	> 2.04 (df=38)
3	E-business Activity via Internet	Financial Performance Revenue Growth Rate Profit Growth Rate	t-test	t = 1.07 t = 0.829	< 2.04 (df=38) < 2.04 (df=38)
4	Information Capabilities	Business Performance	Pearson r	r = .801	> .325 (df=38)
5	Information Capabilities	Financial Performance	Pearson r	r = .196	< .325 (df=38)

ance between groups. The data measuring the dependent variables represented interval and ratio scales, therefore the study performed t-tests to analyze the proposed causal-comparative relationships and Pearson r to identify a correlation between variables with 95 percent confidence level.

5. Results

As shown in Table 4, the t value (4.28) of information capabilities is greater than p (2.04), indicating that there are significant differences for information capabilities between

groups. In addition, the t value (4.04) is greater than p (2.04), therefore the result illustrates significant difference between groups in terms of business performance. However, the test results do not show that there are significant differences for revenue and profit growths between groups, because the t values (1.07 and 0.829) are less than p (2.04).

The result shows that information capabilities are significantly related to business performance because the Pearson's correlation coefficient is greater than the 95% confidence level probability (.325). The value (.801) of the Pearson's correlation coefficient indicates

that improved information capabilities may predict improved business performance. However, the result (1.96) does not indicate any significant corelationship between information capabilities and financial performances.

6. Discussion

6.1 Implications

The findings imply that Internet-based E-business systems can affect an organization's information capabilities. The findings illustrate significant differences in organizations' information capabilities, implying that E-business activity not only changes the ways of managing information technology and information, but also transforms organizational behaviors for effective information use.

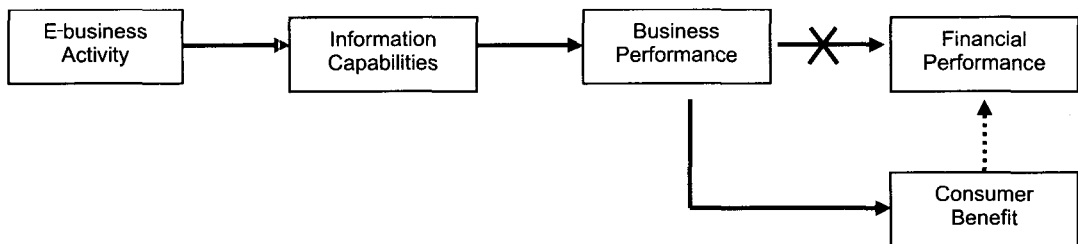
The result also indicates that the enhancement of information capabilities can predict the improvement of business performance. The result of the examination of the relationship between information capabilities and business performance is in agreement with the research conducted by Marchand et al. [8]. The result merely illustrates that a company that possesses higher information capabilities is likely to achieve higher business performance.

The most significant implication of these

findings is that Internet-based E-business systems can affect information capabilities, and that the information capabilities enhanced by the systems are likely to produce improvements in business performance. The results indicate that Internet-based E-business systems can contribute to increased business performance. As a result, this study suggests that companies should utilize Internet-based E-business systems as the "trigger" and "driver" for organizational changes to survive and succeed [14]. However, the researcher does not see any significant evidence that E-business activity via Internet can lead to the growth in total revenue and profit, as financial performance improvement.

6.2 Conclusions

This paper introduced a conceptual model to propose the various effects of E-business activity via Internet on an organization's performances. As illustrated in Figure 4, the results support the hypothesis, indicating that Internet-based E-business systems can affect information capabilities. In addition, it was shown that the information capabilities enhanced by Internet-based E-business systems are likely to lead to improved business performance.



〈Figure 4〉 Sequential Effects of E business Activity via Internet

On the other hand, it could not be confirmed by the results that E-business activity via Internet can lead to the improvement of financial performance. Nevertheless, the researcher insists that continuously improved business performance can produce improvement in financial performance. Mondy et al. (1993) state that if a company cannot consistently create economic values for consumers, the company will not stay in business long enough to make a profit [15]. The citation indicates that creating consumer benefits is a prerequisite for the improvement of financial performance. As time goes by, high customer satisfaction and good reputation tend to make a pie bigger, and the cost saving exceeding price reduction allows companies to attain sustained profitability. The improvement of financial performance may not be an immediate, but a long-term effect of E-business activity.

6.3 Limitations and Recommendations

The conceptual model is adequate for understanding how Internet-based E-business systems can lead to improved companies' performances. However, there are some limitations. First, the use of factors, such as ROI (Return of Investment) and ROE (Return on Equity), should be considered to identify the impact of Internet-based E-business systems on financial performance. Secondly, the sample size is somewhat small. Finally, the use of subjective data to assess the companies' activity and performance levels is likely to have produced some biases.

The study recommends additional studies so

that the findings of this research will be able to be generalized to other industries or countries. One approach would be to use a multiple regression equation to obtain a more accurate prediction. In addition, since there is very little significant empirical data regarding E-business activity and its solutions, such as the roles of ERP, CRM, and SCM, the descriptive method via case study is recommended.

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