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IMPACT OF GLOBALISATION ON INNOVATION OF SMALL AND MEDIUM ENTERPRISES IN VIETNAM

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ABSTRACT

Innovation contributes to improved labour productivity and an enhanced competition, thereby ensuring to the development of the firm. However, small and medium enterprises (SMEs) encounter many difficulties in attempts to innovate. It is not clear whether globalisation works to encourage firms to innovate via transferring knowledge and promote market competition mechanism; or whether it works against such innovation due to a negative impact on the diversification of different dimensions in economic, social, and political life. The primary purpose of this research was to examine how globalisation affects innovation among SMEs in Vietnam. It analyses the micro and macro effects of globalisation on innovation in businesses using a Probit model with data obtained from selected SMEs during the period 2005–2015. The result showed that at a macro level, globalisation negatively correlates with innovation. Additionally, it was found that economic and political globalisation facilitates innovation while social globalisation discourages it. At the micro level, increasing competitive pressure and knowledge transfer due to globalisation are positively correlated with the propensity towards innovation of SMEs.

Keywords: globalisation, innovation, SMEs, Vietnam, economic, political and social globalisation

INTRODUCTION

According to endogenous growth theory, innovation is a crucial factor for the sustainable development of the economy (Romer, 1986). The role of innovation is particularly important for businesses in developing countries. Therefore, examining the factors affecting innovation in enterprises has received the great academic and political attention.

Globalisation is the process by which countries are increasingly integrated through the flow of goods, capital, and ideas (Bloom, 2002). The process of globalisation enhances the role of innovation. Even low-income countries are interested in developing systems of innovation. Innovation systems linked to creativity, adaptation, and dissemination of knowledge can make an important contribution to developing countries in the context of globalisation (Kuncoro, 2012). Santoro et al. (2019a) echoed this finding, namely the better knowledgeable sourcing strategy and internationalisation promotes greater innovation of the firms. With the removal of trade and investment barriers, globalisation provides opportunities and challenges for businesses in developing economies to innovate and improve their competitive position. Businesses in the process of globalisation face competitive pressure both domestically and internationally. In a business environment that is changing rapidly, businesses must innovate so as to be able to adjust quickly to changes in supply and demand in the market.

The small and medium enterprises (SMEs) play a significant role in the economy, especially in developing countries. The extent of innovation in SMEs is often limited compared with large enterprises. Ošenieks and Babauska (2014) indicated the impact of innovation on the firm performance of small and medium firms. Cicea et al. (2019) also confirmed the importance of innovation. Smaller enterprises do not generally participate in cooperation projects to promote innovation (OECD, 2010). In order to innovate, SMEs face many challenges. Their main obstacles are limited access to finance and lack of appropriate high-quality human resources (OECD, 2010). The process of globalisation only brings benefits to large businesses and disadvantages for SMEs because they have limited resources. Santoro et al. (2019a) showed parallel findings, namely medium and small firms are unable to fund the innovation activities by themselves, therefore, they have to depend on external sources. Additionally, SMEs also struggle with insufficient information and financial constraints which lead to difficulties in taking advantages of innovation (Liñán et al., 2020). Mendy et al. (2020) argued that politics, economics, and social aspects negatively impact firm innovation.

It is, therefore, an open question as to whether globalisation positively or negatively impacts SMEs. In response, this study was conducted to test the relationship between globalisation and innovation in SMEs in Vietnam between 2004 and 2014. This study was motivated by lack of empirical evidence on the relationship between globalisation and innovation in Vietnam. Nguyen et al. (2011) analysed the multidimensional impact of globalisation on Vietnam by focusing on the impact of trade liberalisation between 2005 and 2007. The current study expanded on that study by focusing on two points. First, as well as considering the micro channel of globalisation, the current research considered the impact of globalisation at the macro level. Nguyen et al.'s (2011) focus on trade and investment aspects of globalisation has ignored the multidimensional perspective of the impact of globalisation. Second, the current study took advantage of KOF's globalisation's data to assess the impact of globalisation between 2004 and 2014. A survey of 2,500 SMEs firms were undertaken for this purpose. Overall, the main purpose is to examine how globalisation affects innovation among SMEs in Vietnam via macro-economic and micro-economic channels.

