

# An Exploratory Study on E-business Risks due to the Sector Classification of Small and Medium-Sized Enterprises

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## Abstract

Owing to Information and the mobile revolution, e-business has become the most important element of modern management. E-business has the advantage that an organization can conduct its own business efficiently and effectively at relatively lower cost; however, it also carries the risk of affecting the survival of the entire organization. As the number of clients who use Internet and enterprises entering e-business is increasing, various risk factors have shown constant recurrence, and their importance is inevitably increasing. Although studies on e-business risks have been actively conducted since the mid-1990s, there have been limits in applying them in practical work as only few of them have focused on the e-business risk factors of small and medium-sized enterprises and their management methods. Therefore, this study intends to analyze the challenges by classifying the existing studies based on the risk factors and suggesting directions for future studies.

**Keywords:** E-Business, E-Business Risk, Information Technology Risk, Management Risk, Platform Business Risk

## 1. Introduction

The Internet and mobile markets are rapidly spreading, changing the concept of the existing traditional enterprises. Companies are faced with a situation in this evolving market where they cannot overcome competition if they do not have the ability to respond to the changes in the new business paradigm. As the e-business, including the Internet and mobile market, establishes itself as one of the most important forms of businesses for enterprises, companies should be aware that e-business is also bound to become increasingly bigger and diversified. Although various studies have been conducted on e-business among small and medium-sized enterprises, few studies have focused on risks<sup>1</sup>. If they fail to detect

risk factors and adopt appropriate measures and controls, the costs incurred due to the risks will be greater than the benefits obtained from operating as an e-business. Reference<sup>2</sup> stated that there could be a risk in failing to measure and respond to dynamism that is generated in a constantly changing online environment and to prepare for the relevant continuous changes.

Reference<sup>3</sup> A affirmed that “If risk is defined as uncertainty, e-business risk can be seen as the uncertainty occurring when using e-business”. Since the related studies conducted so far have focused on the risk factors of enterprises and their management methods without considering the business sectors, the differences in the characteristics of various business sectors, such as production and logistics, have not been taken into account<sup>4</sup>

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argued that all enterprises have different e-commerce characteristics, indicating that an awareness of the risks associated with these characteristics would provide different purchasing conditions and values. In addition, they argued that there should be a classification to predict e-business risks. Therefore, this study intends to analyze these challenges by classifying the existing studies based on the risk factors and suggest the direction for future studies.

## 2. Literature Review

While previous studies on e-business focused primarily on large enterprises, the few studies related to the e-business of small and medium-sized enterprises lack the research on risk issues<sup>1</sup>. The main results of the studies on the e-business of small and medium-sized enterprises are presented as follows:

Reference<sup>5</sup> conducted a study on the factor analysis, design, risk assessment, and risk management for the main risk factors in construction engineering. Reference<sup>6</sup> concluded that the best practices to reduce e-business risks are good relationship with customers, smooth and efficient cooperation between departments, ability to respond to business, professional enterprise resources, high quality knowledge management, and learning through education<sup>7</sup> argued that studies on e-business should be conducted for identifying the true scope of the threat faced by small and medium-sized enterprises, and that the risk files different from those for large enterprises are required<sup>8,9</sup> pointed out that even though there are a lot of advantages of e-business, the risk associated with its activities is also great.

## 3. Trend Analysis of the Studies on E-Business Risk

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E-business risk related studies conducted so far, as well as the main findings examined in the literature review of Chapter II, can be summarized by topic as shown in the Table 1 below. The early studies conducted in the mid-to-late 1990s primarily focused on strategic risks. This can be explained as a reflection of the transition from the off-line method to the on-line method since that period represented the early stage of the introduction of e-business. Next, from the late 1990s to the early 2000s and in 2012, studies mainly focused on management risks. Since the early transition of e-business practice had passed, the e-business risks at an organizational level were the principal topic. Reviewing managers' attitude towards risks<sup>10</sup>, stated that managers tended to concentrate intensively on performance targets as important factors affecting their risk management methods. In addition<sup>11</sup>, underlined that chief executive officers are interested in clarifying strategic risks and monitoring various aspects of e-business, such as laws, in real-time. Moreover, after the early 2000s, studies were concerned about platform business risks, economics of e-business risks, e-business model analysis risks, and supply chain management risks. These were conducted mainly on platform risks because e-business based on such platforms was actively developed through the high growth of the open market and SNS. In 2014, studies on information technology risk are being actively conducted because of the importance of big data and communication<sup>12</sup> discussed the risk of online trust relationships as a factor, and<sup>13</sup> focused on technical risks, application user risks, and business risks<sup>14</sup> argued that the depth of familiarity with customers, gained through e-business using the Internet and e-business technology, could mainly enhance reliability<sup>15</sup> underlined that e-business strategies create many advantages as well as risks in using them.

