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Factors Affecting Efficiency of Electronic Customs and Firm Performance in Vietnam*

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Abstract

The paper identifies the enablers (drivers) and inhibitors (barriers) influencing e-customs implementation in Vietnam (known as a developing country with a lower technological environment) along with determining the impact of e-customs on firm performance. The survey was conducted with the representatives (managers) of firms in five cities and provinces dominating Vietnam's international trade. The data was analyzed using structural equation modeling (SEM). The findings show two significant drivers (enablers) - relative advantages and national culture, while compatibility and ease of use are the barriers. Previous studies showed that cultural dimensions related to 'uncertainty acceptance' and 'individualism' encourage innovation; however, this paper demonstrates that 'uncertainty avoidance' and 'collectivism' promote e-customs deployment in Vietnam. Previously, Vietnamese culture was known for scoring high on cultural dimensions related to 'power distance' and 'short-term orientation'. However, today, as an emerging country, Vietnamese has switched to 'low distance' and 'long-term orientation', especially in terms of e-customs innovation. Additionally, the paper also emphasized that e-customs implementation had a positive influence on firm performance in Vietnam. Based on the results of the paper, policy-makers can devise essential solutions to enhance e-customs implementation as well as managers of firms can set-up strategies to adapt to the modernized environment.

Keywords: Culture, Diffusion of Innovation, E-Customs, E-Government, Vietnam

JEL Classification Code: F00, F13, O33

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1. Introduction

In the last few years, Vietnam has been known as one of the emerging developing economies in the world with significant GDP growth of 6%-7% per year since 2000. However, its rank in the World Bank's Logistics Performance Index (LPI), which includes a measure of customs, is 64th which is low compared with its neighbors in East Asia such as Japan, China, Singapore, Thailand, Malaysia, and Indonesia (Arvis et al., 2016). The LPI is an interactive benchmarking tool created to help countries identify the challenges and opportunities they face in their *performance* on trade *logistics* and what they can do to improve their *performance*. Further, while the proportion of exports and imports keeps increasing (approximately US\$426 billion in 2017 representing a 21% increase) (Tu & Giang, 2018) Vietnam faces several challenges when implementing e-customs because of its weak technological environment (VGDC, 2017). Technological and legislative constraints, as well as finance and human resource constraints, are the primary problems for Vietnam when modernizing its customs payment system (Raus et al., 2010; Urciuoli et al., 2013). Moreover, the essential role of SMEs

is more and more increasing not only in developed countries but also in developing nations, which is demonstrated by the contribution rate to GDP, the number of SMEs participating in the economy, and the number of career opportunities which SMEs bring (Ilegbinosa & Jumbo, 2015). This argument is supported by several experts who demonstrated that SMEs, the crucial determinant, grow the economy, enhance employment, accomplish competitive markets, innovate technology and develop others social and economic field (Acs & Audretsch, 1990; Storey, 1994; Johnson & Loveman, 1995).

The objective of this paper is to provide an empirical study to examine the drivers and the barriers affecting e-customs implementation as well as firm performance in Vietnam through structural equation modeling (SEM) analysis. Based on this assessment and analysis approach we determine areas for further research or development by the Vietnamese government and researchers. After this introduction, the research method is illustrated. Then, the foundation and development process of e-customs in Vietnam provides an overview of e-customs performance in this country. Furthermore, challenges in using e-customs and suggestions to research and modernize Vietnam's customs processes are mentioned. The conclusion and limitations of this study complete this paper.

2. Literature Review

2.1. Diffusion of Innovation (DOI) Theory

The DOI theory was first introduced in 1962 to explain the processes of adoption and diffusion of innovations (Rogers, 2003). Rogers built his theory based on the attributes of innovation and regarded the users' perception of these attributes as a major factor in determining whether the innovation will be adopted. DOI has been applied in a wide range of domains, such as agriculture and marketing, as well as in specialized IT applications, such as smart card technology, voice-mail, personal workstations, operating systems, and e-government (Rogers, 2003; Rana et al., 2012).

According to DOI, there are five attributes of innovation, namely relative advantages, complexity, compatibility, trialability, and observability. Relative Advantage is defined as 'the degree to which an innovation is perceived as better than the idea it supersedes' (Rogers, 2003, p.229). In the context of e-government adoption, Gerpott (2011) and Raus (2009) refined the concept of Relative Advantage to cover the benefits to government, citizens, and businesses in terms of lower costs, saved time, convenience, and transparency. In the empirical literature, it was found that Relative Advantage represents "one of the strongest predictors of an innovation's rate of adoption" (Rogers, 2003, p.233).

Secondly, Complexity is defined as 'the degree to which an innovation is perceived as difficult to understand and use' (Rogers, 2003, p.257). Hellberg and Sannes (1991)

considered Complexity as an important component in e-customs theoretical models. Complexity can promote the demand for using e-customs as well as restrict both the usefulness of e-customs operation and social expectation of information technologies. Hameed et al. (2012) considered Complexity as a barrier to e-government adoption.

Thirdly, Compatibility is identified as "the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters" (Rogers, 2003, p. 240). Compatibility has been defined as the consistency of the new IT applications with the existing administrative and/or technical system (Tan et al., 2006).

Fourthly, Trialability is defined as "the degree to which an innovation may be experimented on a limited basis" (Rogers, 2003, p.258). Trialability refers to the degree to which a governmental officer or citizen or business personnel thinks that there are opportunities to experiment with an IT application on a limited basis (Gerpott, 2011; Salehi et al., 2010).

