

Digitalization in public sector in emerging economies: The enablers and inhibitors influence electronic customs in Vietnam**Hang Thanh Nguyen^{a*}, David B. Grant^b, Christopher Bovis^c, Thuy Thi Le Nguyen^d and Yen Thi Hai Mac^b**^aLecturer/MSc, Faculty of Management Science, National Economics University, Vietnam^bProfessor/PhD, Dean of Research and Societal Impact, Hanken School of Economics, Finland^cProfessor/PhD, Faculty of Business, Law and Politics, Hull University Business School, United Kingdom^dPhD, Dean of Economics Management Department, National Economics University, Vietnam^eLecturer/MSc, Faculty of Management Science, National Economics University, Vietnam**CHRONICLE****ABSTRACT***Article history:*

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This paper investigates how customs officials perceive the implementation of e-customs will influence business performance in Vietnam, a developing country with a lower technological environment. A survey of customs officials was conducted, and data were analyzed by structural equation modelling. The outcomes discover two significant enablers related to relative advantages and the new exploring factor Culture while Finance & Human Resources and Legislation as the inhibitors. Additionally, the study also emphasized that e-customs implementation had a positive influence on firm performance in Vietnam. In addition, the study provides different viewpoints of cultural dimensions in case study of applying e-customs in Vietnam in comparison with previous studies. Culture with attributions related to uncertain acceptance and individualism encourage innovation in other literature reviews, however, the study indicates uncertainty avoidance and collectivism as Vietnam also promotes e-customs deployment. Vietnam with high power distance and short-term orientation became old themes. This emerging country switched to low distance and long-term orientation in terms of e-customs innovation. In contrast to previous studies related to constraints from technology in emerging economies, technological factors are not an obstacle for Vietnam. Furthermore, previous literature reviews inflected legislation and regulations of government as one of the limitations that should be examined in further and this research carried-out this investigation in one of emerging economies. The results of the paper support policy makers who can have essential solutions to enhance e-customs implementation as well as enterprises' managers set-up strategy to adapt with the modernization environment.

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1. Introduction

Vietnam has moved from eleventh to eighth place in Agility's (2021) top ten emerging markets logistics index and up 25 places to 64 in the World Bank's (2018) Logistics Performance Index (LPI). These successes are due partly to the transformation of customs processing to an electronic system which has continued during the Covid-19 pandemic. However, such rapid development has also created challenges for Vietnam. While the proportion of exports versus imports keeps increasing, approximately USD543.9 billion in 2020 representing a 5.1 percent increase (Vietnam General Statistics Office, 2020), Vietnam has less of a technological environment and faces several challenges when implementing e-customs (Agility, 2021;

* Corresponding author. Tel: +84 902549866

E-mail address: hangmoon2910@gmail.com (H. T. Nguyen)

VGDC, 2017). Technological, legislative, financial, and human resource constraints are primary issues for Vietnam when modernizing their customs processes (Raus et al., 2010; Dam, 2013; Urciuoli et al., 2013). Further, the role of small and medium size enterprises (SMEs) is increasing in developing nations as evidenced by their contribution to GDP, the number of SMEs participating in the economy, and the number of career opportunities SMEs provide (Ilegbinosa & Jumbo, 2015). This evidence supports earlier academic arguments that SMEs are a crucial determinant to grow economies, enhance employment, develop competitive markets, innovate technology, and develop other social and economic fields (Acs & Audretsch, 1990; Storey, 1994; Johnson & Loveman, 1995). This paper presents an exploratory investigations drivers and barriers influencing the intersection of Vietnam's e-customs transformation and SMEs, and their impact on SME firm performance, through empirical studying perspectives of Vietnamese customs official. Background literature is provided next before a discussion of the research methodology and method. Then, the analysis provides an overview of the e-customs development process in Vietnam, including challenges and suggestions for modernizing Vietnam's customs processes. Finally, conclusions and limitations are presented.

2. Literature review and hypothesis development

2.1 Diffusion of innovation (DOI) theory

In DOI theory innovation is "an idea, a practice, or an object that is perceived as new by an individual or other adoption unit" (Rogers, 2003, p.12) while diffusion is "the process in which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2003, p.5). Hence, diffusion is indicated by progress regarding communication, in the information transmission process, to distribute and provide the new ideas in society with a minimum of uncertainty. Diffusion of innovation is thus considered a decision process. Rogers (2003) expressed five steps in the decision-making process associated with innovation including knowledge, persuasion, decision, implementation, and confirmation. DOI theory has been deployed widely in research on e-government generally and e-customs particularly. In a review comprising 434 articles relating to e-government adoption, Rana et al. (2012) found that many researchers used DOI constructs such as relative advantage, compatibility, complexity, trialability and observability, as independent variables to predict the adoption rate of e-customs. Relative advantage and complexity attributes were used most frequently. The more an innovation is perceived to offer a relative advantage, the more likely it is to be adopted. Rogers (2003) classified that the level of economic profitability as well as imparting social dignity can be identified as a relative advantage. The essence of innovation focused on subdivisions of relative advantage, for instance in economy or society, which can provide the most benefit for adopters and the best attributes of users, thereby influencing the types of relative advantage. We thus hypothesize:

H₁: *Relative advantage positively affects e-customs implementation.*

The simpler an idea, the more likely it is to be adopted. In contrast, an idea that requires complex skills and knowledge is less likely to be adopted (Rogers, 2003; Goossenaerts et al., 2006). While relative advantage has a positive association with intention to use, there is generally a negative relationship between complexity and intention to use. Although complexity may not be as important as a relative advantage for many innovations, for some, new ideas and complexity could be a very important barrier to adoption (Rogers, 2003). We thus hypothesize:

H₂: *Complexity negatively affects e-customs implementation.*

Rogers (2003) identified compatibility as the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters. An idea that is not compatible with existing values will not be quickly adopted. Compatibility leads adopters to absorb the new technologies more easily. Enterprises not only implement the e-customs procedure domestically but also forward to international trade. Therefore, compatibility has arisen as a requirement for customs with the aim of enhancing interoperability among the diverse systems of various countries. Based on Rogers (2003), Tan et al. (2006), Choi (2011), and Urciuoli, et al. (2013), the challenges of e-customs compatibility came from inherent differences between systems (e.g., syntactic structures, embedded semantics, and embedded logic), interchange agreements, firm regulations, and the actual practices of the workers. We thus hypothesize:

