



ANALYZING THE BARRIERS TO INNOVATION DEVELOPMENT IN EMERGING ECONOMIES: VIETNAMESE SMALL AND MEDIUM ENTERPRISES (SMES) AS AN EMPIRICAL CASE



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ABSTRACT

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Innovation is widely recognized as a key factor in the competitiveness of nations and firms. Also, it has played a significant role in business ecosystem, and the achievement of science and technology have greatly spread to the development of both local and global firms. However, there are factors that discourage the applicable capabilities of such innovations on business processes. The aim of this paper is to evaluate the degrees of barriers which block the use of innovation in the case of small and medium enterprises (SMEs) in Vietnam namely human resources, access to finance, transparency, tax rates, trade regulations and customs. The secondary data used were gathered from Enterprise survey (ES) of 479 small and medium enterprises in five different regions (Red River Delta, North Central Coast, Central Coast Area, South East and Mekong River Delta), which are conducted by the World Bank Group from 2015 to 2017. The binary logistic regression and Logit Model were used to process variables and data analysis. The major findings revealed that barriers of accessing financial capacity, trading regulations and customs have positively affected on innovation of SMEs in Vietnam. Finally, it could be emphasized that HR training has the strongest impact on innovation changes of the enterprises by 55.7%.

Contribution/ Originality: This study is one of very few studies which have investigated about the barriers discouraging the applications of innovation at SMEs in Vietnam to date. Especially, the paper's primary contribution is finding that human resource training plays the most essential role in enhancing innovation applications of enterprises.

1. INTRODUCTION

Innovation has showcased its importance to the economic development due to its importance and impacts on industrial revolution (Storey, 2000; Galia and Legros, 2004; Isola *et al.*, 2014; Purnama, 2014; Awuah and Addaney, 2016; Oriaku and Oriaku, 2016). Acknowledging this trend, several countries have boosted their investments into innovations, including Vietnam's leading partners such as China, Thailand, and Malaysia. Facing this situation, developing the national innovation ecosystem, especially in business, has become an urgent mission because both digital technology and smart technology – two core factors of the fourth industrial revolution – stem from innovation. Over the last few years, Vietnam has initiated multiple activities to boost the development of innovation among small and medium enterprises. The government has enhanced the development of many incubation and

support centers for technology and science enterprises, as well as young potential research groups coming from different universities and institutes in order to support the establishment of technology and science enterprises. Despite hard efforts, activities relating to innovation have not developed to our expected level. Particularly, numerous statistical indicators have demonstrated our weaknesses regarding innovation, especially the Global Innovation Index. In 2015, Vietnam ranks 71st out of 143 countries and territories with 34,9 points in the Global Innovation Index, far below other countries in the region like Singapore (7th), Malaysia (33rd), and Thailand (48th). This ranking raises concerns about practical difficulties that Vietnamese enterprises are facing in terms of innovation. Hence, identifying the specific impacts of barriers, as well as the most significant barrier to innovation is a very important task conducted from this research.

2. LITERATURE REVIEW AND SHORTCOMINGS IN PREVIOUS STUDIES

Multiple studies were conducted by plenty of scholars around the world in order to find out barriers in the innovation process of small and medium enterprises. Recently, the relationship between barriers and innovation still sparks off heated debates, and a group of authors state that it is a positive relationship while the others consider it as a negative one.

Madrid-Guijarro *et al.* (2009) indicated in their study “*Barriers to innovation among Spanish manufacturing SMEs*” that internal barriers such as human resources and financial accessibility have a negative impact on innovation. With regard to human resources barriers, the study’s outcomes have recognized that the majority of enterprises does not realize that they are facing labor hardships although the lack of qualified human resources leave a negative influence on innovation. In terms of financial issues, capital constraints reduce the ability for enterprises to innovate. In addition, the authors have also proven that different types of innovation are influenced differently by barriers. Particularly, innovation in the process and organization is negatively influenced by internal barriers whereas the remaining types endure a positive influence. The unclear outcomes in the study might be due to the limitations in the research data. The data utilized in the study were taken in two years while OECD’s suggestion is to use data taken around three years to ensure accuracy for studies about innovation.