Finally, Observability is defined as "the degree to which the results of an innovation are visible to others" (Rogers, 2003, p.258). Observability is the degree to which a customs officer or citizen or business personnel can observe an IT application and tell others, such as colleagues, relatives, and friends (Gerpott, 2011; Heeks, 2008).

In summary, Rogers (2003) argued that innovations offering more relative advantage, compatibility, simplicity, trialability, and observability will be adopted faster than other innovations.

2.2. Hofstede Cultural Dimensions

Culture is defined as "the collective programming of the mind which distinguishes the members of one group or category of people from another" (Hofstede, 1997, p. 5). Five dimensions related to the culture have been defined in Hofstede's framework. The first dimension known as power distance refers to the willingness of a culture to accept status and power differences among its members. The second dimension known as uncertainty avoidance refers to a lack of tolerance for ambiguity and a need for formal rules and policies. The third dimension known as masculinity vs femininity refers to the tendency of a culture to stereotypical masculine or feminine traits. The fourth dimension is known as individualism vs collectivism, where in individualistic cultures, people are expected to portray themselves as individuals, who seek to accomplish individual goals and needs, and in collectivistic cultures, people have a greater emphasis on the welfare of the entire group to which the individual belongs, where the individual wants, needs, and dreams are often set aside for the common good. The fifth dimension is known as long vs short term orientation where long-term orientation is the acceptance that business results may take time to achieve

and that the employee wishes for a long relationship with the company. Short-term orientation means results and achievements are set and can be reached within time-frame, and the employee will potentially change employer very often (Hofstede, 1997).

Despite the deficiencies of methodology in Hofstede's measures and concepts (Baskerville, 2003), 60 percent of literature researches adopted Hofstede's cultural dimensions based on the literature review of Leidner and Kayworth, (2006), which means that extent of influence and application of Hofstede's framework is significant. McCoy et al. (2007), contributed to the growing multi-cultural examination of TAM and demonstrates that although the model has been successful in predicting adoption behaviors in some international settings, it might not hold in all cultures. The technology acceptance model (TAM) is one of the most widely used behavioral models in the information systems (IS) field. Researchers have used the model to study many different IS adoption situations and contexts, and it usually demonstrates validity and reliability. Data analysis revealed that the TAM model does not hold for certain cultural orientations. Most significantly, low uncertainty avoidance, high masculinity, high-power distance, and high collectivism seem to nullify the effects of perceived ease of use and/or perceived usefulness. Since TAM is widely applicable to various technological innovations, it is likely to continue to be applied broadly and globally. However, the results of this study suggest the need for caution in applying TAM in at least 20 countries.

Warkentin et al. (2002) investigated online tax services, already available and used extensively in the West. They proposed several ways in which governments can increase citizen trust and thus encourage the adoption of this new and potentially significant mode of government service. The proposed e-government adoption model also takes into account issues of cultural variables, risk, control, and technology acceptance. Institution-based trust, such as an independent judicial system with appropriate legal powers, is proposed to be the major tactic to build trust in e-Government. Besides, among new users of online government services, characteristic-based and cognitive-based antecedents should be crucial; general psychological dispositions and knowledge of the process should also engender trust. Among experienced users, on the other hand, it is suggested that the nature of previous interactions with the e-Government system should be the major predictor of trust, and hence of continued use. These propositions are elucidated, as they apply to different cultures and high-intrusive versus low-intrusive government services.

Al-Hujran et al. (2011) examined national cultural factors that influenced citizen adoption of eGovernment websites in this culturally different part of the world. They developed an integrated model by extending the TAM model with Hofstede's national culture dimensions, which is used to evaluate the impact of national culture on eGovernment adoption in this

paper. Evidence showed that while two cultural dimensions: power distance and uncertainty avoidance had significant impacts on citizens' intention to adopt eGovernment, the other three cultural dimensions: individualism, masculinity, and long-term orientation had no discernible impacts. The results also indicated that perceived usefulness, perceived ease of use, attitude are significant indicators of citizens' intention to use state government services online.

Consequently, since there is wide applicability and acceptance of cultural identification and framework in Hofstede's model, this research also chooses Hofstede's cultural dimensions as a theoretical background to evaluate culture as one of the factors having an impact on e-customs implementation in Vietnam.

2.3. Institutional Theory

According to World Bank (2014), the definition of institutions has been perceived as *'the formal and informal rules of the game for interactions in society'* to promote the growth and development of the economy in the long-term. Institutional theory is a theoretical framework for analyzing social (particularly organizational) phenomena, which views the social world as significantly comprised of institutions – enduring rules, practices, and structures that set conditions on the action. Institutional theory is a prominent perspective in contemporary organizational research. It encompasses a large, diverse body of theoretical and empirical work connected by a common emphasis on cultural understandings and shared expectations. Institutional theory is often used to explain the adoption and spread of formal organizational structures, including written policies, standard practices, and new forms of organization. The institutional theory explains innovation based on cognitive institutions that seek legitimacy so that they'll be accepted. This legitimacy constitutes a mechanism that links organizational behavior with belief systems and public opinion in which change occurs as a response to institutional pressure. Grewal and Dharwadkar (2002) highlighted the importance of the institutional environment and developed a comprehensive conceptual framework that incorporated the institutional environment into current marketing channels research. The institutional environment perspective relies on the primacy of (1) regulatory institutions (e.g., laws), (2) normative institutions (e.g., professions), and (3) cognitive institutions (e.g., habitual actions) in influencing the legitimacy of channel members. Using institutional theory, the authors augmented the current task environment approach by developing three institutional processes and their underlying mechanisms and elaborating on how these institutions might influence channel relationships. Selznick (1996), explored the new institutionalism's ethos and direction. They stated that drawing a sharp line between old and new inhibits the contribution of institutional theory to major issues of bureaucracy and social policy. Problems of accountability and responsiveness, public

and private bureaucracy, regulation and self-regulation, and management and governance will require new understandings of administrative, political, legal, and moral experience. Zucker (1987) stated that legitimated dominants such as normative procedures, requirements of government, and professional licenses can instruct and guide the operations of organizations. To enhance the possibility of survival, the organizations adopt and implement these legitimated elements, which sets up the institutional environment.