**Table 1.** E-Business risk study trend

Period	Area of Study	Author
From the mid-to-late 1990s to the early 2000s	Strategic risks	Willcocks and Plant <sup>16</sup> Tapscott <sup>14</sup> , Plummer <sup>15</sup> , Kalakota and Robinson <sup>8</sup> , Venkatraman <sup>17</sup> .
From the late 1990s to 2012	Management risk	Eisenhardt <sup>18</sup> . Ross, Beath, and Goodhue <sup>19</sup> , Wan, J.P. and Wan, X.Y. (2012).
In the early 2000s	Supply Chain Management	Harland <sup>23</sup> ; Lancioni <sup>21</sup> ; Prestige <sup>23</sup> .
In the early-to-mid 2000s	E-business Model Analysis	Krell and Gale <sup>23</sup> ; Willcocks and Plant <sup>24</sup> .
In the early-to-mid 2000s	Economics of e-business	Love <sup>25</sup> ; Kleist (2003); Grey <sup>26</sup>
Since the early 2000s	Platform business risks	Wilson <sup>27</sup> , Ribbink <sup>28</sup> , Kotha <sup>29</sup> , Jarvenpaa <sup>30</sup> , Harridge <sup>31</sup> , Friedman <sup>32</sup> , Corritore <sup>33</sup> .
From the early 2000s to 2014	Information technology risk	Wan and Liu <sup>34</sup> , Chan <sup>35</sup>

However, these studies on e-business risk did not provide practical assistance to the enterprises, as they had not considered the characteristics of the industry or business sectors. Hence, this study mainly examined management risks, platform business risks, and information technology risks based on previous studies, especially focusing on differences in e-business risks between agricultural and industrial products, which have shown dramatic sales growth recently.

## 4. Research Method

### 4.1 Data Analysis

To verify risk factors, we used a survey method as a data collection tool. The questionnaire was developed by modifying the existing one used by an international research institution. We collected data from e-business enterprises that had adopted e-commerce by either visiting them in person or distributing and collecting surveys via e-mail. Among the 120 surveys distributed from November 2014 to January 28, 2015, we collected 81 and have used them for statistical analyses.

In this study, we conducted a frequency analysis to identify the characteristics of the sample, a reliability analysis to evaluate the reliability of the questionnaire, an exploratory factor analysis to confirm the validity of the survey, and a T-test analysis to verify the difference in average risks between industrial and agricultural product groups.

### 4.2 Definition of Variables and Survey Questionnaire

## 5. Analysis Results

### 5.1 Item Classification and Shopping Mall Types

Frequency analysis was performed on item classification and shopping mall types, and the results derived are summarized in terms of sale items, shopping mall types, sales, the number of employees, and the number of operating years. The ratio and frequency of each sale item group are as follows: Fashion/clothes/accessories (29.6%, 24 items), food (7.4%, 6 items), agricultural products (23.5%, 19 items), household items (13.6%, 11 items), household electronic appliances (2.5%, 2 items), sports/hobbies (6.2%, 5 items), and others (9.9%, 8 items). Relevant details are described in Table 3.

### 5.2 Verification of Reliability and Validity

We used SPSS19.0 to verify the reliability of metrics involving management risks, platform business risks, and information technology risks, which were the risk factors used as measurement variables in the study. The verification results indicated that Cronbach's alpha coefficient was between 0 and 1. Data is considered appropriate if the coefficient is 0.8 or higher and acceptable if it is between

