

Analyzing for Firm E-business Performance in E-business Management Environment

Chui Young Yoon*

*Department of IT Applied-Convergence, Korea National University of Transportation

e-mail : yoon0109@ut.ac.kr

E-business 경영환경에서 기업의 E-business 성과 분석 연구

윤 취 영*,

*한국교통대학교 IT 응용융합학과

요 약

Many firms have used e-business systems to efficiently perform their business in an e-business management environment. Firms have applied their e-business capabilities to management activities in order to raise the performance of business execution in a global market environment. In this business environment, the analysis and management for the performance of a firm's e-business execution need to efficiently build and improve its e-business capability and competitiveness. This research presents an analysis tool for a firm e-business performance to efficiently manage and improve the e-business performance in this environment. The analysis items for a firm e-business performance are developed and extracted from the major components of a general firm performance in previous studies. The generated analysis items were verified by factor analysis and reliability analysis through a pilot test. The developed twelve items were extracted from twenty items by these analyses. This study developed a 12-item tool that can totally analyze a firm e-business performance in an e-business management environment. The developed tool consists of four analysis factors and twelve items.

1. Introduction

With developing of information technology, most firms have implemented their e-business capabilities to efficiently perform management activities and improve the performance of business tasks in an e-business management environment [1][2]. Firms have applied their e-business capabilities to management activities in order to raise the performance of business execution in a global market environment. In this business environment, the analysis for the performance of a firm's e-business execution needs to efficiently build and improve the e-business environment appropriate for its management strategy and business departments. Firm e-business performance means the business results that an enterprise performs its management and business activities based on its e-business capability in an e-business perspective. But a comprehensive and practical tool to analyze a firm e-business performance has rarely been studied in previous literature. Namely, we need a comprehensive and objective instrument that can effectively analyze a firm e-business performance in terms of its entire e-business performance.

Therefore, this study presents a comprehensive and structural tool that can efficiently analyze a firm e-business performance to effectively build its e-business capability and improve its e-business performance, and to systematically establish and improve its e-business environment in terms of a total e-business performance.

2. Related Research

E-business has realized as a core paradigm of firm management, many studies defined it variously, depending on their viewpoints [1][2][3]. By researching previous studies, this research defined that e-business is an approach to increase the competitiveness of organizations by improving management activities through using IT and the Internet [1][2][3]. In this e-business environment, the analysis of a firm e-business performance is an important procedure to effectively raise the e-business performance and firm competitiveness in an e-business management environment.

The previous studies provide the enterprise performance in a variety of perspectives [4 - 16]. The measurement variables of firm performance are operational performance (inventory turnover and accounts receivable turnover), growth performance (sale revenue growth), and profitability performance (sales gross and profit margin) [5]. Firm performance includes process performance and outcome performance. Process performance reflects the performance of business operation process, like cost, products or service level and so on [6]. Outcome performance reflects the performance of business outcome, like property returns ratio, market sharing and so on. These studies focused on financial and non-financial perspectives. In financial research, the measurement of firm performance was studied in terms of sale growth, earning growth, market share, return on assets (ROA), return on sales (ROS), and market value [11][12]. The firm performance includes three factors such as improving client satisfaction, enhancing organizational competitiveness, and enhancing organizational image [14]. In

non-financial research, a firm's performance was measured by efficiency, effectiveness, profitability, quality of service, client satisfaction, and productivity [15]. Their satisfaction level about their firm's performance is presented in terms of growth in sale, growth in profits, and growth in market share [16]. By investigating these studies, this research describes a firm e-business performance as the effectiveness and efficiency of its management activities that are improved by utilizing enterprise e-business capability for its management activities. Firm e-business performance is able to transform enterprise performance into a type of enterprise performance based on an e-business performance perspective.

Hence, firm e-business performance (FEP) can be defined as the performance that a firm can obtain with applying the e-business capability to its management activities and business tasks in an e-business management environment. FEP means a total e-business performance that a firm can get from applying its e-business capability to its management activities and business tasks in an e-business management environment.

Based on these previous studies, we extract the analysis factors and items to analyze a firm e-business performance in an e-business perspective as follows: e-business operation performance (efficiency of business process, inventory turnover and accounts, quality of services, and client satisfaction), e-business growth performance (sale revenue growth, market growth, market value, and return on sale), e-business profitability performance (sale gross and profit margin, net income growth, growth in profits, and cash turnover ratio), and e-business competitiveness performance (sale growth rate, capital structure, market share, number of patents, customer share, and R&D expenditure ratio) [6 - 16]. This research uses these items as analysis items with which to analyze the FEP through the verification process of a validity and reliability analysis.