Demirbas *et al.* (2011) have demonstrated in the study - “*Owner-managers’ perceptions of barriers to innovation: empirical evidence from Turkish SMEs*”- that the lack of transparency, especially corruption, has imposed a negative impact on the innovation of enterprises as it increases the cost of innovation above the business’s budget. Furthermore, the group of authors also believe that human resources barriers also reduce the ability to innovate. Accordingly, enterprises facing labor hardships will have less innovation intensity compared to those with a high-quality human resources. According to the author, the disadvantage of the study is that it can only reflect a few aspects of reality in the researched period. Additionally, among 2 million small and medium enterprises, the selected sample only represents a part of the population.

Zhu *et al.* (2012) have conducted a study focusing on institutional barriers to innovation called “*Institution-based barriers to innovation in SMEs in China*”. The group of authors collected data by interviewing business owners or chief executive officers of 41 small and medium technology enterprises in Beijing, Shanghai, and Shenzhen. The study specializes in 5 institutional barriers, including completion, access to finance, legislation, taxation, and governmental support. According to the authors, taxation is a huge barrier to innovation, with 95% of innovation enterprises making complaints about taxes. What’s more, businesses specializing in research and development have a tendency to be more worried about taxes.

A study named “*Barriers to product innovation in small manufacturing firms*” by Freel (2000) evaluated the impact of internal barriers to business innovation, including difficulties about human resources and finance which receive special attention from the author. With regard to human resources factors, when considering to categorize enterprises into innovative businesses and non-innovative ones, the study has shown that the level of the labor force has an influence on innovation. To be specific, college-educated workers tend to have positive attitudes, and they

are usually willing to support their enterprises when they opt for innovation. Besides, the quality of the human resources contributes to the success of an innovative idea. However, the study could not figure out any relationship between a qualified human resources and the ability to conduct innovations when dividing enterprises based on the level of their labor.

3. EMPIRICAL METHODOLOGY

3.1. Data

This study uses the secondary data from the Enterprise Survey (ES) from 2015 to 2017 under a project of World Bank in order to collect objective data based on experience and perceptions of enterprises regarding the business environment they are operating in. The research in Vietnam was conducted on 996 enterprises, 849 of which are small and medium enterprises. The surveyed enterprises are located in 5 regions, namely Red River Delta, North Central Coast, Central Coast, South East, and Mekong River Delta. After eliminating the observations containing empty data in the variables used, the study was conducted on 479 small and medium enterprises.

The research uses data from small and medium enterprises which fall into these categories: whether or not the enterprise has conducted innovation in one of the four types: product innovation, process innovation, organizational innovation, marketing innovation; and 5 criteria for assessing the impact level of barriers regarding human resources, access to finance, transparency, taxation, and regulations on trade and custom duties to business activities of those enterprises.

3.2. Research model and Variable Measurement

The research model about barriers in innovation of Vietnamese small and medium enterprises below was constructed based on an overview of relevant theories, along with theoretical and empirical research regarding innovation in small and medium enterprises. The study used the binary regression method to evaluate the impact of barriers on innovation. The research model is as follows:

The model consists of barriers in innovation: human resources, access to finance, transparency, Taxation, regulations on trade and custom duties (the researched data was in 2015, 2016, and 2017).

The estimation equation is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_5 X_5 + \beta_6 D_1 + \beta_7 D_2 + \beta_8 D_3 + \beta_9 D_4 + \beta_{10} X_6 + \beta_{11} X_7$$

Dependent variable (Y): The innovation changes of small and medium enterprises. Innovation had a value equal to zero if the firm had not introduced innovation within the 3 years 2015, 2016, and 2017. In which, innovation could be considered as followed changes:

- (1) Product innovation: either changes in products or commercialization of new products;
- (2) Process innovation: either changes in manufacturing processes or acquisition of new equipment; and (3) Management innovation: either management or administration or purchasing, and commercial/sales.