H₃: *Compatibility negatively affects e-customs implementation.*

Trialability is the degree to which an innovation may be experienced with limited implementation or knowledge (Rogers, 2003). A new idea that is easily trialled will be adopted more readily than one that is difficult to be implemented in stages or phases. An opportunity to trial an idea to see how well it works under certain circumstances will reduce uncertainty as well as the risks associated with committing to major changes immediately (Rogers, 2003). In the Vietnamese context, the e-customs trial phase 1 was deployed in 2005 by the Vietnam General Department of Customs (VGDC) with the aim of modernising public administration and introducing e-government. The two biggest seaports, Hai Phong and Ho Chi Minh City, were chosen to start an e-customs trial based on Decision No. 149/2005/QĐ-TTg of the Prime Minister. After that, the trial's coverage was expanded to 21 provincial, interprovincial, and municipal customs agencies by the end of 2012 as Phase 2 of the trial following Decision No.103/2009/QĐ-TTg of the Prime Minister issued in 2009. Several substantial achievements witnessed for Phase 2 of the trial from 2009 to 2012 encouraged its application across the whole country in the beginning of 2013 with the promulgation of Decree No.87/2012/NĐ-CP of the Government. We thus hypothesize:

H₄: *Trialability positively affects e-customs implementation.*

Observability is the degree to which innovation results are visible to others (Rogers, 2003). Some ideas are easily observed and communicated to other people, whereas other innovations are difficult to observe or describe to others. Thus, the observability of a new idea and the ability for one to tell others about the idea make it easier for that idea to be diffused (Rogers, 2003).

H₅: *Observability positively affects e-customs implementation.*

2.2 Hofstede cultural dimensions

Since supply chains have become global over the last 50 years (Grant et al., 2021), issues of culture among different countries must be considered. Hofstede (2011) determined that a collective awareness leading to diversification between human groups can be considered a national culture and defined five cultural dimensions in a seminal framework. The first dimension, power distance, refers to the extent of power distribution between members of groups or society. The second one is uncertainty avoidance which involves the extent of scare feeling of members in groups or society due to insecure conditions. Thirdly, levels of individualism and collectivism integrate and classify groups of individuals. The fourth dimension relates to masculinity and femininity which demonstrate gender assignments in society. The final definition is associated to long-term and short-term orientations and objectives of societies looking forward in the future.

Warkentin et al. (2002) argued that e-government is associated with the cultural dimensions of power distance and uncertainty avoidance. Additionally, Al-Hujran et al. (2011) found national culture indicated a positive adoption of e-government services in the Middle East. Based on these associations between culture dimensions and e-government related to the context of emerging economies, this study also aims to evaluate national culture as an influencing factor e-customs implementation in Vietnam. We thus hypothesize:

H₆: *National culture positively affects e-customs implementation.*

2.3 Institutional theory

The World Bank (2014) defined institutions as formal and informal rules of the game for societal interactions that encouraged economies to grow and develop in the long-term. Moreover, benefits provided by institutions can manage activities of individuals and groups in society. Grewal and Dharwadkar (2002) considered the purpose of institutional theory is to focus on the importance of legitimacy for both social stakeholders and institutions. Prior conceptions argued that connections between institutions and economic prosperity have encouraged the use of resources that has verified the significance of the institutional environment. According to Scott (1987), the definition of institutionalisation is associated with the means to diffuse worth toward a structure or process which were simply instrumental utilities before institutionalisation. Based on Zucker (1987), institutional theories of organisations identify normality, government and external factors as legitimating determinants influencing organisations, for example, normative procedures, requirements of governments, professional licences and guide operations that set up the institutional environment for organisations with the aim of enhancing possibility of survival. Thus, institutional theory forms another theoretical lens for this study. We thus hypothesize:

H₇: *Legislation negatively affects e-customs implementation.*

2.4 Challenges from finance and human resource

While reductions of recurrent costs are a benefit of e-customs, the prerequisite costs of implementation represent a challenge (Urciuoli et al., 2013). It is well known that the introduction of IT systems to exchange data with other businesses and customs administrations is very expensive. This operation is costly because it implies re-engineering of business processes, education of personnel and training. In addition, technical issues related to the integration of IT systems with existing legacy systems generate higher development and maintenance costs. These high costs may be a barrier for many customs administrations that lack the required budget to invest in modern IT systems. Another critical inhibitor for e-customs comes from the shortage of employees with IT knowledge and skills. Shalehi (2010) criticized those customs officials and enterprises in Iran only became familiar with implementing customs procedures on existing ICT equipment and software and they found difficulties in changing and getting acquainted with the improved version. Although citizens and businesses receive the benefits of convenience and service accessibility with ICT innovation, employees in customs departments and businesses who do not possess the right skill set to fit with the new technology fear losing their jobs and changing familiar habits (Raus, 2009). Consequently, e-customs cannot operate effectively. We thus hypothesize:

H₈: *Finances and human resources negatively affect e-customs implementation.*

2.5 Stakeholder theory

A stakeholder is any individual or group who can affect, or is affected by, the achievement of an organisation's objectives (Freeman, 1984). In addition, suppliers and customers who have direct interactions with enterprises are referred to as other key stakeholders. Despite their indirect relationship with business, the secondary stakeholders have a significant influence on organisational operation, especially regarding the impact on the society and environment. According to Donaldson and Preston (1995), the government, administrative agencies, trade associations, communities and political groups have been listed as the primary stakeholder groups. Fitzgerald and Storbeck (2003) determined that both firms and stakeholders made alliance

strategies to enhance their cooperation and achieve specific goals. With the aim of stable and long-lasting relationships between parties, a solution regarding the identification and adjustment of stakeholders has been proposed by Mitchell, Agle and Wood (1997). Three perspectives relate to the impacts/pressures of the stakeholders on companies, the requirement of legitimacy, which is the demand of the stakeholders, and the necessity of stakeholders have been classified in this method. Thus, our last hypothesis is:

H₉: *E-customs positively affects business performance*

3. Method

Confirmatory factory analysis (CFA) and covariance structural equation modelling (SEM) using AMOS version 24 were applied to investigate the hypotheses above, and a questionnaire survey carried-out from January to March 2018 with 1034 Vietnamese customs officials in firms related to international trade in five provinces and interprovinces including Hanoi, Hai Phong, Ho Chi Minh city, Binh Duong and Dong Nai. The customs departments in these locations manage a number of imported and exported goods. Of the 1034 questionnaires distributed, 767 were returned with 702 valid responses used in the analysis for a 68 percent response rate. Studies related to e-government provided the questionnaire’s measurement items which are shown in Table 1 along with their related constructs and sources.

