



AN INVESTIGATION INTO THE RELATIONSHIP BETWEEN FIRM SIZE AND PERFORMANCE AND THE USE OF ELECTRONIC COMMERCE (EC) BY THE FIRMS AT VUNG TAU CITY

Lê Sĩ Trí

*¹Dr, Ba RIA Vung Tau University.

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ABSTRACT

In this study, we examine the relationship between firm size and the use of electronic commerce (EC) and firm performance by firms at Vung Tau city. Using data collected, we identified internal and external drivers that affect the use of electronic commerce. Our findings indicated that the large firms tend to adopt EC at a higher level than the small firms do. Our results also investigated the positive relationship between firm performance and the use of EC and firm size. On the other hand, sales growth, profitability and customers' satisfied needs are effected by the use of EC and firm size.

INTRODUCTION

Nowadays, the use of electronic commerce in business is becoming increasingly widespread. This application is used to capture, store and transmit information for greater efficiency. Moreover, these firms have recognized the importance of using electronic commerce to attain a competitive edge through reduced costs, increased productivity and improved customer services (Lai, Cheng, & Yeung, 2004). Using electronic commerce and the effect of firm size are important to explore. Firm size plays an important role in most of empirical researches on strategic management ranging from internal organization to strategic alliance among sets of firms (Wang, Liu, & Yong, 2007). Firm size can be a source of competitive advantage because bigger firms are presumed to be relatively more efficient than smaller ones (Hawawinin, Subramanian, and Verdin, 2003). Despite this widespread recognition of its importance, there is not any research conducted that focuses on firm size and the use of EC on firm performance of the firms in Vietnam. Therefore, to gain a better understanding of the effect of firm size, the authors test empirical investigation into the firms in Vung Tau.

The aims of study:

- Identify the factors that influence the use of EC on the firms in Vung Tau
- Investigate the relationship between firm size and the use of EC
- Measure the relationship between firms performance (dependent variable) and the use of EC
- Test the relationship firm performance and firm size when they use the EC

Hypothesis

Managers often think that the growth is a desirable goal to their organizations (Hall, 1967; and Brush, Bromiley, & Hendrickx, 2000). The growth may impact on economic scale (Chandler, 1990). Increased firm size can associate with their prestige, and the ability to withstand environmental shocks and other managerial benefits.

Firm size and the internal drivers to use EC

Management advocacy is one of the key determinants to use EC (Srinivasan, Lilien, & Rangaswamy, 2002). To use EC, adequate resources to support the high investment in hardware and software technology that would be required (Lai et al., 2005). Other key drivers for firms to use EC include reduction in cost and improvement in productivity (Chiu, 1995; and Rao, Metts, Carlo, & Mora, 2003). Nevertheless, literature on the relationship between firm size and its impact on internal drivers to use EC is very limited. Whether firm size is related to internal drivers to use EC is an issue to investigate. To evaluate the relationship between firm size and internal drivers to use EC, we present the following hypothesis:

Hypothesis 1: Internal drivers to use EC are stronger on large firms

Firm size and the external drivers to use EC

The firms that focus on customers may use EC as a tool in customer relationship management. They use the Internet to boost their corporate image and build brand recognition in the cyber market (Karagozoglu & Lindell, 2004). Through a knowledge network, EC can be used to improve organizational decision making and react



quickly to change (Warkentin, Sugumaran, & Bapna, 2001 and Lee, 2008). EC can also be used to respond to competition through the enhancement of customer services (Daniel & Grimshaw, 2002). The use of inter firm information systems helps to minimize the duplication of paperwork and consequently the time and cost of administration (Lun et al., 2009). Connected with customers, the use of EC allows the carriers to provide highly integrated services, from cargo booking all the way to delivery, customers have requested their service providers use EC (Fillis, Johansson, & Wagner, 2004). To investigate the relationship between firm size and external drivers to use EC, the following hypothesis is proposed:

Hypothesis 2: External drivers to use EC are stronger on large firms

Firm size and use of EC

The literature tends to support that larger firms perform better. Performance can be conceptualized as the extent to which the firm’s goals, such as sales growth, profitability, and customer satisfaction level, are achieved (Ellinger, Daugherty, & Keller, 2000). As large firms are likely to have more resources and capability to use EC:

Hypothesis 3: Large firms use EC at a higher level.

Use of EC and firm performance

The use of EC enhances quality and timeliness of information. Rodgers, Yen, and Chou (2002) argued that use of EC can lead to competitive advantages, as well as improvement in overall performance. Kotha and Swanidass (2000) suggested that the use of EC is related to higher growth rates and profitability.