Independent Variables:

The independent variables in this study inherit the measurement method from studies by [Freel \(2000\)](#); [Demirbas et al. \(2011\)](#) in which the using a 1–5 Likert scale (1 = not important and 5 = very important) is used to evaluate the degree of difficulty that independent variables cause for the businesses' operation. The researched enterprises were requested to respond to the question: "Barriers in human resources, difficulty of accessing to finance, transparency, taxation policy, regulations on trade and custom duties have affected your operation to what extent?"

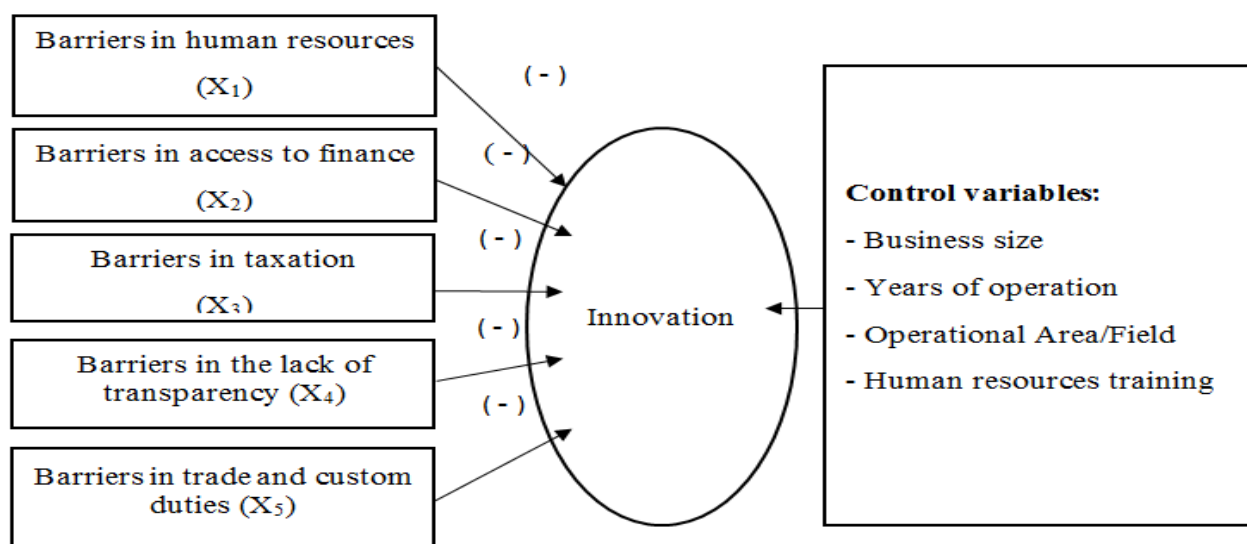


Figure-1. Proposed Research Model

Source: Suggested by authors based on literature review

Human resources (X₁): According to the classification utilized in the Enterprise Survey, highly skilled production workers are workers engaged in the production process whose primary mission is to solve complicated issues such as creation and making decisions, which demands a huge amount of knowledge about a specialized field. A highly skilled product worker has to undergo at least one year of training after graduating from high school. Semi-skilled production workers are workers involved in the production process whose primary mission is to operate and maintain mechanic and electronic equipment. This type of workers can also study necessary skills through the enterprise's training process and working experience. The concept of skill is defined by the job description of an individual. This skill corresponds to level 3 and level 4 in the International Labor Organization classification.

Access to finance (X₂): According to the World Bank's definition, access to finance is the ability of individuals or businesses to obtain financial services, including credit, deposit, purchase, insurance, and other risk management services. The concept of access to finance is different from the real financial capacity. Even though individuals and enterprises do not use financial services, it does not mean that they do not have access to finance.

Transparency (X₃): The concept of transparency in this study is defined as the existence of corruptive behaviors. As defined by the World Bank, corruption is an act of offering or accepting directly or indirectly something valuable in order to negatively influence another side's activities.

Taxation policy (X₄): The concept of taxation in this study is a general one without classifying any type of tax. Accordingly, tax is a mandatory contribution to the government defined by the law for taxable legal and natural persons to meet the government's expenditure needs. Taxation is a form of redistributing the society's financial resources, not directly reimbursable to the payer. This variable will get the value of 1–5 Likert scale (1 = not important and 5 = very important) based on the response of firm' managers.