At the macro level, globalisation has a negative correlation with propensity to innovate among SMEs. Economic and political globalisation help to promote innovation while social globalisation restricts it. At the micro level, both competitive pressure and the level of knowledge transfer increase with globalisation and they are positively correlated with the innovation of enterprises. In addition, large and long-established businesses often have more opportunities to innovate compared with small and newly-established ones. Regular training activities and university or college educated employees also facilitate innovation. The findings contribute to research in the innovation field in developing countries, particularly in encouraging firm innovation using different policies of innovation, primarily through competition and vertical linkages.

LITERATURE REVIEW

Innovation is an improvement in an overall technology capacity (Howitt, 2000). At the firm level, the most common definition of innovation is based on the Organisation for Economic Co-operation and Development's (OECD, 2005) (2005) approach that innovation can be divided into two categories: product innovation and process innovation. Product innovation is defined as the manufacture or commercialisation of a product with improved features, such as providing new or improved services to customers. Process innovation is defined as the implementation or application of a new production process or significant improvement. Cicea et al. (2019) suggested that innovation may have an impact on SME's

performance in European countries. Lesakova (2018) reported on the importance of innovation in a developing country, namely Slovakia. Norek and Arenhardt (2015) discussed the factors that influence the innovative achievements in SME and they concluded that globalisation is an important factor in firm innovation.

The term "globalisation" became prevalent in the 1990s and early 2000s. The current study uses defines globalisation as per Dreher (2006), Clark (2000), and Norris (2000) as the process of creating interconnected network between entities inside or outside the continent, implemented through flows of people, information, ideas, capital, and goods. Dreher (2006) distinguished three different aspects of globalisation – economic, political, and social globalisation. Economic globalisation is characterised by the flow of goods and services, capital as well as market information and awareness. Globalisation of society refers to the spread of ideas, images, and people. Political globalisation on the other hand describes the spread of national policies. Clearly distinguishing these concepts is useful but it may be difficult to achieve. Figge and Martens (2014) and Gygli et al. (2019) argue that if we use a pluralistic and multidimensional definition of globalisation, the distinction is not actually necessary.

The nexus between globalisation and innovation is a complex relationship. On the one hand, the increase in import and foreign direct investment (FDI) due to the removal of trade barriers can enhance the level of competition in the domestic market and reduce profits. In this context, enterprises are forced to improve production efficiency to survive in the market (Bertschek, 1995). Innovation is one of the ways to help companies improve operational efficiency in order to maintain competitiveness in the market (Kuncoro, 2012). Hence, globalisation and innovation can have a positive relationship.

On the other hand, some studies have suggested that the relationship between globalisation and innovation may be negative (Braga & Wilmore, 1991). Therefore, the resources required for research and development activities to create new products and production processes is significant while their benefits are highly uncertain. Because of the asymmetry, the industry has become cautious about innovation and focuses only on the application of imported technology (Kuncoro, 2012). In this case, globalisation may be negatively correlated with innovation.

There is also a view that globalisation allows developing countries to achieve progress in the learning process, without the time and resource-consuming discovery process, by approaching the ideas and technology developed in other areas and applying for the businesses after appropriate adjustments (Bloom, 2002).

In order to analyse the relationship between globalisation and innovation, current studies mainly consider two possible mechanisms to influence the innovation ability of enterprises: (1) knowledge transfer and (2) competition mechanisms from the participation of foreign businesses and foreign trade activities (Goronidchenko, 2010). Sutton (2007) examined the impact of globalisation on innovation through knowledge transfer, while Schumpeter (1943) focused on competition. Additionally, Supriyono and Trisnawati (2015) suggested that the changes in the globalisation has led to the different perceptions of innovative leadership to help SMEs. Scuotto et al. (2017) argued that globalisation has generated more new products and service. Similar to Saleem et al. (2020), the globalisation enhance better firm's performance.