Table 1
Drivers and barriers in e-customs implementation

Drivers (Enablers)	Relative advantages	Time saving	King (1990), Hellberg (1991), Raus, (2009, 2010), Granqvist et al. (2011), Choi (2011), UNPAN (2012)
		Cost-savings	Raus (2009), Granqvist et al. (2011), Urciuoli et al. (2013), King (1990), Hellberg (1991), Raus, (2009, 2010), Granqvist et al. (2011), Choi (2011), UNPAN (2012)
		Reduction of burden of administrative documents	Dam (2013), Henningsson & Andersen (2009)
		Reduction of requirement of data re-entry and few data errors	Raus (2010), Granqvist et al. (2011).
		Risk management	Gordhan (2009), Biljan (2012), Choi (2011), UNPAN (2012), Holloway (2009)
		Convenience	Holloway (2009), King (1990), Aoyama (2008), Amin (2010), UNPAN (2012)
		Advance clearance	Dam (2013)
		Trialability	Raus (2009, 2010), Rogers (2003), Byrne & Golder (2002),
		Observability	Rogers (2003), Nilakanta & Scamell (1990),
		Culture	Warkentin et al. (2002), Hujran et al. (2011)
Barriers (Inhibitors)	Complexity	Data loss over Internet; Complicated e-customs software;	Goossenaerts et al. (2006), Rogers (2003), Raus (2009, 2010)
	Compatibility	Adequate IT skills and IT equipment; Compatible legacy software; Interoperability of technology; Confidentiality; International standards among nations	Shalehi (2010), Salehi, Alipour & Yahyavi (2010), Rogers (2003), Egyedi & Loeffen (2002), Byrne & Golder (2002), Mustonen-Ollila & Lyytinen (2003)
	Finance and Human resource		Urciuoli, Hints, & Ahokas (2013)
	Legislation	Laws and Regulations system	Holzner (2009), Raus (2010)

4. Findings

4.1 Sample characteristics

The demographic attributes of the sample are presented in Fig. 1. Two-thirds of respondents were male with over 40 percent 30-40 years. Over 56 percent had work experience of five years or greater. Finally, over 86 percent had college diplomas or bachelor’s degrees or better.

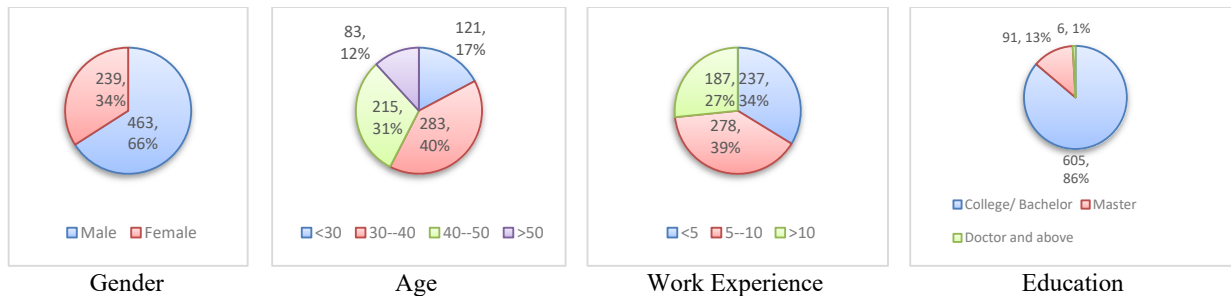


Fig. 1. Personal characteristics of the participants

4.2 Reliability and validity

According to Tabachnick et al. (2007), Hair (2010) and Pallant (2011), each latent variable's reliability was calculated using Cronbach's Alpha. The constructs of Relative Advantage (RA), Observability (OBSERVE), Compatibility (COMPAT), Complexity (COMPLEX), Finance and Human Resource (FinHR), Legislation (LEGAL) and E-customs Implementation (E_CUS_IMPL) have reliability coefficients of 0.95, 0.83, 0.94, 0.80, 0.88, 0.94, and 0.82 respectively, exceeding the 0.70 threshold. However, Cronbach's Alpha for Culture (CUL) were not satisfactory for some constructs and variables. Item-total statistics revealed that CUL3, CUL8 and CUL9 have corrected item-total correlations of less than 0.30, i.e., 0.04; 0.02 and 0.02 respectively. According to Field (2010) a value less than 0.30 means an item does not correlate very well with the scale and such items may have to be deleted. MacKenzie et al. (2011) strongly recommend deleting problematic items provided that essential aspects of the construct are captured by the remaining items. After deleting these three problematic items (CUL3, CUL8 and CUL9), the construct of CUL showed a reliability coefficient of 0.93. The construct of Firm Performance (FIRM_PF) also had a Cronbach's Alpha below the cut-off value of 0.70 and some the variables had corrected item-total correlation' less than 0.30. Consequently, the variables FINPR3, STRPF2, STRPF3 and STRPF6 in this construct were deleted and the resultant Cronbach's Alpha reliability value for the construct with of remaining items was 0.91. In conclusion, all but the Trialability construct and 7 observed variables remained in the model after non-statistically significant items were eliminated.

4.3 Confirmatory factor analysis measurement model

After verifying the level of internal consistency of the items in each of the six groups, CFA was carried-out on each group of items to extract the corresponding latent variable.