Regulations on trade and custom duties (X₅): According to the Vietnam Commercial Law (2005) commercial activities have profit-generating purposes, including the sale of goods, the provision of services, trade promotion, and other profit-making activities. Custom duties are government's regulations on exported, imported, transited products, along with means of transportation regarding exit, entrance, transit of domestic and foreign individual and organization in custom territory, complying with the customs' principles and operations.

Table-1. Basis of the scale in the model

Type of variable	Name of variable	Source	Expected Outcome
Dependent variables	Innovative activities (Y)		
Independent variables	Lack of qualified human resources (X ₁)	Madrid-Guijarro <i>et al.</i> (2009); Mohnen and Röller (2005); Galia and Legros (2004); Frenkel (2003); Zwick (2002); Baldwin and Lin (2002); Hadjimanolis (1999)	-
	Difficult Access to Financial Resources (X ₂)	Madrid-Guijarro <i>et al.</i> (2009); Galia and Legros (2004); Hewitt-Dundas (2006); Mohnen and Röller (2005); Frenkel (2003); Zwick (2002); Storey (2000); Hadjimanolis (1999); Galia and Legros (2004)	-
	Barriers in non-transparency (X ₃)	Anokhin and Schulze (2009); Demirbas <i>et al.</i> (2011)	-
	Barriers in taxation policy (X ₄)	Zhu <i>et al.</i> (2012); Hadjimanolis (1999); Freel (2000); Frenkel (2003)	-
	Barriers in regulations on trade and custom duties (X ₅)	Nha and Quan (2013)	-
Control Variables	Business size (X ₆)	Freel (2000)	+
	Years of operation – Experience (X ₇)	Freel (2000)	+
	Red River Delta (D ₁)	Manual (2005)	+/-
	North Central and Central Coast (D ₂)	Manual (2005)	+/-
	South East (D ₃)	Manual (2005)	+/-
	Human resource training (D ₄)	Segarra-Blasco <i>et al.</i> (2008)	+

Source: Compiled by the author, 2017

Control Variables

The size of the business (X_6): The business size is measured by the number of full-time workers (including managers). According to this study, the variables' values range from 1 to 99 because the majority of the subject are small and medium enterprises.

The experience of the business (Age) (X_7): The business' experience is measured by the number of years of operation. Because most of the surveyed enterprises used 2015 as the fiscal year in the interview, so this study decided to use the total of years since establishment to 2017 to measure the experience of the business.

Red River Delta (D_1): Enterprises operating in ten provinces and cities, including Bac Ninh, Ha Nam, Ha Noi, Hai Duong, Hai Phong, Hung Yen, Nam Dinh, Ninh Binh, Thai Binh, and Vinh Phuc take the value of 1 while the others take the value of 0.

North Central and Central Coast (D_2): The enterprises located in 14 provinces namely Thanh Hoa, Nghe An, Ha Tinh, Quang Binh, Quang Tri, Thua Thien Hue, Da Nang, Quang Nam, Quang Ngai, Binh Dinh, Phu Yen, Khanh Hoa, Ninh Thuan and Binh Thuan will be received the value of 1 whereas the other provinces have the value of 0.

South East (D_3): Enterprises located in 6 provinces and cities, namely Ho Chi Minh City, Ba Ria - Vung Tau, Binh Duong, Binh Phuoc, Dong Nai and Tay Ninh receive the value of 1 while the remaining provinces take the value of 0.

Human resource training (D_4): Over the period from 2015 to 2017, enterprises which conducted official training for its employees in response to innovative activities take the value of 1 while the counterpart receives the value of 0. According to Gallié and Legros (2007) the greater the spending time and intensity level of such human resource training courses, the more innovative activities there are in the business. The variables used in the model are listed below in table 1.

4. RESULTS AND DISCUSSIONS

4.1. Research Outcomes

Before conducting the evaluation, the study performed validation whether the multi-collinearity phenomenon between the independent and control variables take place in the model by using the correlation matrix and the VIF coefficients.