The impact of globalisation on innovation through knowledge transfer and competition was discussed by Goronidchenko (2010) surveyed business in 27 transition economies between 2002 and 2005. In the study, the impact of globalisation was represented by an increase in competitive pressure and the import-export value of enterprises. Innovation was measured by introduction of new products or technologies. The results showed that statistically, competitive pressure from foreign countries encourages innovation of enterprises in these countries. Through import and export activities, vertical knowledge transfer also helps to improve the innovation ability of enterprises. The relationship between globalisation and innovation has similarities between business groups (by industry or by distance from the effective frontier).

Consistent with Gorondichenko (2010) and Nguyen et al. (2011) considered the relationship between trade liberalisation and innovation in SMEs in Vietnam during the period 2007–2009. They measured trade liberalisation indirectly by competition and import and export variables. Unlike Goronidchenko (2010) and Nguyen et al. (2011) viewed competition based on the price strategy of enterprises (specifically, enterprises determine the selling price of products as dictated by their competitors). The results showed that prices are determined by competitors and it has a positive relationship with the innovation ability of enterprises. In addition, Nguyen et al. (2011) stated that dealing with foreign enterprises can improve innovation activities of enterprises.

Aldaba (2011) analysed the relationship between the removal of trade barriers and the innovation activities of manufacturing enterprises in the Philippines over the period 1996–2006. The results showed that trade liberalisation increases the level of competition and encourages innovation in enterprises measured by research and development expenditure. Using research and development costs as a proxy for

innovation, Kuncoro (2012) examined the impact of globalisation on the innovation of medium and large-scale manufacturing enterprises in Indonesia from 1980 to 2007. Globalisation was represented by export participation, foreign investment, and the level of trade protection of enterprises. The study also showed that export participation is positively correlated with research and development expenditure while trade protection has a negative correlation.

The above empirical studies have provided us with useful evidence about the relationship between globalisation and innovation. However, these studies only focused on globalisation in terms of trade or investment but did not consider other aspects of globalisation, such as the social or political aspects. This pattern is partly due to the nature and accessibility of data. Goronidchenko (2010), Nguyen et al. (2011), Aldaba (2011), and Kuncoro (2012) used microdata at the enterprise level. Hahn and Narjoko (2011) argued that the use of microdata provides a better understanding of the relationship between globalisation and innovation compared with macro data. Notwithstanding the arguments of Hahn and Narjoko (2011), the use of microdata when it comes to the relationship between globalisation and innovation is insufficient. Globalisation is multidimensional, and not every aspect of it can be quantified specifically for each business. Empirical studies on globalisation and innovation at the micro level only analyse the impact of globalisation on trade and investment. Thus, the current paper examines the relationship between globalisation and innovation with the application of a combination of micro and macro data simultaneously. National level data is used to capture aspects of globalisation that have not been measured at the firm level.

METHODOLOGY

Data

The current research used data from Vietnam SME Surveys (a biennial event) to examine the relationship between globalisation and innovation. This survey has been conducted every two years since 2005 with the cooperation of Central Institute for Economic Development, the Ministry of Labor, Invalids and Social Affairs, Development Economics Research Group (DERG) at the University of Copenhagen and United Nations University. It involved more than 2,500 SMEs in nine provinces/cities. The surveys effectively represent the only data source providing information on the innovation of SMEs in Vietnam (Nguyen et al., 2011). The dataset used for the research covered a period between 2005 and 2015.

Additionally, data on globalisation from the KOF Globalisation Index (KOFGI) provided by the Swiss Institute of Technology was also used. The KOFGI is one of the most commonly used synthetic indicators of globalisation (Gygli et al., 2019). This measure can assist in illuminating the impact of different aspects of globalisation on innovation, including economic, social, and political aspects.