2.4. Conceptual Framework

Investigating the theories or models used by previous studies to analyze the adoption of new technologies, Rana et al. (2012) found that scholars prefer to combine theories and models of innovation in their studies. According to Rana et al. (2012), TAM and DOI have some similarities and overlap. Particularly, the relative advantages and complexity attributes of DOI and the perceived ease of use (PEOU) and perceived usefulness (POU) attributes of TAM have a similar construct.

For the present purposes, it makes sense to combine elements from both the DOI theory, institutional theory, and Hofstede dimensions. Based on the literature review, some drivers and barriers of the e-customs system in

previous studies have been clarified and they are grouped corresponding to some characteristics of the DOI theory. Moreover, the research conducted to understand the connection between national culture and citizen adoption of e-government services in Arab, found out that culture has a positive influence (Al-Hujran et al., 2011). However, Raus (2010) emphasized that there are several opposing arguments to the fact that culture has a positive effect on the innovation process as well as e-government. Besides, factors of national culture have not been considered in previous research concerning e-customs. That is one of the grounds for this research to address this issue. In this framework, questionnaire items that contribute to PU and PEOU (Davis, 1989) can be adapted for designing items contributing to relative advantages, complexity, and compatibility.

Thus, our conceptual framework comprises three main parts. The first part consists of the enablers with a positive impact and barriers with a negative influence on e-customs in relation to the attributions of DOI theory. The second part comprises firm performance which is analyzed to clarify the correlation between e-customs and business performance of SMEs based on the institutional theory. The third section examines the impact of relative advantages on firm performance with the strategic profit model support.