Table-2. VIF coefficients of variables in the model

Name of variable	VIF	1/VIF
Human resource (X_1)	1,240	0,806
Access to finance (X_2)	1,170	0,855
Transparency (X_3)	1,200	0,833
Taxation (X_4)	1,220	0,820
Regulations on trade and custom duties (X_5)	1,370	0,730
Business size (X_6)	1,050	0,952
Business' experience (X_7)	1,030	0,971
Red River Delta (D_1)	2,220	0,450
North Central and Central Coast (D_2)	2,480	0,403
South East (D_3)	2,470	0,405
Human resource training (D_4)	1,060	0,943
Average value of VIF	1,500	

Source: Results of data processing, 2018

Table 2 indicates that the VIF coefficients of these variables are below 10.00, which implies that the multi-collinearity phenomenon does not take place in the model. Table 3 shows the correlation coefficients and the confidence level of the model's variables. It can be seen that the coefficients are smaller than 0.8.

Table-3. The correlation coefficients and the confidence level of the model's variables

	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	D ₁	D ₂	D ₃	D ₄
X ₁	1,000										
X ₂	0,164***	1,000									
X ₃	0,226***	0,174***	1,000								
X ₄	0,293***	0,207***	0,288***	1,000							
X ₅	0,350***	0,306***	0,287***	0,276***	1,000						
X ₆	-0,002	-0,107**	-0,093**	0,040	0,068	1,000					
X ₇	0,042	-0,034	-0,008	-0,032	-0,005	0,083*	1,000				
D ₁	-0,004	0,097**	-0,069	-0,072	-0,026	-0,002	-0,050	1,000			
D ₂	0,197***	0,100**	0,070	0,091**	0,222***	-0,052	-0,051	-0,355***	1,000		
D ₃	-0,118***	-0,111**	0,061	0,000	-0,134***	0,011	0,098**	-0,400***	-0,470***	1,000	
D ₄	0,101**	0,052	0,041	0,035	0,174***	0,044	0,050	0,032	0,141***	-0,134***	1,000

Source: Results from data processing, 2018

***, **, * are the levels of significance at 1%, 5%, and 10% respectively

Table-4. Logit regression estimation results of barriers to innovation

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant	-1,113***	-1,435***	-1,743***	-1,391***	-1,649***	-2,039***	-2,505***
Human resource		0,250*					0,013
Access to finance			0,348***				0,219*
Transparency				0,164			-0,054
Taxation					0,300**		0,159
Regulations on trade and custom duties						0,553***	0,468***
Business size	0,007	0,007	0,010	0,008	0,006	0,005	0,006
Business' experience	0,018	0,017	0,019	0,018	0,019	0,019	0,020
Red River Delta	0,932***	0,892**	0,815**	0,914**	0,951***	0,889**	0,824**
North Central and Central Coast	0,921***	0,811**	0,797**	0,864**	0,853**	0,667*	0,600
South East	-0,402	-0,424	-0,450	-0,460	-0,442	-0,448	-0,481
Human resource training	2,365***	2,350***	2,374***	2,356***	2,377***	2,266***	2,308***
Number of observations	479	479	479	479	479	479	479
Log likelihood	-268,335	-266,650	-262,993	-267,311	-265,096	-257,204	-254,192
Pseudo R ²	0,3918	0,2969	0,4079	0,3949	0,4016	0,4253	0,5344

Source: Results from data processing, 2018

***, **, * are the levels of significance at 1%, 5%, and 10% respectively

Table 3 shows the correlation coefficients and the reliability of the model and variables. It can be seen that the coefficients are smaller than 0.8, and the highest correlation coefficient found in the correlation between variables regarding area of operation is 0.470.

4.2. Discussion

Model 1

Model 1 examines the impact of some variables, including business size, business' experience, as well as the impact of dummy variables such as area of operation and human resource training on dependent variables. The results show that business size and business' experience do not contribute to innovative activities in enterprises. According to Freel (2000) the difference in innovation capacity between large and small enterprises lies in the investment in R&D. The author concluded that large-scale enterprises invest more in research, thus developing more innovative ideas. However, in Vietnam, several companies are still not aware of the importance of R&D. The majority of firms do not have funds and specialized departments for R&D. Hence, there is no difference in the innovation capacity among different businesses with different sizes.