Hypothesis 4: Use of EC is positively related to business performance.

SAMPLES

Samples are the firms that they use simple EC including firms use EC as a tool for basic Internet, such as Internet connections, communications via email, posting company website information for customers. Moreover, firms use EC as a tool for online booking of shipping space (Electronic booking) and electronic payment.

Methods collected data is used by the survey manager’s opinions of the firms to understand the factors that influence’s decision in use EC. Questionnaire is anchored on five-point Likert-type scale.

THE RESULTS

Test to scale by Cronbach’s alpha reliability coefficients

The result of Cronbach’s Anpha for the fourth different components are displayed according to table 4.1. The scales are represented by 12 observes and cronbach’s alpha of the four components are higher than 0.6. Moreover, corrected item total correlation is higher than 0.3, so all these variables to evaluate concept research are used in the next Exploratory Factor Analysis (EFA)

Table 3.1. Cronbach’s Alpha in the concept research

Variables	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Internal Drivers: ID, alpha = 0.723				
ID2	7.98	1.871	0.559	0.618
ID3	8.03	1.877	0.572	0.601
ID4	7.88	2.042	0.503	0.684
External Drivers: ED, alpha = 0.656				
ED2	7.60	2.059	0.432	0.609
ED3	7.54	2.083	0.511	0.500
ED4	7.62	2.157	0.459	0.569

Firm Performance: FP, alpha = 0.651				
FP1	7.67	1.852	0.472	0.542
FP2	7.59	1.988	0.511	0.486
FP3	7.35	2.290	0.407	0.623
Size firm: SF, alpha = 0.699				
SF1	7.05	2.288	0.475	0.657
SF2	7.29	2.041	0.579	0.526
SF3	7.14	2.121	0.496	0.634

Exploratory Factor Analysis (EFA)

The result of exploratory factor analysis for the two components to use EC shows the Initial Eigenvalues of internal drivers and external drivers are 1.108, greater than 1. And the cumulative percentage of component 1 and component 2 are 62.278%, greater than 50%, the six drivers can be considered as valid measure of the two components in studying the factors affecting the use of EC by the firm in Vung Tau.

Table 3.2. Validity of the factors total variance explained

Variables	Initial eigenvalues		
	Total	% of variance	Cumulative %
1	2.629	43.809	43.809
2	1.108	18.469	62.278
3	.648	10.793	73.071
4	.589	9.822	82.893
5	.556	9.264	92.157
6	.471	7.843	100.000

Extraction method: principal component analysis

*Table 3.3. Results of factor analysis rotated component matrix**

Rotated Component Matrix ^a		
	Component	
	1	2
ID3	0.803	
ID2	0.792	
ID4	0.752	
ED4		0.808
ED3		0.794
ED2		0.639
Initial eigenvalues	2.629	1.108
% of variance	43.809	18.469

Extraction method: Principal component analysis

Rotation method: Varimax with Kaiser Normalization

* Rotation converged in 3 iterations.

According to Table 4.4, the third observational variables are used to measure the levels to use EC compare to small firms. The initial eigenvalue is 1.877, percentage of variance is 62.56. Variables with loading of 0.5 and above are considered practically significant (Hair, Black, Babin, Anderson, & Tatham, 2006). Loading of the variables range from 0.759 to 0.835. Hence, the results can be considered good.



Table 3.4: Analysing factors to the levels using EC on firm size

Variables	Loading	Initial egeivalues	% of variance
Firm size		1.877	62.56
SF2	0.835		
SF3	0.776		
SF1	0.759		

Results of Exploratory Factor Analysis show that the scale of the factors impact to use EC and the level using EC depend on firm size are achieved to value’s convergence.

Test these hypothesis researches

To evaluate is 1 and Hypothesis 2, the author uses one sample t test to assess the statistical significance of the mean scores of the EC drivers. In addition, we regress models to examine the relationship between drivers to use EC and firm size. The next step to conduct correlation analysis to find out the relationship between firm size and the use of EC to evaluate hypothesis 3. Our last hypothesis proposes that firm performance is affected by firm size. We examine the relationship between firm size and performance by using a structure equation model (SEM).