Table 2
Measurement Model Assessment with CFA

Variables	R ²	Loading ≥ 0.70	Composite Reliability (CR ≥ 0.70)	Average Variance Extracted (AVE ≥ 0.5)		
CUL1	0.540	0.735	0.931	0.601		
CUL2	0.566	0.752				
CUL4	0.595	0.771				
CUL5	0.570	0.755				
CUL6	0.658	0.811				
CUL7	0.629	0.793				
CUL10	0.638	0.799				
CUL11	0.591	0.769				
CUL12	0.624	0.790				
RA1	0.723	0.850			0.947	0.721
RA2	0.723	0.850				
RA3	0.675	0.821				
RA4	0.640	0.800				
RA5	0.787	0.887				
RA6	0.715	0.845				
RA7	0.786	0.886				
EOU1	0.468	0.684	0.822	0.704		
EOU2	0.941	0.970				
COMPAT1	0.695	0.834	0.936	0.747		
COMPAT2	0.765	0.875				
COMPAT3	0.749	0.866				
COMPAT4	0.718	0.848				
COMPAT5	0.803	0.896				
OBSERVE1	0.505	0.711	0.873	0.780		
OBSERVE2	1.055	1.027				
LEGAL1	0.705	0.840	0.944	0.772		
LEGAL2	0.742	0.861				
LEGAL3	0.760	0.872				
LEGAL4	0.828	0.910				
LEGAL5	0.825	0.908				
FINHR1	0.632	0.795	0.878	0.706		
FINHR2	0.697	0.835				
FINHR3	0.788	0.888				
E_CUS_IMPL1	0.483	0.695	0.826	0.615		
E_CUS_IMPL2	0.741	0.861				
E_CUS_IMPL3	0.620	0.788				
FINPF1	0.499	0.707	0.912	0.636		
FINPF2	0.545	0.739				
STRPF1	0.671	0.819				
STRPF4	0.746	0.864				
STRPF5	0.738	0.859				
STRPF7	0.615	0.784				

The Keiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) score was greater than 0.6 with a value of 0.92, and the Bartlett's Test of Sphericity was significant with $p=0.00$, so that all constructs were considered appropriate for factor analysis (Pallant, 2011; Tabachnick et al., 2007). Table 2 displays the indicator reliability through standardized loadings (standardized regression weights using AMOS terminology), internal consistency reliability via CR and convergent validity via AVE. The lowest loading obtained a 0.68 linking Complexity (COMPLEX) to item COMPLEX 1 and 0.70 linking E-customs

Implementation (E_CUS_IMPL) to item E_CUS_IMPL1, which are near the 0.70 threshold but still exceed the 0.50 threshold for exploratory analysis. The AVE estimates ranged from 60 percent for Culture (CUL) to 78 percent for Observability (OBSERVE). All exceed the 50 percent rule of thumb. Construct reliabilities ranged from 0.822 for Ease of Use (EOU) to 0.94 for Legislation (LEGAL). Once again, these exceeded 0.70 suggesting adequate reliability. Taken together, the evidence supports the convergent validity of the measurement model. The AVE estimates all exceeded 0.50 and the reliability estimates all exceed 0.70. All of them exceeded the recommended threshold, thus exhibiting unidimensional, reliability and convergent validity. According to Fornell and Larcker (1981) and Götz et al. (2010), discriminant validity is indicated by a comparison between the square root of the AVE for each latent variable and its correlations with the other latent variables. Table 3 shows that the discriminant validity of the model is satisfied.

Table 3
Construct Correlation (Standardised)

Construct	CUL	RA	COMPAT	EOU	OBSERVE	LEGAL	FINHR	E_CUS_IMPL	FIRMPF
CUL	1.00	0.293	0.357	-0.054	0.072	-0.210	-0.257	0.423	0.238
RA	0.293	1.00	0.260	0.040	0.046	-0.478	-0.477	0.422	0.477
COMPAT	0.357	0.260	1.00	0.047	0.091	-0.255	-0.204	0.345	0.143
EOU	-0.054	0.040	0.047	1.00	-0.128	-0.038	0.006	-0.027	0.091
OBSERVE	0.072	0.046	0.091	-0.128	1.00	-0.137	-0.073	0.149	0.028
LEGAL	-0.210	-0.478	-0.255	-0.038	-0.137	1.00	0.362	-0.374	-0.546
FINHR	-0.257	-0.477	-0.204	0.006	-0.073	0.362	1.00	-0.472	-0.443
E_CUS_IMPL	0.423	0.422	0.345	-0.027	0.149	-0.374	-0.472	1.00	0.339
FIRMPF	0.238	0.477	0.143	0.091	0.028	-0.546	-0.443	0.339	1.00
√AVE	0.775	0.849	0.864	0.839	0.883	0.879	0.840	0.784	0.798

Key GOF indices for CFA output used in this study include the χ^2 statistics, root mean square error of approximation (RMSEA), and the comparative fit index (CFI). The overall model χ^2 is 2236.443 with 783 degrees of freedom ($p < 0.05$). Thus, the χ^2 goodness of fit statistic is satisfactory and indicates the observed covariance matrix matches the estimated covariance matrix within sampling variance. Moreover, the normed χ^2 statistic (χ^2 value divided by degrees of freedom) is 2.86 and within the value of 2 to 5 for an acceptable CFA model fit (Hair et al., 2010). The value of RMSEA, an absolute fit index, is 0.05. This value and is below the 0.070 guideline for a model with 33 measured variables and a sample size of 702. Using the 90 percent confidence interval for this RMSEA, the true value of RMSEA is between 0.049 and 0.054. The RMSEA therefore provides additional support for model fit. The incremental fit index CFI has a value of 0.94 which exceeds the guideline of greater than 0.90 for a model of this complexity and sample size (Jöreskog, 1969; Jöreskog & Sörbom, 1985; Bagozzi, 1981, 2010; Brown, 2015). Although this model is not compared to other models, the parsimony index of the adjusted GFI or AGFI has a value of 0.86, which reflects 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. The CFA output from the AMOS software is shown in in Fig. 2.