Regarding the business experience variable, according to Freel (2000) an enterprise which has operated for a long time usually has in-depth understanding of the market, its competitors and customers, thus making it adapt quickly to come up with initiatives. However, the reality in our country shows that small and medium-sized enterprises are often family-owned enterprises operating from one generation to the next. For businesses of this type, their relationships with suppliers, customers are not just business relations, but they also relate to emotional issues. For that reason, enterprises are quite hesitant to bring up innovation since it can affect the relationships that they have already built.

In terms of area of operation, with a 99% confidence interval, enterprises operating in the Red River Delta, North Central, and Central Coast are more likely to undertake more innovation with an impact coefficient of 0.932 and 0.921 respectively (Table 4). As a matter of fact, enterprises in the Northern part have more advantages over other Southern counterparts with regard to business in general and innovation in particular. The Red River Delta is considered as a research and development center of the entire country, so enterprises in this area have the opportunity to gain access to more technological advances, thus bringing out more innovative ideas. Furthermore, Northern enterprises usually have higher product diversification than Southern ones (Vietnam Central Institute for Economic Management - CIEM, 2015) which dramatically boosts competitiveness in the market as customers have more choices. This reason has encouraged Northern enterprises to be more active in researching product innovation, improving processes to reduce costs, increase competitiveness, and come up with several marketing ideas to enhance customer retention rate.

Model 2

Model 2 evaluates the impact of human resource barriers to enterprises' ability to produce innovative ideas in their operation. The human resource barriers variable is statistically significant at 10%. However, with an impact coefficient approximately of 0.3, (Table 4), the proposed hypotheses are not completely consistent with the real situation in Vietnam since the difficulties in human resources have a positive impact on the ability to conduct business innovation. This finding aligns with some authors' idea that barriers create a positive impact on innovation, namely Freel (2000) and Segarra-Blasco *et al.* (2008).

Model 3

Model 3 examines the impact of barriers in access to finance on the enterprise's ability to foster innovation. The results indicate that barriers in access to finance have a positive impact on innovation at the 1% significance level ($\beta = 0.348$). This outcome is contrary to initial expectations (Table 1) regarding the negative correlation between

difficulty to access financial resources and innovation in Vietnam. Nevertheless, some studies about the relationship between barriers and innovation, various authors also come with the conclusion that there is a positive relationship between these two factors. According to [Freel \(2000\)](#) an innovative enterprise finds it more difficult to access external capital, so they have a motivation to foster innovation in order to overcome the challenges. Similarly, according to [Segarra-Blasco et al. \(2008\)](#) at a certain level of barriers, obstacles in financial mobilization encourage entrepreneurs to come up with innovative ideas.

For Vietnamese small and medium enterprises, difficulties in accessing to financial resources encourage enterprises to focus more on innovation. As mentioned previously, Vietnamese enterprises' initiatives are primarily driven by the desire to overcome the existing problems. Therefore, when enterprises have difficulty accessing finance, they will try to find a more appropriate method to handle their capital through innovation. This is especially true for small and medium enterprises because they usually find it challenging to gain access to external capital sources. Credit institutions are usually reluctant to target small and medium enterprises due to the small scale and low level of creditworthiness, not to mention that there are also several risks. The ability to meet limited loan conditions and unsecured collaterals are also causes that cut down on the enterprises' chances of accessing credit capital. Therefore, such activities like changing outdated facilities or reducing the organization apparatus allow enterprises to cut down on the unnecessary expenses. Instead, they can use the same amount of capital to invest in other business activities, thus helping enterprises overcome financial difficulties and better adapt to the changing business environment ([Nha and Quan, 2013](#)).