**Table 2.** Summary of e-business risk

Aspects	Elements	Questionnaire items
Management risk	Organizational Structure risk	X1. Conflicts of interest between technical departments and other departments X2. Insufficient analysis of internal and external trends
	Organizational Planning risk	X3. Uncertain purpose of e-business development
	risk of corporate members	X4. Shortage of excellent e-business workforce
	executives risk	X5. Officers' lack of awareness of e-business tasks X6. Officers' lack of support and collaboration
Platform business risks	product risk	X7. Products that are too expensive for online sales X8. Products that are inappropriate for online sales
	competitive risk	X9. Intense competition over main products between online and offline sales
	marketing campaign risk	X10. High marketing expenses
	customer service risk	X11. Non-professional customer services
	logistics distribution risk	X12. Logistics distribution conducted through a complicated distribution system. X13. High expenses for distribution.
	Collaboration risk	X14. Insufficient collaborating partners
Information technology risks	information system risk	X15. Limited exposure to SNS X16. Shortage of mobile contents
	website construction risk	X17. Inappropriate website layout structure to display the product brand and quality X18. Absence of constant optimization
	data security risk	X19. The potential security risk of customer data to hackers
	data analysis risk	X20. Absence of both analysis and usability of customer data.

0.6 and 0.7. The result of performing reliability analysis of the measuring tool in this study confirmed that there is no reliability issue in using the variables as shown in Table 4. Thus, we used all the variables as data for the next step, the validity test.

In this study, we conducted a factor analysis to examine the validity as well as principal component analysis based on the Varimax orthogonal rotation, which uses the least number of factors while minimizing information loss, in order to confirm the validity of the composition concept of the measuring tools. Only factors with an Eigen value of 1 or higher were selected, and the questions with each item factor loading of 0.5 or higher were considered valid. The factor analysis result is shown in Table 5. Twenty variables were input initially, but 9 variables (4 information technology risk variables, 3 platform business risk variables, and 4 management risk variables) were removed. The rest 11 variables constituted three factor groups, i.e. i

information technology risks (1, 2, 3, 4), platform business risks (4, 6, 7), and management risks (1, 2, 3, 4).

As a result, we confirmed that the questionnaire, which had been developed to measure variables based on the three factors, such as information technology risks, platform business risks, and management risks, was conceptually consistent with the result of the factor analysis and thus valid.

### 5.3 T-Test Analysis

## 6. Conclusion

### 6.1 Summary of Study Results and Significance of the Study

Management of e-business risk is an important issue in the current era of mobile revolution. Over the past few years, there have been many small and medium-sized enterprises winding up their businesses because they

**Table 3.** Item classification and shopping mall types

	Characteristics	Frequency	Ratio (%)
Sale item	Fashion/Clothes/Accessories	24	29.6
	Food	6	7.4
	Agricultural products	19	23.5
	Furniture/Bedding	6	7.4
	Household items	11	13.6
	Home electronic appliances	2	2.5
	Sports/Hobbies	5	6.2
	Others	8	9.9
Shopping mall types	General mall	2	2.5
	International open market	2	2.5
	Specialized mall	50	61.7
	National open market	25	30.9
	Others	2	2.5
Sales	Less than 50,000,000 won	24	29.6
	Over 50,000,000 won to 300,000,000 won	31	38.3
	Over 300,000,000 won to 500,000,000 won	6	7.4
	Over 500,000,000 won	20	24.7
The number of employees	Less than 10	45	55.6
	10 to 30	36	44.4
	Over 30 to 100	0	0
	Over 100	0	0
The number of operating years	Under one year	20	24.7
	One to three years	25	30.9
	Over three to five years	14	17.3
	Over five years	22	27.2

**Table 4.** Result of verifying reliability of risk management variables

Variable	The number of related questions	Cronbach's alpha
Management risks	6	0.785
Platform business risks	8	0.744
Information Technology risks	6	0.824

**Table 5.** Result of confirming validity (factor analysis) of risk factors

Variable	Factor		
	1	2	3
Information Technology risks 2	<b>.909</b>	.062	.059
Information Technology risks 4	<b>.884</b>	.153	.072
Information Technology risks 3	<b>.740</b>	.076	.107
Information Technology risks 1	<b>.724</b>	-.202	.161
Platform business risks 6	-.134	<b>.820</b>	.163
Platform business risks 7	-.014	<b>.754</b>	.048
Platform business risks 4	.219	<b>.747</b>	.050
Management risks 3	.331	.284	<b>.789</b>
Management risks 2	.243	.205	<b>.767</b>
Management risks 1	-.202	-.197	<b>.727</b>
Management risks 4	.447	.406	<b>.583</b>