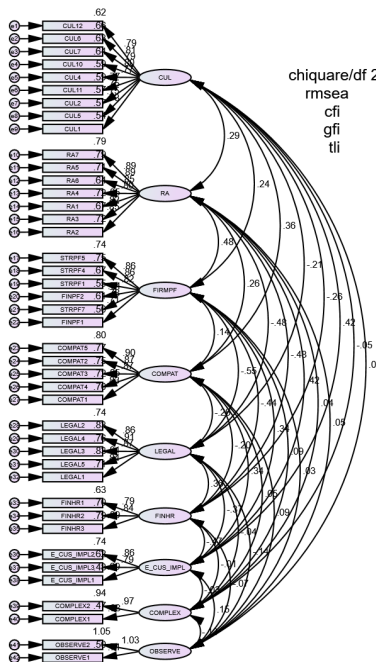


Fig. 2. The results of CFA

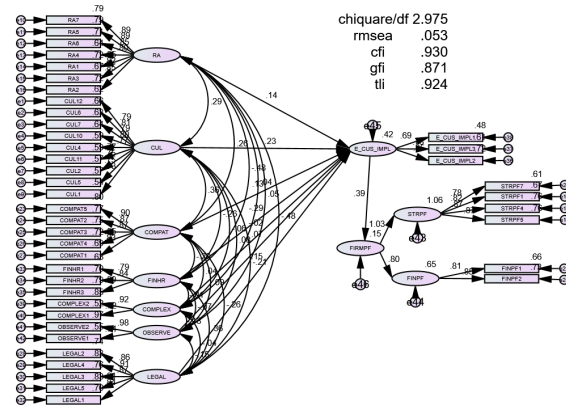


Fig. 2. Standardised Path Estimates for Structure Model

4.4 Structural equation modelling (SEM) results

The structural model was then estimated as shown in Fig. 3. The χ^2 is 2344.150 with 788 degrees of freedom ($p < 0.05$) and the normed chi-square is 2.99. The model CFI is 0.93 with a RMSEA of 0.05 and 90 percent confidence interval of 0.051 to 0.056. Although GFI (0.87) is below the threshold, this value is still acceptable over 0.8 and closed to 0.9. Therefore, almost measures are within a range that would be associated with good fit. The standardised coefficients among the constructs determine whether the structural relationships are consistent with theoretical expectations and the nine hypotheses.

H₁: *Relative Advantages (RA) positively affects E-customs Implementation (E_CUS_IMPL).*

This hypothesis is supported with a standardised positive coefficient of 0.14.

H₂: *Complexity negatively affects e-customs implementation.*

This hypothesis is not supported as the p-value cannot satisfy the criterion of below 0.05, although this factor has a standardised negative coefficient of -0.020.

H₃: *Compatibility negatively affects e-customs implementation.*

This hypothesis is supported with a standardised positive coefficient of 0.13.

H₄: *Trialability positively affects e-customs implementation.*

This hypothesis is not supported.

H₅: *Observability positively affects e-customs implementation.*

This hypothesis is supported with a standardised positive coefficient of 0.073.

H₆: *National culture positively affects e-customs implementation*

This hypothesis is supported with a standardized positive coefficient of 0.23.

H₇: *Legislation negatively affects e-customs implementation.*

The hypothesis is supported with a standardised negative coefficient of -0.15.

H₈: *Finances and human resources negatively affect e-customs implementation.*

The hypothesis H8 is supported with a standardised negative coefficient of -0.29.

H₉: *E-customs positively affects business performance.*

This hypothesis is supported with a standardised positive coefficient of 0.40.

In summary, six hypotheses and structural path estimates are significant and in the expected direction with p-value < 0.05 with one hypothesis significantly supported but having a positive impact instead of a negative impact as shown in previous studies.

5. Discussion

5.1 Drivers of e-customs implementation in Vietnam

5.1.1. Relative advantages positively affect E-customs Implementation (H1)

The influence of relative advantages (RA) on e-customs implementation suggests that the more benefits e-customs provides, the more effective e-customs implementation achieves. In this context, there were seven reliable items for the construct of Relative Advantage: 'time savings' (RA1), 'cost savings' (RA2), 'fewer data errors' (RA3), 'reduction in burden of administrative documents' (RA4), 'convenience with 24/7 system' (RA5), 'risk management' (RA6) and 'advance clearance' (RA7). Hence, customs officials were aware of and agreed with these benefits of e-customs. This finding is consistent with several studies. Dmitrieva and Rudakova et al. (2021) identified advantages that stakeholders received when applying e-customs as the encouragement of e-customs diffusion and implementation in Russia. Particularly, customs officials perceived clearly that time for travelling, data processing and customs clearance can be reduced with e-customs adoption. Consistent with previous research of King and Konsynski (1990), Hellberg and Sannes (1991), Raus (2009, 2010), Granqvist et al. (2011), Choi (2011), and UNPAN (2012), businesses could save time for accessing data, inspecting, and clearing goods through an e-customs

process, which makes importing and exporting flow quicker compared with the traditional customs. In 2017, it took a total 132 and 105 hours to conduct series of import and export procedures, a decrease of 6 hours and 3 hours respectively compared to 2016, from adopting the Vietnam Automated Cargo Clearance System (VNACCS) and Vietnam Customs Intelligence Information System (VCIS) (General Department of Vietnam Customs, 2017). In 2018, export procedures can be processed in the same day and it takes around 3 days for import products (General Department of Vietnam Customs, 2018). In addition, applying Vietnam Automated System for Seaport Customs Management (VASSCM) since 11th December 2017 has declined at least 50 percent time of taking goods and delivery process in seaports, airports, and local customs departments. It takes just 1 or 2 minutes to take goods from customs warehouses while business had to spend at least from 7 to 10 minutes adding from 10 to 15 minutes for travelling among functional departments in previous time (VGDC, 2017). Time for clearance reduced to 10 minutes in Noi Bai International Airport in 2020 (Vietnam Financial Magazine, 2020). Additionally, customs officials totally agreed that e-documents and online submission could save multiple costs. Manual process with paper documents has been eliminated by using VNACCS/ VCIS and VASSCM system. Based on the report of VGDC (2017), information was collated between customs departments and port firms in computerisation and data storage instead of paper methods. Both enterprises and customs could manage accurately and transparently as well as save their costs based on using the modern solution (VGDC, 2017). In term of business view, enterprises could save their costs in goods storage at customs warehouses and opportunity costs with the fast clearance.

RA3 related to reduced requirement of data re-entry and fewer data errors was supported by customs officials' perspective. Data which businesses saved on the system could also be used to fill-in the declarations automatically. VNACCS/VCIS supports customs officials to double check enterprises and consignments' information to improve analysis accurately and minimize mistakes. Raus (2010) and Granqvist et al. (2011) determined that firms storing information, consignments, and their trading history in an e-customs system would reduce the necessity for data re-entry and errors.