Research Model

The paper first constructed a model to show how globalisation impacts firms' innovation via macro-economic and micro-economic channels. The model was later embellished using secondary data from Vietnam SME Survey. It has to be noted however, the data may not be complete as some firms terminated their operation and others started their business. As a result and in addition to the baseline estimation, the model is regressed with the sample of firms present in all surveys.

Goronidchenko (2010) model was used to build a research model in which globalisation is measured at the micro level and impacts on innovation through competition mechanisms and knowledge transfer. In addition, Kuncoro's (2012) theoretical model was also used to examine the extent to which globalisation affects innovation. Thus, the study proposes the following empirical model:

$$\begin{aligned} INV_{it} &= \alpha_1 Globalisation_t + \alpha_{2m} \sum Competition_{mit} + \\ &\alpha_{3n} \sum KnowledgeTransfer_{nit} + \alpha_{4k} \sum FirmCharacacteristics_{kit} + \\ &\alpha_{5h} \sum OwnerCharacteristics_{hit} + \alpha_o + \alpha_{oi} + \alpha_{ot} + \varepsilon_{it} \end{aligned} \quad (1)$$

Where INV_{it} is the innovation of enterprise i in year t. In this study, similar to Goronidchenko (2010), and Nguyen et al. (2011), innovation is defined as the firm's introduction of new products (new_product), a significant improvement of existing products (new_improvement) or the application of new technology (new_tech).

The study used three groups of variables representing globalisation to analyse the impact of globalisation: $Globalisation_t$, $Competition_{it}$, and $KnowledgeTransfer_{it}$. The group $Globalisation_t$ measures the macro level of globalisation of Vietnam in year t. In this group, the impact of globalisation in general is considered (represented by KOFGI). The impact of globalisation on specific aspects was analysed through KOFGI in the economy (KOFEcGI), society (KOFSoGI), and politics (KOFPoGI) which represent macro and micro level globalisation.

Globalisation can negatively impact on firms' innovation, especially SMEs, which are a significant contributor to innovation performance (OECD, 2010). Sander and Janovsky (2016) discussed some of the risks of innovation of SMEs in the process of globalisation, such as information overload, the trend to product standardisation in the international market, the lack of communication due to the lack of face-to-face contact, the over-consumption of business resources to meet the increasing requirements in the process of globalisation, and the increasing time pressure. Based on the theories and empirical reviews, the following hypothesis was proposed:

H1: Globalisation is negatively correlated with innovation of SMEs at the macro level.

Supporters of globalisation argue that it has a positive effect on the economy in the innovation of businesses in particular as it facilitates the international flows of knowledge and know-how, the cross-cultural interactions, and the commercialisation of new products and services (Sander & Janovsky, 2016). Danaeefard and Abbasi (2011) reported that social globalisation is as a mechanism that promotes imperialism in the field of society and political. Therefore, the following hypothesis was formulated:

H2: Globalisation is positively connected with innovation of SMEs at the micro level.

$Competitions_{it}$ represents the level of competition that businesses face. Data from the survey was used to measure competition from foreign businesses (com_foreign), competition from domestic private enterprises (com_domestic), competition from state enterprises (com_state) and competition from informal commercial activities (com_smuggling). Studies on the relationship between globalisation and innovation of enterprises at the micro level, such as Goronidchenko (2010) and Nguyen et al. (2011), restricted themselves to considering the competition from foreign enterprises (com_foreign) to represent globalisation. However, the current study argues that globalisation not only raises the level of competition from foreign enterprises but it also enhances the level of competition among domestic enterprises as their capacity is strengthened in the process of globalisation. Therefore, in this study, the competition variable from domestic private enterprises was added (com_domestic) and competition from state-owned enterprises (com_state). Additionally, globalisation promotes informal trade because it reduces transportation, communication, and information costs (EMCDDA, 2016). Therefore, in the process of globalisation, domestic enterprises may face increased

competitive pressure from informal commercial activities measured by com_ smuggling in the estimation model.