The mean scores of internal and external EC drivers are shown in Table 4.5. The mean scores of the third internal EC drivers range from 3.916 to 4.065 which is higher than 3.0. Similarly, the mean scores of the third external EC drivers are also at a high level with a range from 3.761 to 3.839 which is higher than 3. To test the internal and external EC drivers from a sample population with a known mean but unknown standard deviation, we use the t statistic. According to Table 4.5, the observed significance level is obtained from t distribution with 991 degrees of freedom. The most common significance level for testing hypotheses is at the 5% level (Cavana, Belahaye, and Sekaran, 2002). The results of the t-test show that the significance levels of all the internal and external EC drivers are close to 0. Hence, our findings suggest that the internal and external EC drivers are important to the use of EC by firms in Vung Tau.

Table 3.5. Results of t -test

One-Sample Test						
	Test Value = 0					
	T	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
t test: Internal EC drivers						
ID2	151.159	991	0.000	3.963	3.91	4.01
ID3	151.601	991	0.000	3.916	3.87	3.97
ID4	161.086	991	0.000	4.065	4.02	4.11
t test: External EC drivers						
ED2	130.170	991	0.000	3.781	3.72	3.84
ED3	143.836	991	0.000	3.839	3.79	3.89
ED4	139.133	991	0.000	3.761	3.71	3.81

Table 3.6. Results of regression models

Model	Independent variables	Dependent variables	R ²	Beta coefficient	P-Value
1	Firm size	ID2: Resource allocation	0.021	0.118	0.000**
2	Firm size	ID3: Improvement in productivity	0.014	0.097	0.000**
3	Firm size	ID4: Reduction in cost	0.017	0.102	0.000**
4	Firm size	ED2: React to change	0.017	0.119	0.000**
5	Firm size	ED3: Response to competitors	0.052	0.192	0.000**
6	Firm size	ED4: Request from customer	0.039	0.169	0.000**

According to Table 4.6, firm size is related internal drivers of resource allocation (with beta = 0.118 at the p = 0 level), improvement in productivity (with beta = 0.097 at the p = 0 level), reduction in cost (with beta = 0.102 at the p = 0 level). Thus, Hypothesis 1 receives partial support.

Our findings suggest that firm size is related to external EC drivers of react to change (with beta = 0.0.119 at the p = 0 level), response to competitors (with beta = 0.192 at the p = 0.015 level), and request from customers (with beta = 0.169 at the p = 0 level). Thus, Hypothesis 2 also receives partial support.

Table 3.7. Correlation between firm size and the use of EC

	Firm size	The use of EC
Firm size	1	
The use of EC	0.235**	1
	(0.000)	

The third hypothesis posits that firm size is positively related to the use of EC. We use correlation analysis to test the hypothesis. Correlations measure how firm size and use of EC are related. In a correlation model, correlation coefficient (r) indicates the strength of the association between two metric variables. The sign (+ or -) indicates the direction of the relationship. The value ranges from +1 to -1, with +1 indicating a perfect positive relationship, 0 indicating no relationship at all, and -1 indicating a perfect negative relationship. According to Table 4.7, the result shows that firm size and the use of EC are positively related with beta = 0.235 at the p = 0 level. The finding indicates that Hypothesis 3 is supported.

Our fourth hypothesis assumes that the use of EC affects firm’s performance. In this study, we use perceptual items with respect to profitability, sales growth, and customer satisfaction to measure firm performance. To evaluate the relationship between the use of EC and firm performance, we use the Bivariate Correlations procedure to compute Pearson’s correlation coefficient. Correlations measure how variables are related. The correlations of the variables are shown in Table 4.8. Our findings show that the use of EC positively affects profitability with correlation coefficient (r) = 0.368 and the result is significant the 0 level. The use of EC positively affects sale growth with correlation coefficient (r) = 0.368 and the result is significant the 0.000 level. The use of EC positively affects customer satisfaction with correlation coefficient (r) = 0.432 and the result is significant the 0.000 level. The finding indicates that Hypothesis 4 is supported.

Table 3.8. Correlation between use of EC and firm performance

	Use of EC	Profitability	Sale growth	Customer satisfaction
Use of EC	1			
Profitability	0.368** (0.000)	1		
Sale growth	0.303** (0.000)	0.455** (0.000)	1	
Customer satisfaction	0.432** (0.000)	0.325** (0.000)	0.372** (0.000)	1