The pressure of administrative documents and paperwork could be reduced by 25 percent with adoption of electronic data, e-documents, e-records, and e-customs system (RA4). This finding is consistent with study of Henningson et al. (2011). Similarly, customs officials were aware of convenience with 24/7 (RA5) and advanced clearance (RA7) to contribute profits in e-customs system. Business could submit files and the related documents online and were able to pay tax via Internet later. Therefore, it was convenient to submit dossier and to receive and clearance outcome in advance even before goods arrived ports with 24/7 system. Dan and Carlotte (2019) emphasized the dramatically effect of improvements of e-customs process with immediate release and 24/7 automated customs processing on trade and economy.

E-customs requests information exchange among customs, business, and other stakeholders such as government ministries and agencies and warehouse and distribution centres. To address issues of smuggling and commercial fraud, especial in case of immediate release and clearance, sharing data among ports, borders, entry points, authorities and enterprises is asserted compulsively. Hence, customs officials in this survey perceived usefulness in risk management (RA6). According to Gordhan (2007) and Biljan and Trajkov (2012), risk management in customs refers to indication and investigation of individuals, goods and means of transport at all levels. Government agencies and business could archive quick clearance and minimize risks of non-compliance or illicit trade in acceptable standards based on modernising customs systems and databases.

Additionally, automatic e-customs systems could analyse pre- arrival or pre-departure data as well as verify various consignments with the high-risk performance and after that more inspection could be conducted (Holloway, 2009; UNPAN, 2012). Based on Choi (2011), UNPAN (2012), and VGDC (2015), data has been collected regularly by risk management software and this information has also been used for analysis to make decisions in selecting new subjects for inspection. Risk management thus appears to be the responsibility and concern of customs departments rather than business.

5.1.2 Culture positively affects e-customs implementation (H6)

The findings confirmed the significance of culture and its influence on e-customs implementation in Vietnam. Moreover, culture was explored as the new factor that had not appeared in prior literature related to relationship between culture and e-customs. The research results strongly supported H2, which proposed that national culture (CUL) positively affected e-customs implementation. This study applied five culture dimensions of uncertainty avoidance, power distance, collectivism/individual, masculine/feminine and long-term/short-term orientation. Based on the findings, Vietnam customs officials perceived that cultural attributions of uncertain avoidance, low power distance, collectivism, masculine, and long-term orientation facilitate e-customs development. In comparison with previous studies, several differences related to culture and innovation/ e-government emerged. The studies of Shane (1993), Warkentin et al. (2002), and Al-Hujran et al. (2011) identified encouragement of uncertain acceptance, low power distance and individualism to innovation and e-government. In contrast, uncertainty avoidance and collectivism dimension were found to support e-customs implementation positively affecting emerging economies such as Vietnam. Regarding the second difference, Hofstede (2011) denoted Vietnam as a high-power distance country however, to integrate and improve international trade Vietnam is changing from high to low power distance between policy makers and business. Finally, this study supports the previous studies of Shane (1993), Warkentin et al. (2002), and Al-Hujran et al. (2011) in that masculine and long-term orientation societies have more advantages in innovation/e-government. Hofstede (2011) argued that Vietnam was a short-term orientation society, which has become dated as this emerging country is switching to a long-term orientation.

5.1.3 Compatibility positively affects e-customs implementation (change H3)

Regarding customs officials' perspective, this hypothesis was supported suggesting that compatibility becomes a facilitator for e-customs implementation. In the ICT aspect of e-customs, there are several achievements, for example, deploying outsourcing management system and automated system for seaport customs management; improving automated clearance and release system VNACCS/VCIS 24/7; enhancing the security system; developing e-tax and duty 24/7 with 12 banks' participation and promoting the online public service system (GDVC, 2017). The government departments, trading firms and transportation service providers desire to enhance the efficiency of supply chain operations and must apply ICT solutions in supplying public services mandatorily (UNCTAD, 2006). Specific IT innovation solutions in an Industry 4.0 technological era include blockchain and big data require non-stop improvement of the e-customs system, such as expanding the National Single Window (NSW) and ASEAN Single Window (ASW). Unfortunately, the current NSW in Vietnam cannot satisfy the demands of users according to the annual report of GDVC (2017). Further, the continuous development of various systems requires users to have professional ICT skills to update and be proficient in their applications. If the ICT conditions are responded to, ICT skills and equipment will become one of the motivators promoting e-customs.

5.1.4 Observability positively affects e-customs implementation (H5)

Customs officials perspectives related to observability are that it seems to be easy and convenient to observe process and procedures of e-customs implementation and share them with their colleagues. This finding is also consistent with the scholars of Gerpott (2011) and Lee (2004) regarding observability of government officers in the context of e-government.

5.1.5 Trialability positively affects e-customs implementation (H4)

This hypothesis is not supported by the perspectives of customs staff. The trial period was conducted in two cities, namely Ho Chi Minh City and Hai Phong, with most customs staff having less than ten years work experience in customs departments. Hence, the respondents had only a slight awareness of the e-customs trial period. This result is also consistent with purpose of this research examining implementation, development and evolution phases of e-customs which is corresponding to the fourth step (implementation) in innovation-decision process model of Rogers (2003).

5.2 Barriers of e-customs implementation in Vietnam

5.2.1 Finance and Human Resource have negative influence on e-customs implementation (H3)

This hypothesis was supported, and three variables were used to measure construct of finance and human resource including 'Investment for e-customs deployment' (FINHR1), 'demand of training' (FINHR2) and 'quality of human resource' (FINHR3). The findings suggest a costly investment for e-customs system deployment, high demand in training and inadequate customs officials with high quality have negative impact on e-customs implementation. Lack of quantity as well as quality of human resources, such as a deficit of IT knowledge and skills or the fear of losing jobs, can be a dramatic barrier to e-customs implementation. Shalehi (2010) found that customs staff and clients in Iran are used to working with existing ICT equipment and software, which leads to an ineffective operation of e-customs.