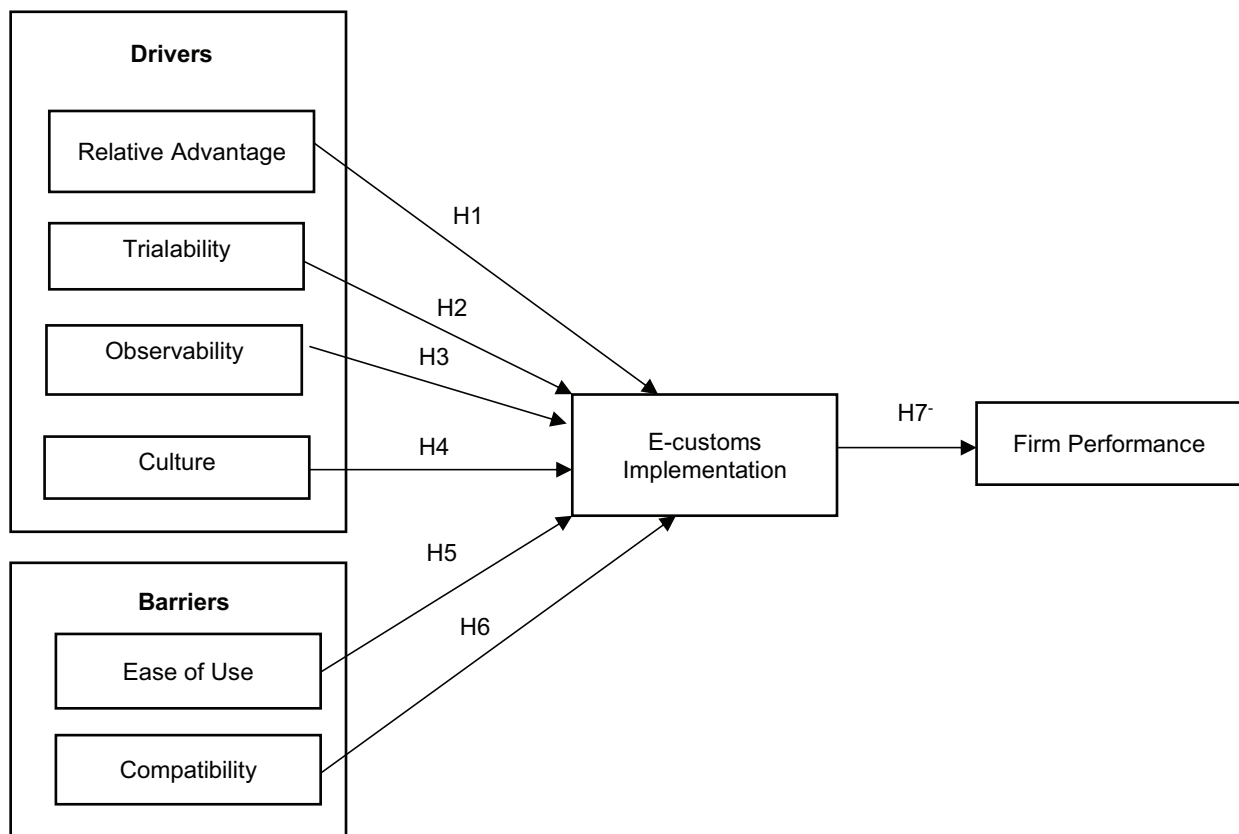


Figure 1: Proposed Model by the Authors

3. Methodology

This research applies several analytical techniques. First, the analytical review and synthesis which illustrate analyzing, conciliating, summarizing, and presenting data and information systematically have been adopted to review the literature. Second, a questionnaire survey study was conducted with 439 businesses and 397 valid responses were used to examine the proposed model using confirmatory factor analysis (CFA) and structural equation modeling (SEM). Multivariate data analysis is a set of statistical models that examine patterns in multidimensional data by considering, at once, several data variables. The primary objective of multivariate analysis in this study is to explain and predict the influence of factors on e-customs implementation in Vietnam as well as the relationship between e-customs and business performance. In comparison with other techniques, SEM has more advantages. That is the reason why SEM was selected for this study with AMOS version 24 to analyze the data.

3.1. Structural Equation Modelling (SEM) and Confirmatory Factory Analysis (CFA)

One of the multivariate analysis techniques is the SEM that combines methodological contributions from psychometric theory and structural equations. SEM is a family of statistical models that seek to explain the relationships among multiple variables. In doing this, it examines the structure of interrelationships expressed in a series of equations, similar to a series of multiple regression equations. These equations depict all of the relationships among constructs (the dependent and independent variables) involved in the analysis. Constructs are unobservable for latent factors represented by multiple variables (much like variables representing a factor in factor analysis). So far each multivariate technique has been classified either as interdependence or dependence techniques. SEM can be thought of as a unique combination of both types of techniques because SEM's foundation lies in two familiar multivariate techniques: factor analysis and multiple regression analysis (Hair et al., 2010).

Confirmatory factor analysis (CFA) is a way of testing how well measured variables represent a smaller number of constructs. The oldest and best-known statistical procedures for investigating relations between sets of observed and latent variables is that of factor analysis. In using this approach in data analyses, the researcher examines covariation among a set of observed variables to gather information on their underlying latent constructs (factors). CFA is used to provide a confirmatory test of our measurement theory. A measurement theory specifies how measured variables logically and systematically represent constructs involved in a theoretical model. In other words, measurement theory specifies a series of relationships that suggest how measured

variables, represent a latent construct that is not measured directly. The measurement theory may be combined with a structural theory to fully specify an SEM model.

3.2. Survey Data Collection

Survey methodology studies the in-depth sampling of individual units from a population and administering data collection techniques on that sample. It includes instruments or processes that ask different question types to a predefined sample, to conduct data-collection, and increase the survey response rate (Easterby-Smith & Lyles, 2003; Kotzab, 2005). It is usually associated with the deductive approach (Saunders et al., 2007) and is a traditional methodology tool associated with logistics research. The questionnaire survey was carried out from January to March 2018. 439 representatives of firms related to international trade in five provinces and inter-provinces including Hanoi, Hai Phong, Ho Chi Minh City, Binh Duong, and Dong Nai were surveyed. 439 questionnaires were distributed to the representatives of enterprises, of which, 423 were returned and 397 valid responses were collected to use in the analysis.

The questionnaire for firms' representatives was designed based on the theory of DOI by Rogers (2003) as applied in the e-government domain by Raus et al. (2009), Conrad (2009), Gerpott (2011), and Hameed et al. (2012), and on preliminary information obtained from documents relating to the pilot implementation of e-customs in Vietnam. The content of the instrument was also derived from the literature review on e-government and e-customs. Research hypotheses are as follows:

H1: Relative advantages positively indicates e-customs implementation, i.e., $\beta > 0$;

H2: Trialability positively indicates e-customs implementation, i.e., $\beta > 0$;

H3: Observability positively indicates e-customs implementation, i.e., $\beta > 0$;

H4: National culture positively indicates e-customs implementation, i.e., $\beta > 0$;

H5: Compatibility has a negative influence on e-customs implementation, i.e., $\beta < 0$;

H6: Ease of use has a negative influence on e-customs implementation, i.e., $\beta < 0$;

H7: E-customs has a positive influence on firm performance, i.e., $\beta > 0$.

4. Results

4.1. Reliability and Validity

Cronbach's alpha was used to test the reliability of all latent variables. Cronbach's alpha coefficient was calculated

for each latent variable using SPSS 24. All coefficients calculated were greater than the cutoff value of 0.70 (Tabachnick & Fidell, 2007; Hair et al., 2010; Pallant, 2016). Then, constructs Ease of Use (EOU), E-customs Implementation (E_CUS_IMPL), and Firm Performance (FIRMPF) have reliability coefficients of 0.862, 0.826, and 0.933 respectively that can satisfy the threshold.

However, there are some constructs and variables of constructs that do not satisfy the criteria of Cronbach's Alpha. In test construction, the corrected item-total correlation is used to define the association of the item with the total score on the other items. The items with corrected item-total correlation lower than 0.30 are not acceptable. For the construct Relative advantages (RA), the item-total statistics reveal that RA4, RA6, and RA7 have "corrected item-total correlation" less than 0.3. These three items showed corrected item-total correlation 0.060, 0.018, and 0.014 respectively. According to Field (2010), a value of less than 0.3 means the item 'does not correlate very well with the scale overall items may have to be dropped'. MacKenzie et al. (2011) strongly recommend deleting problematic items 'provided that the essential aspects of the construct domain are captured by the remaining items. After deleting these three problematic items (RA4, RA6, and RA7), the construct of RA showed a reliability coefficient of 0.912.