3. Methods

We initially generated 20 analysis items for FEP based on definitions and components of enterprise performance [6 - 16]. This research analyzed the construct validity of the developed items to ensure that FEP is efficiently analyzed by the items. The construct validity of the model was researched by many researchers. These studies presented two methods of model construct validation: (1) correlations between total scores and item scores, and (2) factor analysis [17][18][19]. Etezadi-Amoli & Farhoodmand (1996) and Tippins et al. (2003) used factor analysis to verify the validity of the measurement tool construct [17][18]. Torkzadeh & Lee (2003) used correlation analysis to verify the validity of the measurement tool construct [19]. We are likely to verify the validity of the analysis tool construct and the extraction of adequate analysis items by factor analysis and reliability analysis. The ratio of sample size to number of measurement items (11:1) was above the minimum (10:1) ratio suggested for factor analysis [18][19]. The analysis questionnaire used a five-point Likert-type scale; where, 1: not at all; 2: a little; 3: moderate; 4: good; 5: very good. The survey was gathered data from a variety of industries, business departments, experience, and education. We performed two kinds of survey methods: direct collection and e-mail.

3.1 Sample Characteristics

We obtained a sample of 152 usable responses collected from a variety of industries and business departments. This excluded four incomplete or ambiguous questionnaires, leaving 148 usable questionnaires for statistical analysis. All respondents had college or university degrees in: humanities and societies (14.2%), management and economics (26.4%), engineering (42.5%), and science (16.9%). The respondents in terms of business departments were identified as strategy planning (18.9%), development and maintenance (13.5%), business application (41.9%), and administration support (25.7%). The respondents identified themselves as top manager (3.4%), middle manager (39.2%), and worker (57.4%). The respondent had on average of 8.6 years of experience (S.D. =1.021) in their field, their average age was 35.1 years old (S.D. =4.984), and their gender, male (66.2%) and female (33.8%).

3.2 Analysis and Discussion

By factor analysis and reliability analysis, the first 20 measurement items were reduced to 12 items, with 8 items were deleted, with applying the criterion of previous studies [17][18][19]. The elimination was sufficiently considered to ensure that the retained items were adequate analysis items of FEP. The validity and reliability of the developed tool were also verified through factor analysis and reliability analysis. They were used to identify the underlying factors or components that comprise the FEP construct. Each of the 12 items had a factor loading > 0.607 as shown in Table 1. The reliability coefficients (Cronbach's alpha) of four potential factors had values > 0.778 as indicated in Table 1, above the threshold recommended for exploratory research [17][18][19].

<Table 1> Reliability, validity, and factor loadings of FEP construct

Variable	Factor Loading				Corrected Item-Total Correlation	Coefficients Alpha
	Factor 1	Factor 2	Factor 3	Factor 4		
V01	0.749				0.668	0.839
V03	0.802				0.691	
V04	0.712				0.654	
V05		0.782			0.738	0.837
V06		0.819			0.786	
V08		0.712			0.687	
V10			0.736		0.749	0.882
V12			0.832		0.676	
V14			0.783		0.638	
V16				0.765	0.715	0.778
V19				0.798	0.782	
V20				0.607	0.612	

* Significant P ≤ 0.01

This research calculated the corrected item-total correlations between each variable and its corresponding factor in order to investigating the reliability and validity of the analysis items. These correlations along with alpha coefficients of each factor are presented in Table 1. It also shows the alpha coefficients for the analysis factors if an analysis item was deleted from the scale. These coefficients

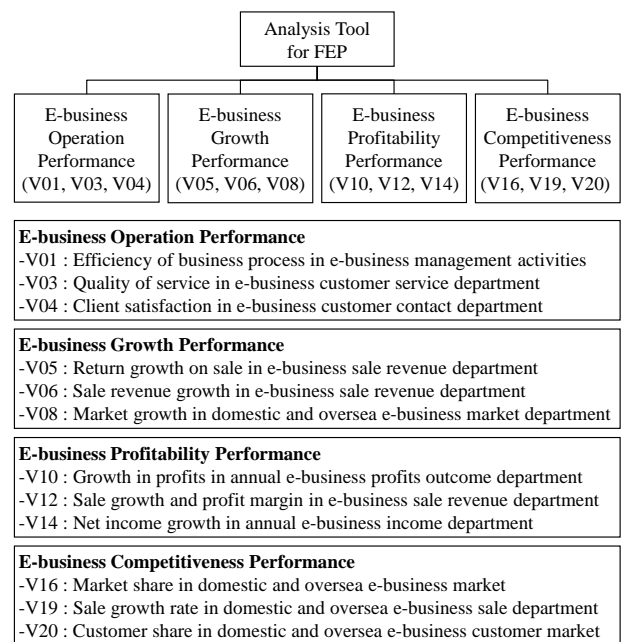
indicate the relative contribution of an analysis item to the construction of a scale for analyzing a particular factor. They are all in the acceptable range. Most corrected item-total correlations were greater than 0.612, showing that the analysis items are good indicators of their corresponding factors. The extracted items have a validity and reliability in terms of an analysis construct based on the analysis results as presented in Table 1. However, our efforts to provide additional evidence of this tool's validity, internal consistency, and stability are encouraged. This may be successfully achieved by accumulating many research findings and case studies.