Model 4

Model 4 assesses the impact of barriers in transparency on innovation. The estimated results indicate that transparency is not statistically significant. In other words, the hypothesis that barriers in transparency negatively affect the enterprises' innovation capacity is rejected. According to [Anokhin and Schulze \(2009\)](#) the lack of transparency increases the cost of doing business, thereby reducing the motivation to innovate. In Vietnam, nevertheless, enterprises are not only the victims of the lack of transparency, but they are also the culprits of it. Specifically, Vietnamese enterprises actively contribute unofficial fees to governmental organization to make their business operations smoother. They consider these unreasonable expenses as an obvious step rather than a barrier to innovation.

Model 5

Model 5 examines the relationship between barriers in taxation to innovation under the influence of control variables. The estimated results demonstrate that taxation affects innovation with a 95% confidence level. With a positive impact coefficient $\beta = 0.003$, the hypothesis proposed in Chapter 2, which assumes that taxation has a negative impact, is rejected. Contrary to the idea of [Zhu et al. \(2012\)](#) barriers in taxation in Vietnam are a driving force that encourages domestic enterprises to innovate. This phenomenon stems from two reasons. First of all, small and medium enterprises are financially constrained, so the high tax rate pushes them to suffer capital shortages, which encourages them to undertake innovation in order to overcome difficulties and sustain their businesses. Secondly, the birth of the Law on environmental protection in 2012 has somewhat created a positive impact on enterprises' decisions to foster innovation. Accordingly, the integration of environmental protection taxes has encouraged businesses to invest in innovative research with a view to producing environmental friendly products and services. In other words, the environmental protection taxes have encouraged enterprises to come up with innovative ideas.

Model 6

Model 6 examines the impact of barriers in regulations on trade and custom duties on innovation. Table 4 shows that the R^2 value increases (0.4201) and the absolute value of the log likelihood decreases (258,950) compared to the models discussed above. In other words, the explanatory power of the barriers in regulations on trade and custom duties variable is better than the previous models' variables. The impact coefficient of the variable is 0.554, which is found to have a positive impact on the dependent variables with a confidence interval of 99%. This finding is consistent with [Nha and Quan \(2013\)](#) indicating that barriers in regulations on trade and custom duties have the greatest impact on innovation for Vietnamese enterprises. Vietnam has an incomplete legal system with a limited regulation quality, not to mention that there is a huge number of subordinate legal documents. In fact, the country has to carry out a lot of additional modifications to the law system, leading to many difficulties in controlling, overlapping, and contradictory. Moreover, there are still many inadequacies in the promulgation of regulations, resulting in the impossibility of the laws. Not only they cannot support the enterprises, they also create multiple barriers. For that reason, domestic enterprises always have to take an active role in resolving difficulties, as well as changing rapidly to adapt to the law modifications. A typical issue relating to trade and custom duties which enterprises have to face is import licensing. In terms of simplification, small and medium enterprises usually innovate their working methods and cooperate with intermediaries specializing in importing materials, machinery, and equipment to meet the demand, as well as avoid unnecessary costs incurred from many types of procedures.

Model 7

Model 7 examines the impact of all four barriers in human resources, access to finance, taxation, and regulations on trade custom duties on an enterprise's innovation capacity under the control variables about area of operation and human resource training. As can be seen from the estimated results in Table 4, the value of R^2 increases while the absolute value of the log likelihood decreases, but the amount is not significant compared to model 6 ($R^2 = 0,5344$, log likelihood = 254,192). Out of the four independent variables, the access to finance variable and regulations on trade and custom duties variable are statistically significant at 10% and 1%. Unlike the above models, out of the four control variables, only the Red River Delta variable and human resource training variable are statistically significant.

The variables in the model have a positive impact on small and medium enterprises' ability to foster innovation. The relationship between the barriers and the decision to innovate has an opposite trend. Accordingly, there is a positive relationship between barriers and innovation. Simply put, the more difficulties an enterprise has to face, the more innovation it can foster. This positive relationship can be explained by the characteristics of the ongoing innovative process which is taking place among small and medium enterprises, which are alternating the short-term goals to overcome the existing issues.