Furthermore, the Trialability and Observability constructs were removed because the Cronbach's Alpha values were below the cutoff value of 0.7 and all the variables have 'corrected item-total correlation' less than 0.3. The general rule of thumb is that a Cronbach's alpha of 0.70 and above is good. Similarly, the COMPAT2 and COMPAT4 of Compatibility (COMPAT) construct; CUL3, CUL4, CUL7, CUL8, and CUL10 of Culture (CUL) construct were removed to ensure reliability coefficients of 0.890 and 0.913 respectively.

In conclusion, after Cronbach's Alpha test, 14 variables of 43 observed variables tested for reliability were removed as they failed to meet the Cronbach's Alpha cutoff. Therefore, only 29 observed variables could satisfy the requirements.

4.2. Factor Analysis

A Kaiser-Meyer-Olkin (KMO) test is used in research to determine the sampling adequacy of data that are to be used for Factor Analysis. The KMO test allows us to ensure that the data we have are suitable to run a Factor Analysis and therefore determine whether or not we have set out what we intended to measure. *Bartlett's test for Sphericity* compares your correlation matrix to the identity matrix. In other words, it checks if there is a redundancy between variables that can be summarized with some factors. Bartlett's test of sphericity tests the hypothesis that your correlation matrix is an identity matrix, which would indicate that your variables are unrelated and therefore unsuitable for structure detection

After verifying the level of internal consistency of the items in each of the five groups, CFA was carried out on each group of items to extract the corresponding latent variable. The results show that the scores of the Keiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) are greater than 0.6 with a value of 0.912, and Bartlett's Test of Sphericity is significant with $p = 0.00$ so that all five-factor analyses are appropriate (Pallant, 2016; Tabachnick & Fidell, 2007).

Table 1: Pattern Matrix

	Factor				
	1	2	3	4	5
STRPF6	.828				
STRPF5	.819				
STRPF4	.816				
STRPF1	.798				
STRPF7	.795				
STRPF2	.737				
FINPF2	.727				
FINPF3	.721				
STRPF3	.719				
FINPF1	.666				
CUL11		.823			
CUL12		.819			
CUL9		.817			
CUL5		.761			
CUL2		.744			
CUL1		.722			
CUL6		.700			
EOU2			.905		
COMPAT3			.884		
EOU1			.857		
COMPAT5			.853		
COMPAT1			.809		
RA5				.858	
RA2				.850	
RA3				.849	
RA1				.828	
E_CUS_IMPL2					.913
E_CUS_IMPL3					.746
E_CUS_IMPL1					.677

Factor loadings are correlation coefficients between observed variables and latent common factors. Factor loading is the correlation coefficient for the variable and factor. Factor loading shows the variance explained by the variable on that particular factor. In the SEM approach, as a rule of thumb, 0.7 or higher factor loading represents that the factor extracts sufficient variance from that variable. However, a *factor loading* should be a minimum of 0.6. The pattern matrix in Table 4.1 of the factor analysis on 29 items shows that all 29 factors have a factor loading greater than 0.6. Thus, all 29 items are valid to form five factors (latent variables) (1) Relative Advantages, (2) Culture, (3) Compatibility and Ease of Use, (4) E-customs Implementation, and (5) Business Performance created by a combination of Financial Performance and Strategic Performance.

4.3. Confirmatory Factor Analysis (CFA)

Indicator reliability is the proportion of indicator variance that is explained by the latent variable. Composite reliability or construct reliability (CR) is a measure of internal consistency in scale items. It can be thought of as being equal to the total amount of true score variance relative to the total scale score variance. Alternatively, it's an “indicator of the shared variance among the observed variables used as an indicator of a latent construct” (Fornell & Larcker, 1981). Convergent validity refers to how closely the new scale is related to other variables and other measures of the same construct. Not only should the construct correlate with related variables but it should not correlate with dissimilar, unrelated ones.

Table 2: Measurement Model Assessment with CFA

Variables	Loading ≥ 0.70	R ²	Composite Reliability (CR ≥ 0.70)	Average Variance Extracted (AVE ≥ 0.5)
STRPF6	.803	0.644	0.933	0.585
STRPF5	.827	0.685		
STRPF4	.821	0.675		
STRPF1	.769	0.592		
STRPF7	.791	0.626		
STRPF2	.734	0.539		
FINPF2	.707	0.500		
FINPF3	.772	0.596		
STRPF3	.734	0.539		
FINPF1	.674	0.454		
CUL11	.810	0.656	0.913	0.602
CUL12	.813	0.661		
CUL9	.802	0.643		
CUL5	.755	0.570		
CUL2	.754	0.569		
CUL1	.745	0.555		
CUL6	.748	0.560		
EOU2	.887	0.787	0.936	0.746
COMPAT3	.880	0.774		
EOU1	.853	0.728		
COMPAT5	.866	0.750		
COMPAT1	.831	0.691		
RA5	.808	0.653	0.912	0.721
RA2	.896	0.804		
RA3	.853	0.727		
RA1	.838	0.702		
E_CUS_IMPL2	.880	0.774	0.831	0.623
E_CUS_IMPL3	.773	0.597		
E_CUS_IMPL1	.704	0.496		

The average variance extracted (AVE) is a measure of the amount of variance that is captured by a construct in relation to the amount of variance due to measurement error.