While IT innovation provides benefits of more convenient and accessible services for citizens and businesses, it may become obsolete for government activities (Raus, 2009). According to Navigos Group, the largest career website in Vietnam, 71 percent of employers agree that the biggest obstacle is lack of IT skills (Agility, 2021). The 2020 annual report of General Department of Vietnam Customs notes the shortage of customs staff with professional skills and rich experience is determined by the obstacle of e-customs implementation. The innovation and development of e-customs system requires customs officials to keep improving their skills and qualification to update and apply new methods. Hence, the labour demand and requirement related to quality of employees has increased steadily. In addition, the VNACCS/VCISS system is currently easy to use, however, e-customs software was complicated in the beginning. Thus, customs staff and businesses perceived difficulties in adapting with the new management system and they needed for training. Mr. Duc Thanh Le, Director of IT and Customs Statistics Department, stated that the customs officers and enterprise got used to applying the previous system as well as they had just been trained how to use that (VGDC, 2020). While SMEs can implement e-customs procedures and process easily with a small investment for technology, the General Department of Vietnam Customs spends a huge amount to deploy e-customs system of government. Moreover, that government had to invest synchronously and comprehensively not only in e-customs system but also in other industries such as IT infrastructure, legislation, and human resources. Furthermore, switching e-customs and e-government systems not only costs a lot in terms of hardware and software development, but also in changes of procedures, instructions, paperwork and legislation. Additionally, VGDC also allocates the financial budget for training customs officials and enterprises to instruct how to use e-customs system regularly (VGDC,2020).

5.2.2 Legislation has negative influence on e-customs implementation (H4)

H4 was supported and this finding is consistent with Raus (2010) and Holzner and Peci (2011), legislation constraints have been argued as a negative impact on innovation processes in general and customs systems in particular. Therefore, policy

makers should concentrate on improving legislation to minimize its restrictions and enhance effectiveness of e-customs implementation through a comprehensive review and update of legal documents. Moreover, enterprises should comply process and procedures absolutely as well as update frequently customs regulations via the GDVC website. The legislation construct comprised five measurement items: ‘unification of legislation’, ‘compliance ability of business’, ‘compliance ability of customs staffs’, ‘difficulties in approaching to customs law or regulations’ and ‘difficulties in changing/ updating/ transforming of customs legislation. In addition, the annual reports of VGDC (2016, 2017, 2018, 2019, 2020) also describe the restrictions and weaknesses of legislation related to e-customs and National Single Window (NSW) when there are a number of overlapping regulations, which makes customs staffs and business confused when conducting import and export procedures. Regarding regulation compliance, a survey of GDVC and Vietnam Chamber of Commerce and Industry (VCCI) (2016) shows that only 37 percent of firms assess that customs employees comply with regulations, laws and responsibilities and 83 percent of businesses participating this survey suggested that administrative procedures and regulations should be simplified. Furthermore, legislation and regulations are not strict and specific enough to enhance compliance of customs officials and business. For example, although many laws call for access to corruption, the lack of legislation outlining specific responsibilities has led to very uneven implementation of transparency provisions. Laws also fail to address the need for a monitoring and enforcement system for transparency. There are 30 laws, rules, and regulations calling for access to information, but these are often not implemented seriously.

5.2.3 Complexity negatively affects e-customs implementation

This hypothesis was not supported as customs officials considered the ease of use related to technological constraints as having little impact on e-customs implementation in comparison with a business point of view. Technological obstacles, such as inadequate infrastructure, IT skills, confidentiality, and difficulties in using and upgrading software, have been discussed in the literature as primary barriers in developing countries like Vietnam (Goossenaerts et al., 2009; Dmitrieva & Rudakova et al., 2021). The Vietnamese government has identified the ICT sector as a primary one contributing to national growth. To achieve a sustainable economy and 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 and Trang, 2017).

5.3 E-customs implemetation positively affects firm performance (H9)

Consistent with previous research the findings supported H9. Hence, the more effectively e-customs are achieved, the more a successful enhancement of business performance. Furthermore, this study highlights the positive impact of e-customs implementation for both of financial and strategic firm performance with indicators of as profit, growth rate, paperless communications, and customer and employee satisfaction. VCCI (2016) conducted a survey related to firms’ assessment of customs quality two years after launching the VNACCS/VCISS. They reported the transformation of customs legislation and process was evaluated positively by 93 percent of enterprises and also indicated e-customs systems have been implemented by 100 percent of Vietnamese of customs departments since 2015 along with continuous improvement of the systems.

VGDC (2017, 2019) reported that the number of customs declaration forms submitted electronically increased from over 6 million in 2015 up-to nearly 11 million in 2017 and 12.42 million in 2019. With electronic declaration, the value of exports and imports rose from US\$25.1 billion in 2017 to US\$ 500 billion in 2019. WTO (2019) expressed that Vietnam ranked in the third in ASEAN after Singapore and Thailand in term of total value of imports and exports. Furthermore, the LPI of Vietnam achieved the 3rd position in ASEAN and the 39th among 160 countries in 2018 (World Bank, 2019). Hence, the transformation and development of customs services have made a great contribution to Vietnam’s logistics performance, for instance, speed, simplicity of computation and timeless of customs procedures and clearance.

6. Recommendations

There are some issues including ‘sharing information’ (CUL7), ‘focus on HR training’ (CUL10), ‘financial achievement’ (CUL11), ‘more investment in customs in the future’ (CUL12), ‘difficulties in approaching to customs law or regulation’ (LEGAL4), ‘difficulties in changing/ updating/ transforming of customs legislation’ (LEGAL5) and ‘adequate human resource (FINHR3). In summary, the problems of e-customs implementation not only relate to barriers including legislation, finance and human resource but also involve factors of culture corresponding to solution categories. Hence, this study recommends two primary solution categories including (i) legislation and administration and (ii) human resources and culture.

There are some recommendations of legislation and administrative paperwork according to solving problems experience for enterprise related to e-customs procedures and process. Firstly, legal detailed documents and instructions should be completed especially supported documents of Customs Law, Import and Export Tax Law and Tax Management Law. Vietnam General Department of Customs also figured-out the detailed plan to improve legal system and assigned primarily this responsibility for Legal Department and Customs Management Supervision Department from 2019 to 2021 (VGDC, 2019). Furthermore, conducting international agreements and commitments terms of WTO signed in 2007 as well as EVFTA signed in 2019, tariffs must proceed with reductions and regulations should enhance and facilitate international trade. Secondly, e-customs procedures should be standardised internationally to ensure stable environment for business as well as guarantee compliance ability

of both firms and customs staffs. Sometimes, there are differences in e-customs procedure instructions among customs departments in various cities and provinces (VGDC, 2018).