Table-5. The impact of individuals in model 7 on innovation in enterprises

	Coefficient β	Marginal of impact Factors	Level of significance
Human resource	0,013	x	ns
Access to finance	0,219	0,055	*
Transparency	-0,534	x	ns
Taxation	0,159	x	ns
Regulations on trade and custom duties	0,468	0,117	***
Business size	0,006	x	ns
Business' experience	0,021	x	ns
Red River Delta	0,824	0,206	**
North Central and Central Coast	0,600	x	ns
South East	-0,481	x	ns
Human resource training	2,308	0,577	***

Source: Results from data processing, 2018

***, **, * are the levels of significance at 1%, 5%, and 10% respectively;

ns: not statistically significant

The estimated results in Table 5 indicate that there are two kinds of barriers which encourage enterprises to innovate, including access to finance and regulations on trade and custom duties. It revealed that when the difficulties in access to finance (capital) increase by one level, then the enterprise is more likely to enhance innovation by 5.5%, while the difficulties in regulations increase the chance of innovation by 11.7%.

Regarding regulations on trade and custom duties, shortcomings in the administrative procedures force enterprises to foster innovation. However, if these regulations are not improved in the long run, they will facilitate the lack of transparency. To be specific, the biggest difficulty in the import – export process lies in the permission application and customs inspection and procedure. According to enterprises, the process of obtaining the permission is usually long, but not always successful, not to mention that the exported and imported goods have to undergo several unnecessary and time-consuming quality inspection. Therefore, inappropriate regulations should be modified or eliminated in order to encourage the development of innovation.

With an impact coefficient of 2.308, human resource training has the strongest impact on dependent variables, even greater than the impact of independent variables. If other conditions are kept unchanged, enterprises which have training courses for employees tend to have more innovative ideas than those do not by 0.557 units. In other words, the level of innovative changes in enterprises will increase by 55.7% by fostering human resource training (Table 4). This outcome implies that difficulties relating to finance and regulations can enhance the enterprise's innovation capacity, but the effects are temporary because of the low growth rates.

For the variables relating to area of operation, it is showed that enterprises in the Red River Delta are most likely to conduct innovation with an impact coefficient of 0.824 at a 5% significance level. If the difficulties are similar, enterprises operating in the Red River Delta have more innovations than other regions by 20.6 percent (Table 4). In Vietnam, the North is the leading economic development area, concentrating a lot of resources for innovative activities such as research institutes and universities, along with the effective policy of collaborative regional development. As a result, enterprises can absorb the scientific advances, thus promoting innovation. According to the results, the North Central and the Central Coast are the most innovative regions in the country.

5. CONCLUSIONS, POSSIBLE EXTENSIONS AND LIMITATIONS

This study has analyzed and discussed the issues relating to the innovation of small and medium enterprises, thus making the following conclusions. *Firstly*, the innovation of small and medium enterprises has an upward trend, but the development is still insignificant, with only around 50% of enterprises being innovative ones. *Secondly*, two barriers in access to finance and regulations on trade and custom duties have a positive impact on innovation due to the fact that our country is currently at the early stage of innovation with simple forms, thus adapting to business constraints. Nevertheless, the development in this way may not be applicable in the long run, so it is important that a change in the innovation trend should be conducted.

In addition to this study's outcomes, there are some inevitable limitations. First, because the dependent variable innovation used in this study is not specific, so the evaluation whether an enterprise is innovative or not depends on its self-assessment. An enterprise which participated in the survey has introduced or dramatically improved one of its products, services, processes, marketing, or sales is considered innovative. As a result, this can lead to misunderstandings of each enterprise. Therefore, in order to be more accurate, the following studies need to measure innovation in a more particular way such as through the number of inventions or the revenues obtained from innovation.

Then, this study examines the impact of barriers on innovation in general rather than the impact on specific types of innovation. Previous authors like Madrid-Guijarro *et al.* (2009) have proved the diversity of barriers' impacts on each type of innovation, so subsequent studies can focus more on this matter. Next, this study is currently focusing on evaluating an enterprise's innovation capacity, not on the characteristics of innovation like the innovation intensity or quality. In the future, other authors can explore more about this issue in order to

understand the innovation of an enterprise. Finally, the results may be improved and more robust using longitudinal data instead of cross-sectional information.

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