Table 4.2 displays indicator reliability through standardized loadings (standardized regression weights using AMOS terminology), internal consistency reliability through CR, and Convergent validity through AVE. The lowest loading obtained is 0.674 linking firm performance (FIRMPF) to item FINPF1 which is below 0.7 but still exceeds 0.5 standard for exploratory. The AVE estimates range from 58.5 percent for Firm performance (FIRMPF) to 74.6 percent for Compatibility and Ease of use (COMPATEOU). All exceed the 50 percent rule of thumb. Construct reliability range from 0.831 for E-customs implementation (E_CUS_IMPL) to 0.936 for Compatibility and Ease of use (COMPATEOU). Once again, these exceed 0.7, suggesting adequate reliability. Taken together, the evidence supports the convergent validity of the measurement model. The AVE estimates all exceed 0.5 and the reliability estimates all exceed 0.7. All of them exceed the recommended threshold, thus it exhibits unidimensionality, reliability, and convergent validity.

Discriminant validity is demonstrated by evidence that measures of constructs that theoretically should not be highly related to each other are, in fact, not found to be highly correlated to each other. According to Fornell and Larcker (1981) and Götz et al. (2010), discriminant validity is examined by comparing the Square Root of AVE of a particular construct with the correlation between that construct with other constructs. The value of the Square Roof of AVE should be higher than the correlation. Table 4.3 shows that the discriminant validity of the model is satisfied with the criteria.

CFA output includes many fit indices. In this study, the author did not present all possible fit indices. Rather the researcher focused on the key GOF values including the χ^2 statistic, the CFI, and the RMSEA. The overall model χ^2 is 701.190 with 367 degrees of freedom. The p-value associated with this result very tiny, i.e., less than 0.0001. This p-value is significant using a rate of 0.05. Thus, the χ^2 goodness of fit statistic can satisfy criteria and indicate that the observed covariance matrix matches the estimated covariance matrix within sampling variance.

Furthermore, the value of RMSEA, an absolute fit index, is 0.049. This value appears quite low and is below the 0.07 guideline for a model with 29 measured variables and a sample size of 381. Using the 90% confidence interval for this RMSEA, we conclude the true value of RMSEA is between 0.043 and 0.054. Thus, even the upper bound of RMSEA is low in this case. The RMSEA, therefore, provides additional support for model fit. Moreover, the following absolute fit statistics is the normed χ^2 , which is 1.911. This measure is the chi-square value divided by the degrees of freedom ($701.190/367=1.911$). A number smaller than 2.0 is a good fit for the CFA model (Hair et al., 2010).

Moving to the incremental fit indices the CFI is the most widely used index. In this CFA model, CFI has a value of 0.955, which, like RMSEA, exceeds the CFI guideline of greater than .90 for a model of this complexity and sample size. Although the value of GFI (0.890) is just closed to 0.9 as the threshold, the model can be permissible (Bagozzi & Yi, 1988). The other incremental fit indices also exceed suggested cut-off values. Although this model is not compared to other models, the parsimony index of AGFI has a value (0.870), which reflects a good model fit. In conclusion, the CFA results suggest this measurement model provides a reasonably good fit, and thus it is suitable to proceed to further examination of the model results.

4.4. Structural Equation Modelling (SEM) Results

The structural model shown in the path diagram can now be estimated and assessed. To do so, the emphasis first will be on the SEM model fit and then whether the structural relationships are consistent with theoretical expectations. The information in Table 4.8 shows the overall fit statistics from the testing SEM model. The χ^2 is 749.887 with 370 degrees of freedom ($p < 0.05$) and the normed chi-square is 2.027. The model CFI is 0.949 with an RMSEA of 0.052 and a 90% confidence interval of 0.047 to 0.057. Although GFI (0.884) is below the threshold, this value is still acceptable over 0.8 and closed to 0.9. Therefore, almost all measures are within a range that would be associated with a good fit.

Table 3: Construct Correlation (Standardised)

Factor	FirmPF	Culture	COMPATEOU	RA	E_CUS_IMPL
FirmPF	1.000	.209	-.120	.439	.290
Culture	.209	1.000	-.357	.291	.411
COMPATEOU	-.120	-.357	1.000	-.275	-.360
RA	.439	.291	-.275	1.000	.418
E_CUS_IMPL	.290	.411	-.360	.418	1.000
	0.765	0.776	0.864	0.849	0.789

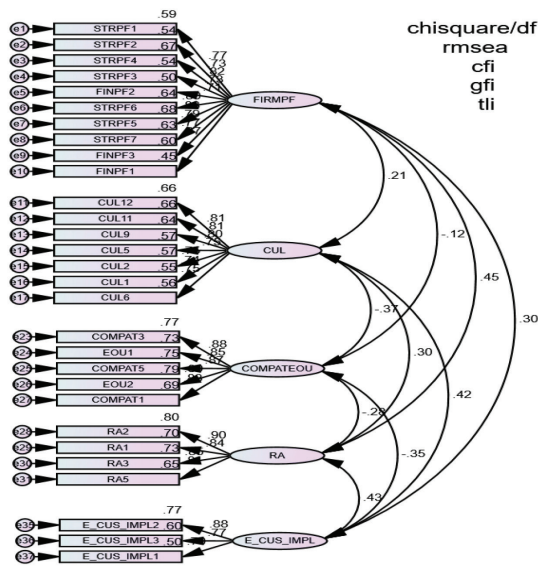


Figure 2: CFA result

Seven hypotheses pertaining to structural relationships were presented above and are supported and not supported as follows:

H1: *Relative Advantages (RA) positively indicates E-customs Implementation*

This hypothesis is supported by a standardized positive coefficient of 0.33 and relative advantages (RA) is evaluated as the most important factor in this research.