Besides competitive mechanisms, globalisation can impact innovation through knowledge transfer. Data from a SME survey allows us to capture the level of knowledge transfer between foreign and domestic enterprises. In the study, we use three variables that represent knowledge transfer including export, import, and sales_fdi. In addition, we control for a number of possible factors affecting the innovation of the business. The control variables include the characteristics of the business and the characteristics of the owner/manager of the business. Details of the variables in the model are detailed in Appendix 1.

Estimation Method

The dependent variable INV_{it} is a binary variable, and therefore, Equation (1) is estimated and verified by a Probit model. Equation (1) was estimated first with KOFGI index as a proxy for globalisation at the macro level. Next, to exploit the multifaceted aspect of globalisation, the KOFGI variable was replaced by three variables representing globalisation of the KOFEcGI, KOFSoGI, and KOFPoGI.

In the base regression, the Probit model was used to estimate the Equation (1) with the entire sample within six years. On average, an enterprise is observed for three years. The panel data is unbalanced due to deactivation and new entry of firms participating in the survey. In order to ensure the robustness of the results, the Probit model was used to regress with businesses participating in all six surveys. Among more than 2,500 businesses surveyed each year, about 1,000 businesses participated in all surveys, and this allows for a balanced dataset. Thus, we have a foundation on which to make a meaningful assessment of the impact of globalisation on the innovation of businesses over the years.

RESULTS AND DISCUSSION

Descriptive Results

The descriptive statistical results of all variables in the model are shown in Appendix 2. The globalisation trend in Vietnam over the period of 2004–2014 is illustrated in Figure 1. As measured by the KOF globalisation index, the level of globalisation of Vietnam increased moderately during the period, with an average value of 52.5/100 points, and a growth rate of 6% per year. The KOFGI index of

Vietnam in 2004 was 44.8 points (ranked 145/197 countries) and in 2014 was 60.2 points (ranked 99/197 countries).

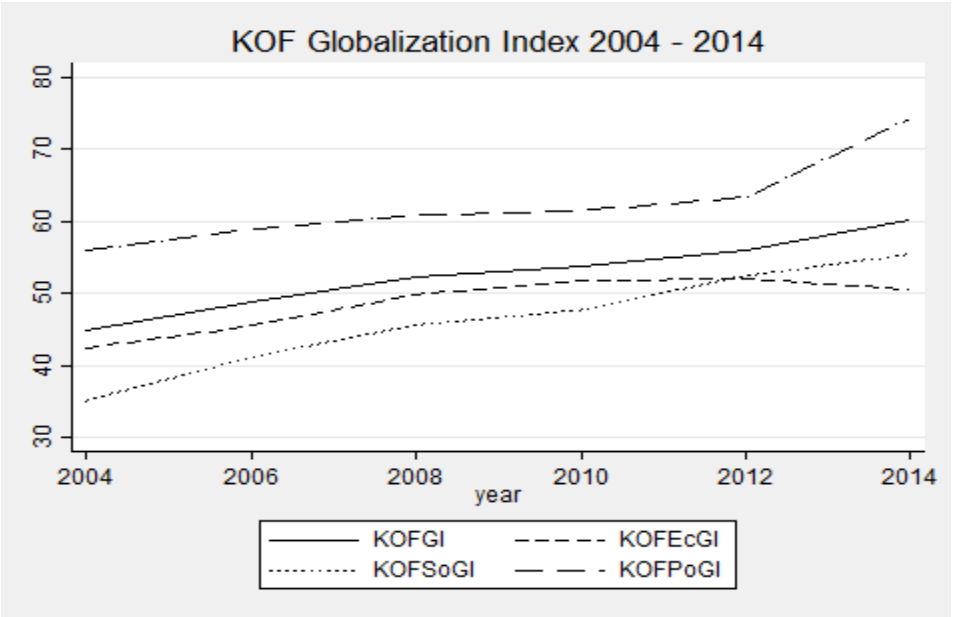

Figure 1. Globalisation trend in Vietnam in the period between 2004 and 2014

Source: Conducted by the authors based on data from https://www.kof.ethz.ch

In the period of 2004–2014, on average, only 13.2% of SMEs launched new products. The proportion of enterprises introducing new products has significantly dropped. Specifically, from a value of 40% in 2004, the proportion dropped sharply to 5.2% in 2006 and remained at less than 5% in the period of 2008–2012. The increase in businesses introducing new products in 2004 could be explained by the positive impact on the Enterprise Law issued in 2000. According to Nguyen et al. (2011), the number of SMEs established in Vietnam had significantly increased compared with 2003 (increased by 29%).