4. Analysis Tool for FEP

This research presented the 12 analysis items appropriate for analyzing FEP. We classified four factor groups from the factor analysis. The factor groups indicate the potential factors as major analysis components to analyze FEP. With investigating the analysis items of each factor group, this research identified the following four potential factors: factor 1: e-business operation performance; factor 2: e-business growth performance; factor 3: e-business profitability performance; and factor 4: e-business competitiveness performance. The potential 4 analysis factors are used as the 4 core analysis factors of our analysis tool construct. The meanings and analysis items of each factor are as follows. E-business operation performance represents the efficiency and effectiveness improved by applying the firm e-business capability to its management activities in firm e-business operation perspective. That is, the e-business operation performance indicates the result that a firm obtains from its e-business management activities in terms of e-business execution. It includes efficiency of business process, quality of service, and client satisfaction in firm management activities. E-business growth performance presents the efficiency and effectiveness raised by applying the firm e-business capability to its management activities in enterprise growth perspective. It comprises sale revenue growth, return growth on sale, and market growth in an e-business perspective. E-business profitability performance means the efficiency and effectiveness improved by applying the firm e-business capability to its management activities in enterprise profit perspective. It has sale gross and profit margin, growth in profits, and net income growth in an e-business perspective. E-business competitiveness performance refers to the efficiency and effectiveness increasing by utilizing the firm e-business capability for its management activities in enterprise competitiveness perspective. Namely, e-business competitiveness performance means the total e-business performance of a firm in a competitiveness perspective. It contains sale growth rate, customer share, and market share. Our findings present a comprehensive and structural tool that can efficiently analyze FEP in terms of a total e-business performance from e-business operation performance to e-business competitiveness performance, including 4 analysis factors and 12 items as shown in Figure 1. As shown in Table 1 and Fig.1, e-business operation performance has the analysis items, such as V01, V03, and V04. E-business growth performance includes V05, V06, and V08. E-business

profitability performance contains V10, V12, and V14. E-business competitiveness performance comprises V16, V19, and V20. These factors affect FEP, that is, the total FEP of a firm. It is important to improve and manage FEP by analyzing a firm e-business performance with a valid and reliable tool.

Therefore, understanding the FEP construct is essential to analyze the success of FEP that denotes the total e-business performance to efficiently support its management activities. This research can use the comprehensive and structural tool to analyze FEP across different industrial fields and business departments, and perhaps even as a global measure. Hence, the developed tool is an important theoretical construct to efficiently analyze the total e-business performance that a firm can obtain by utilizing its e-business capability for its management activities in an e-business management environment.



(Figure 1) The developed tool structure with factors and items

Additionally, this research analyzed the mutual relationship between the analysis factors, and the relationship between each factor and FEP.

<Table 2> Correlation matrix

Division	Factor Correlation Matrix				
		(2)	(3)	(4)	(5)
FEP	(1)	0.46	0.51	0.43	0.39
E-business Operation Performance	(2)		0.41	0.45	0.42
E-business Growth Performance	(3)			0.43	0.48
E-business Profitability Performance	(4)				0.44
E-business Competitiveness Performance	(5)				

Since there are the factors affecting FEP, understanding their mutual relationship is very important for efficiently improve FEP and for the effective utilization of the developed tool in industrial fields. Their mutual relationship is complex and may be affected by other variables. This research analyzed how they were correlated in order to examine the relationship between e-business operation performance, e-business growth performance, e-business profitability performance, and e-business competitiveness performance, and FEP, as shown in Table 2.

5. Conclusions

We present a comprehensive and structural tool that can analyze perceived FEP from a total e-business performance perspective. This 12-item scale is implicative, concrete, easy to use, and appropriate for practical and research purposes. This research also has some limitations in terms of a specific FEP perspective. The developed tool with adequate validity and reliability provides groundwork for the development of a standard framework of FEP.

Therefore, this study presents a comprehensive tool that can efficiently analyze FEP that a firm can obtain by applying a firm e-business capability to its management activities and business tasks in an e-business management environment. This result provides a new direction and foundation for the development and advancement of the efficient analysis tool for FEP.

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