H2: *Trialability positively indicates e-customs implementation*

H3: *Observability positively indicates e-customs implementation*

The hypothesis related to the influence of Trialability (TRIAL) and Observability (OBSERVE) in E-customs implementation (E_cus_impl) were not supported because all observed variables of TRIAL and OBSERVE construct did not satisfy the Cronbach Alpha's reliability.

H4: *National Culture (CUL) positively indicates E-customs Implementation*

This hypothesis is supported by a standardized positive coefficient of 0.27.

H5: *Compatibility (COMPAT) and H6 Ease of use (EOU) has a negative influence on E-customs Implementation*

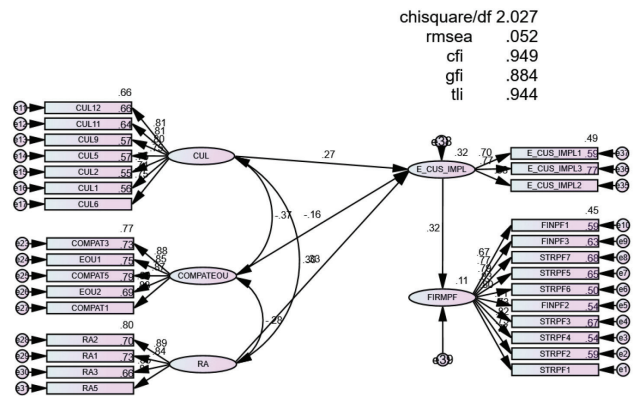


Figure 3: Standardised Path Estimates for Structure Model

After CFA, the construct of Ease of use (EOU) was merged to Compatibility (COMPAT). The hypothesis H5 is supported with a standardized negative coefficient of -0.16.

H7: *E-customs implementation has a positive influence on firm performance (FIRMFPF)*

This hypothesis is supported by a standardized positive coefficient of 0.32.

To sum up, four of seven hypothesis and structural path estimates are significant and in the expected direction with p-value < 0.05.

5. Discussion

5.1. Relative Advantages as a Driver of E-Customs Implementation

This study is one of the evidences regarding several studies discussing the benefits of e-customs (Tan et al. 2006; Raus, 2009; Choi, 2011; Urciuoli et al., 2013) as follows:

Reduced burden of administrative documents: By adoption of e-documents and e-records, e-customs is likely to decrease the pressure of administrative documents. According to Henningsson and Andersen (2009), ICT applications in a paper-work can reduce administrative burden by 25%.

The reduced requirement of data re-entry and fewer data errors: The information and data when shared and exchanged in the electronic system reduce the necessity for data re-entry as well as reduce data errors. Moreover, technical processing can save time and costs (Raus, 2010; Granqvist et al., 2011).

Time savings: E-customs can reduce the time of accessing data, inspecting and clearing goods, which supports business to implement customs procedures quicker compared with traditional customs (Hellberg & Sannes, 1991; Raus, 2009, 2010; Granqvist et al., 2011; Choi, 2011; UNPAN, 2012). Furthermore, customs agencies and officials can communicate and coordinate with businesses using e-customs. For example, they can exchange information about examination results, approval of clearance, quarantine verifications, and recommendation documents by using the e-customs EDI (Electronic Data Interchange (EDI) system. EDI is designed to exchange/transact **customs** clearance related information electronically. This helps the business as well as individuals to save time and costs at the time of customs declaration because they do not have to move and visit many state agencies (UNPAN, 2012; Choi, 2011).

Cost reductions: According to Raus (2009), Granqvist et al. (2011), Urciuoli et al. (2013), one of the drivers of e-customs is cost-saving through the modernization of the customs system by computerization. The administrative costs related to paperwork, faxes, and phone calls of enterprises and public organizations can be reduced because of the adoption ICTs in customs processing and declaration (Hellberg & Sannes, 1991; Raus, 2009, 2010; Granqvist et al., 2011; Choi, 2011; UNPAN, 2012).

Usefulness in risk management: Gordhan (2009) and Biljan and Trajkov (2012) analyzed the importance of the risk management approach for enhancing customs performance quality. The main dilemma in customs management, especially during the last two decades, is balancing the needs for trade facilitation as a process of simplification, standardization, and unification of documents and procedures in the international supply chain, on the one hand, and the level of controls and interventions, on the other hand. The main characteristic of the customs risk management approach is determining which persons, goods, and means of transport should be examined and to what extent. High-risk persons, goods, and means of transport are subject to high-level controls and interventions; despite low-risk ones that receive high-level trade facilitation (Holloway, 2009; UNPAN, 2012).

5.2. National Culture Positively Influences E-Customs Implementation

Five dimensions of culture including uncertainty avoidance, power distance, collectivism/ individual, masculinity /femininity, and long-term/ short-term orientation were applied in this study. The results support the positive relationship between the national culture dimension and e-customs implementation in Vietnam and culture plays a significant factor in e-customs

implementation. Previous studies indicated that uncertainty acceptance, low power distance, and individualism encourage innovation and e-government (Shane, 1993; Warkentin et al., 2002; Al-Hujran et al., 2011). Whereas, in Vietnam, uncertainty avoidance and collectivism have a positive impact on e-customs. Second, Vietnam is known as a high-power distance country (Hofstede, 2011); however, with the aim of integration and international trade improvement, this perspective is changing in Vietnam. The country has now become a low power distance nation. Third, this research also agrees with literature reviews that masculinity and long-term orientation societies will be more innovative (Shane, 1993; Warkentin et al., 2002; Al-Hujran et al., 2011). Vietnam is moving from being known as a short-term orientation society to a long-term orientation society (Hofstede, 2011). In terms of five dimensions, uncertainty avoidance, power distance, and masculinity show significant influence (Warkentin et al., 2002; Al-Hujran et al., 2011).