Thirdly, NSW and ASW should be deployed and operated smoothly and concentrate on organising and implementing administrative procedures with NSW and ASW as well as inspection of import and export goods should be concentrated on. Additionally, Vietnam General Department should develop a Decree to connect and share information between government agencies and stakeholders via NSW. According to VGDC (2020), NSW and ASW have been promoted with participation of 13 Ministries and Departments, 188 administrative procedures were put on the NSW, 2.9 million files have been processed and 36,000 firms have been joined NSW. Fourthly, structure of customs departments can be simplified to improve efficiency of activities and solve problems for business quicker. According to annual report of VGDC (2019), 12 customs departments were cut down in the process of restructure.

Next, upgrading online public service to level 4 is an urgent task. Administrative documents at level 4 are the highest degree applied to all Internet processes and steps to facilitate user accessing and implementing paperwork anytime and anywhere. In 2019, 163/193 customs documents conducted at level 4 while 21 documents were at level 3 and 9 documents were level 1 and 2 (VGDC, 2019). Hence, the number of customs declarations processed and handled in 2019 reached to 13.24/13.33 million e-customs documents accounting for a 99.3 percent amount of taxes and fees via digital method occupied 96.8% (VGDC, 2019). Finally, the effectiveness of inspection, supervision and control of exported and imported goods should be enhanced. VGDC also set-up the Scheme on innovating inspection models of exported and imported goods inspection.

The second solution category mentions to human resources and culture. Firstly, the quality of customs staffs should be reviewed and checked regularly to motivate human resource to keep improving their professional skills. That is the result why VGDC usually organised periodic qualification test for customs staffs. Over 2,100 customs staffs joined in competency assessment examination from 25 November 2019 to 8 January 2020 (VGDC, 2020). In 2018, VGDC established and implemented a system of assessing the capacity of civil servants who are not in leader position in 6 main professional fields including management supervision, import and export tax, post-clearance inspection, risk management, anti-smuggling investigation and handling of violations with 9 sets of threads. The software application applied to assess staff qualification to ensure stability, transparency and accuracy was deployed in 2018 (VGDC, 2019). This application was also carried-out with 3,000 customs officials (VGDC, 2019).

Secondly, training human resources with the aim of enhancing compliance and attitude of customs staffs also should be concentrated. On average, VGDC has annually organized 150 training classes with participation of around 17,000 customs officials (VGDC, 2019). A number of local customs departments have actively implemented good and suitable ways for their condition, for instance, constructing a software for testing staff qualification (Dong Nai, Hai Phong, Quang Tri...), self-developing documents and organizing professional training for executive officials. Furthermore, open training class related to e-customs system and procedures for business and customs brokers should be expanded.

Finally, increasing relationship and collaboration with business and stakeholders to listen to their feedback and review, update problems they get difficult in, share and update information for enterprises should be paid attention. On 15 January 2020, VGDC launched Decision 85/ Decision- VGDC regarding to plan of promoting relationship between customs departments, business, and stakeholders (VGDC, 2020). This activity can spread to business community, facilitate for enterprises to participate in cooperation with customs authorities actively. Moreover, firms can identify their responsibility in contributing in policy consultations, law enforcement supervision and collaboration to improve efficiency customs management. In addition, the regular communication between enterprises and customs offices supports business in accessing, grasping, and understanding legal regulations as well as limiting arising problems and improving legal compliance capacity. Customs departments in cities and provinces should focus on deploying the following activities such as propagandizing about dialogue between customs and firms, supporting business to deal-with issues related to e-customs procedures, consulting with enterprises and stakeholders, monitoring law enforcement, cooperating with business community.

7. Conclusions

The outcomes of this study point-out drivers and barriers affecting e-customs implementation in Vietnam as well as the relationship between e-customs and business performance. Relative advantage and culture are two significant factors influencing on e-customs deployment while legislation, finance and human resource are claimed as inhibitors. In addition, the development of e-customs implementation has positive effect on firm performance. In addition, some recommendations were indicated for customs administrators to improve the effectiveness and efficiency of e-customs.

This research was conducted using DOI, cultural dimensions, and institutional and stakeholder theory. Culture and legislation as the exploring factors were investigated in this empirical study. Some perspectives of cultural dimensions linking the stakeholders' behavior are changing when applying innovation in e-government and e-customs in the case of Vietnam, for instance, switching to less power distance between government staffs and business and rolling to long-term orientation with public service as e-customs. Additionally, this research demonstrates legislation as the instrument and regulatory force of institutions that have impact on e-customs application.

However, this study has some limitations as does all research. Firstly, this paper focuses on a single perspective of customs officials. To gain a more comprehensive understanding, studies with both businesses and customs staffs should be conducted. Secondly, the factor of technological constraints should be investigated with both business and customs policy makers as it did not show any significant influence in this sample. Finally, the results of the SEM show that factors of relative advantages, culture, finance and human resource and legislation explain 40 percent of e-customs implementation while e-customs implementation and legislation explain 16 percent of firm performance. Thus, other factors affecting e-customs implementation and business performance in Vietnam should be explored in future research.

Author Contributions

Conception: David B. Grant, Hang Thanh Nguyen, Christopher Bovis

Data curation: Yen Thi Hai Mac

Formal analysis: Hang Thanh Nguyen, Thuy Thi Le Nguyen

Investigation: Hang Thanh Nguyen, Thuy Thi Le Nguyen, Yen Thi Hai Mac

Methodology: David B. Grant, Hang Thanh Nguyen

Project administration: Yen Thi Hai Mac, Thuy Thi Le Nguyen

Software: Thuy Thi Le Nguyen, Yen Thi Hai Mac

Supervision: David B. Grant, Christopher Bovis

Validation: David B. Grant, Hang Thanh Nguyen, Christopher Bovis

Visualization: Thuy Thi Le Nguyen, Yen Thi Hai Mac

Writing- original draft: Hang Thanh Nguyen

Writing- review & editing: David B. Grant, Christopher Bovis

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