**Table 6.** The result of a T-test analysis

		Levene's Homoscedasticity Test		T-test for Equality of the Average						
		F	Significance Probability	t	Degree of Freedom	Significance Probability (both)	Average Difference	Standard Errors of Difference	95% Confidence Interval of Difference	
									Lower Limit	Upper Limit
Platform risk 4	Homoscedasticity assumed	.908	.344	2.111	79	.038	.818	.387	.047	1.589
	Homoscedasticity not assumed			2.215	51.947	.031	.818	.369	.077	1.559
Platform risk 6	Homoscedasticity assumed	.000	.990	-.865	79	.390	-.341	.394	-1.125	.444
	Homoscedasticity not assumed			-.868	46.654	.390	-.341	.392	-1.130	.449
Platform risk 7	Homoscedasticity assumed	.907	.344	-.253	79	.801	-.112	.444	-.995	.771
	Homoscedasticity not assumed			-.241	41.356	.811	-.112	.466	-1.052	.828
Management risk 1	Homoscedasticity assumed	5.673	.020	2.905	79	.005	1.230	.423	.387	2.073
	Homoscedasticity not assumed			3.270	62.003	.002	1.230	.376	.478	1.982
Management risk 2	Homoscedasticity assumed	3.872	.053	1.726	79	.088	.597	.346	-.091	1.286
	Homoscedasticity not assumed			1.869	56.205	.067	.597	.320	-.043	1.237
Management risk 3	Homoscedasticity assumed	6.957	.010	2.434	79	.017	.975	.401	.178	1.772
	Homoscedasticity not assumed			2.921	71.855	.005	.975	.334	.310	1.640
Management risk 4	Homoscedasticity assumed	20.608	.000	4.439	79	.000	1.564	.352	.862	2.265
	Homoscedasticity not assumed			5.727	78.824	.000	1.564	.273	1.020	2.107
Information risk 1	Homoscedasticity assumed	.336	.564	1.566	79	.121	.516	.329	-.140	1.171
	Homoscedasticity not assumed			1.517	42.983	.137	.516	.340	-.170	1.201
Information risk 2	Homoscedasticity assumed	.000	.993	2.447	79	.017	.924	.378	.172	1.676
	Homoscedasticity not assumed			2.473	47.382	.017	.924	.374	.172	1.676
Information risk 3	Homoscedasticity assumed	.684	.411	.101	79	.919	.030	.296	-.559	.619
	Homoscedasticity not assumed			.098	42.635	.922	.030	.306	-.588	.648
Information risk 4	Homoscedasticity assumed	21.464	.000	1.948	79	.055	.706	.362	-.016	1.427
	Homoscedasticity not assumed			2.462	77.756	.016	.706	.287	.135	1.276

pursued the wrong risk management policies. Since the mid-1990s, hence, studies on e-business risks have been relatively actively conducted, especially in the fields of Strategic risk, Organizational risk, Supply Chain Management risk, E-business Model Analysis risk, Economics of e-business risk, Platform business risk, Information Technology Risk, and Management risk. However, they could not be applied very usefully in practical business because they did not consider the unique characteristics of each industry sector.

Therefore, we considered that a comparative study on e-business risks between agricultural and industrial products would derive more practical results that could be useful in actual business. Under this assumption, we focused on verifying platform business risks, management risks, and technology risks among various risk factors and conducted a T-test, classifying groups into agricultural and industrial products to comparatively analyze e-business risks between the groups. The result showed that there are different risks in the following

areas: platform business risk (4), management risk (1, 3, and 4), and information technology risk (2). This result points to the need for each industrial sector to implement specific risk management strategies in order to reduce failures from risks.

Based on this, it can be concluded that small and medium-sized enterprises can achieve more reasonable and efficient stabilization through performance management that applies weights to the most important risk factors for agricultural and industrial products.

## 6.2 Limitations of the Study

In this study, the survey was conducted among e-business enterprises that had adopted e-commerce. However, this study had the following limitations: The sample size was too small to represent an entire industry, it did not collect long-term data that could represent overall industry, and it mainly focused on enterprises that generated relatively small sales. However, it did determine that risk factors for small and medium-sized enterprises could be examined in various ways by analyzing differences in risk between agricultural and industrial products in terms of differences in sales and corporate size.

## 7. Acknowledgement

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