National culture is considered as a driver to promote e-customs in Vietnam. Elements of culture based on business perspectives also suggest some recommendations for policymakers to enhance the efficiency of e-customs implementation (Le, 2020). The specific instructions related to e-customs procedures and processes should be completed to avoid errors and facilitate speedy clearance. Additionally, customs agencies and support teams can be promoted to increase support for businesses to solve customs problems quickly. Finally, conversations and communications among customs, business, and stakeholders should be encouraged. Customs officials should not only listen to the feedback of companies regarding the e-customs system but also answer and explain the rising issues of stakeholders regarding e-customs in these discussions.

5.3. Compatibility and Ease of Use Has a Negative Influence on E-Customs Implementation

Technological obstacles such as inadequate infrastructure, IT skills, confidentiality, difficulties in using and upgrading software can be assessed as the primary barriers with developing countries as Vietnam (Rogers, 2003; Raus, 2009, 2010; Salehi et al., 2010; Egyedi & Loeffen, 2002; Byrne & Golder, 2002; Mustonen-Ollila & Lyytinen, 2003). Nguyen et al. (2018) agreed that technology was an inhibitor for Vietnamese SMEs. Due to limitations of capital, capacity, and labor, funding for adopting the latest technologies were not given adequate attention. Although this study proves that both compatibility (COMPAT) and ease of use (EOU) of technology are technological constraints in the implementation of e-customs in Vietnam, the impact

coefficient of COMPATEOU is not quite remarkable. Vietnam's ICT market is expected to continue its growth between 2018 and 2020, due to the government's desire to turn Vietnam into an ICT power. In 2015 and 2016, the government issued fourteen important documents including six governmental decrees and eight Prime Minister decisions instructing Ministries and provincial governments to promote the application and development of IT to meet the objectives of sustainable economic growth and successful international integration. All Ministries and local governments were instructed to promote IT adoption and development through Resolution No.26/NQ-CP promulgated by the Prime Minister in April 2015 (Nguyen, 2017). Besides, a Master Plan for Information Technology has been devised with strategies of pushing Vietnam up to an advanced ICT country in 2020. Moreover, the US \$415 million can be invested in the ICT industry by 2020 with the state budget (Business Monitor International, 2016). According to the report of the Vietnam Ministry of Information and Communication (2017), as of 2017, the number of fixed broadband internet subscribers was 11.5 million, while the number of mobile broadband internet users via the 3G network is nearly 47.2 million. The Internet sector in Vietnam can be developed significantly with 9% growth in the next few years because of the expansion of IT applications, e-commerce, and Internet TV (Business Monitor International, 2016).

5.4. E-Customs Implementation Has a Positive Influence on Firm Performance

E-customs implementation affects positively both the financial and strategic performance of a company with indicators as following: profit, growth rate, paperless, customer satisfaction, and employee satisfaction. In a survey of VCCI in 2016, after 2 years of launching VNACCS/VCISS, most enterprises (93%) evaluated positively the transformation of customs legislation and process (VCCI, 2016). The proportion of customs declaration forms that were submitted electronically rose from over 6 million customs declaration forms in 2015 up to 11 million in 2017 (VGDC, 2017) and 12.42 million in 2019 (VGDC, 2019). Similarly, in terms of turnover value, the value of exports and imports being declared electronically (rather than through traditional customs) increased sharply from US\$25.1 billion in 2017 to US\$ 500 billion in 2019. The total value of import and export of Vietnam ranked third just after Singapore and Thailand. Vietnam jumped 25 spots in the World Bank's *Logistics Performance Index* 2018, ranking 39th among 160 countries (Vietnam Briefing, 2018). Improvements in customs services including speed, simplicity, and computation, and less time-consuming customs procedures and clearance are significant in LPI of Vietnam in 2018.

6. Conclusion

The paper identifies the enablers (drivers) and inhibitors (barriers) influencing e-customs implementation in Vietnam (known as a developing country with a lower technological environment) along with determining the impact of e-customs on firm performance. The survey was conducted with the representatives (managers) of firms in five cities and provinces dominating Vietnam's international trade. The data was analyzed using structural equation modeling (SEM). The findings show two significant drivers (enablers) - relative advantages and national culture, while compatibility and ease of use are the barriers. Previous studies showed that cultural dimensions related to 'uncertainty acceptance' and 'individualism' encourage innovation; however, this paper demonstrates that 'uncertainty avoidance' and 'collectivism' promote e-customs deployment in Vietnam. Previously, Vietnamese culture was known for scoring high on cultural dimensions related to 'power distance' and 'short-term orientation'. However, today, as an emerging country, Vietnamese has switched to 'low distance' and 'long-term orientation', especially, in terms of e-customs innovation. Additionally, the paper also emphasized that e-customs implementation had a positive influence on firm performance in Vietnam. Based on the results of the paper, policy-makers can devise essential solutions to enhance e-customs implementation as well as managers of firms can set-up strategies to adapt to the modernized environment.

This study also has some limitations. First, this paper just focuses on the viewpoints of the business people on e-customs. To gain a comprehensive understanding, a survey with both business and customs officials should be carried-out. Second, the technological constraints factor can be re-investigated with both reviews of business and customs policymakers because this factor does not have a significant impact on e-customs implementation. Finally, other factors apart from the factors used in this study affecting e-customs implementation in Vietnam should be explored in further research.

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