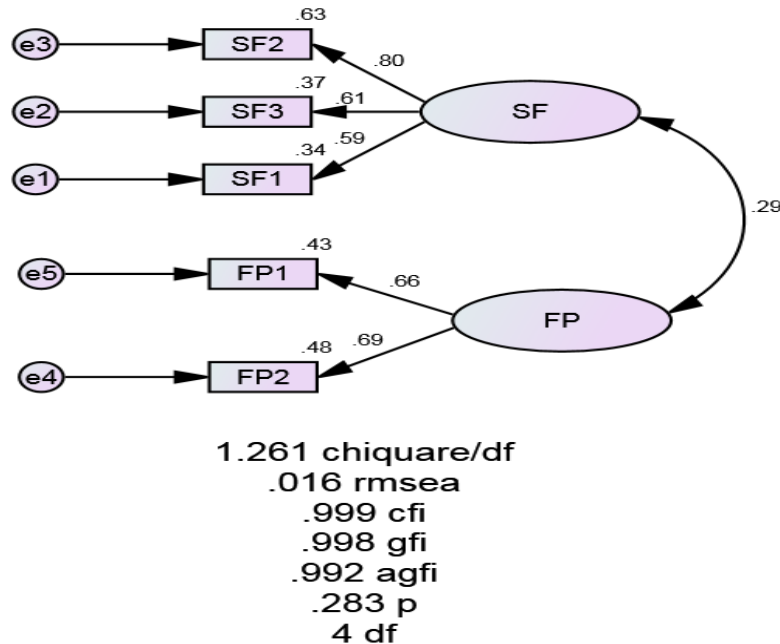
To evaluate the relationship between firm size and performance, we use a structure equation model (SEM).

Results of the first CFA for the scale firm performance of FP3 (customer satisfaction) is 0.489 which is lower than 0.5¹, so we remove to observed variable and conduct continuously the second CFA.

¹ According to (Gerbring và Anderson, 1988), a loading is higher than 0.5.



Results of the second CFA states that the loading of the observed variables are higher than 0.5 and enough to standard for critical analysis modeling



Picture 1: Results of CFA for the scale of firm size and performance

Results of critical analysis modeling shows that the number of degree of freedom is 4 and the models fits the data very well (Chi-square/df = 1.261 < 2, p-value = 0.283 > 0.05, CFI = 0.999 > 0.95, GFI = 0.998 > 0.95, AGFI = 0.992 > 0.8).

The result shows that the standardized relationship between firm size and performance is 0.288 and they have a statistical significant.

CONCLUSION

The article has identified the factors internal and external drivers affect the use of EC by firms in Vung Tau:

- The internal drivers after they are tested reliability, including the third factors: Managerial staff or owner willing to devote resources to support the high investment in hardware, software technology and training the staff; improvement in productivity; reduction in communication cost.
- The external drivers consist the third factors: reacting more quickly to changes; respond to competitor's action; demands or requests from customers.

Results of regression models state that the existent relationship between firm size and the use of EC. Therefore, firm size plays an important role to decide the use of EC. Firms have a large size to use the higher level EC than a small firm size.

About aspect of firm performance, firms use to the high level EC to improve the sales growth, increase the profitability and satisfy to demand of customers. This helps to the ability of the firms to withstand environmental changes is associated with increasing economics of scale. Our findings is similar to experimental research of Misguba, Pollock and Porac (2004).

The finding shows that the large firm's size using EC will enhance the firm performance. Our structural equation model (SEM) has confirmed the positive relationship between firm size and performance when they use EC.

APPENDIX

The causality promotes your firm to use EC as a tool in order to conduct activity trades

Scale:

1: strongly disagree; 2: disagree; 3: neutral; 4: agree; 5: strongly agree

Ordinal numbers	Components	Symbol	Observed variables	Scale				
1	ID:Internal drivers	ID1	Managerial staff/owner manager advocating	1	2	3	4	5
2		ID2	Managerial staff and/or owner manager advocating	1	2	3	4	5
3		ID3	Improvement in productivity	1	2	3	4	5
4		ID4	Reduction in communication cost	1	2	3	4	5
5	ED:External drivers	ED1	Boosting of the company image	1	2	3	4	5
6		ED2	Reacting more quickly to changes	1	2	3	4	5
7		ED3	Response to competitors' action	1	2	3	4	5
8		ED4	Demands or requests from customers	1	2	3	4	5
9	FP:Firm performance	FP1	Profitability	1	2	3	4	5
10		FP2	Sales growth	1	2	3	4	5
11		FP3	Customer satisfaction	1	2	3	4	5
12	(SF:Size firm)	SF1	To get internal drivers so large firm size use the high level EC	1	2	3	4	5

13	SF2	To get external drivers so large firm size use the high level EC	1	2	3	4	5
14	SF3	Large firm size usually uses the high level EC compare to a small firm	1	2	3	4	5

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