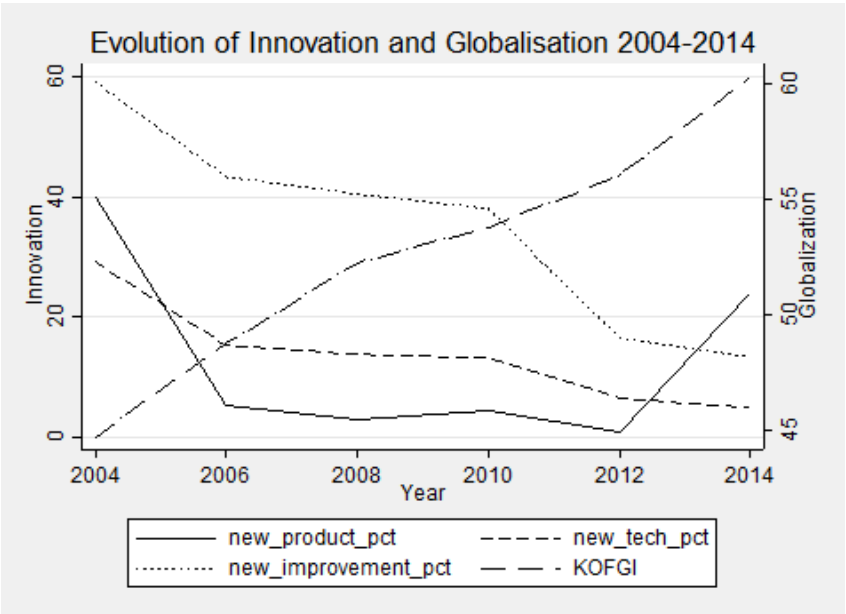

Figure 2. Globalisation and innovation of Vietnam's SMEs in the period 2004–2014

Source: Conducted by the authors based on data from Vietnam SME Survey

The average rate of enterprises applying new technologies in the period of 2004–2014 was about 14%, similar to the rate of introduction of new products. However, the rate of application of new technology gradually decreased from approximately 30% in 2004 to 4.8% in 2014. This may imply a delay in the technological innovation process of these enterprises.

The most popular form of innovation for SMEs in Vietnam is that of improving existing products with 35.5% enterprises doing this. However, this declined in the research period and remained at 13.3% in 2014. Based on Figure 2, the relationship between globalisation and innovation at businesses appears to be negative. While the level of globalisation showed an upward trend, the innovation scales showed a downward movement (except for the period 2012–2012 for the case of new product introduction rates). This prediction can be shown through regression results.

Estimation Results

Equation (1) is regressed with each variable representing innovation based on 14,802 firm-year observations. In the first step, the KOFGI index was used as a proxy for globalisation at the macro level. The regression results of this step are shown in detail in Table 1. In all three models A1, A2, and A3, the KOFGI variable is negative and statistically significant. The negative coefficient on KOFGI implies that there is a negative relationship between globalisation and the propensity for business innovation. This result confirms our prediction for the trend related to globalisation and innovation.

One can argue that globalisation has a positive impact on creativity and innovation by enhancing access to technological know-how and knowledge among diverse cultures and by promoting the commercialisation of new products and services (Sander & Janovsky, 2016). However, empirical results for SMEs in Vietnam do not appear to comply with such a position. Nevertheless, a negative relationship between globalisation and the propensity to innovate can be reasonably explained. Following Danaeefard and Abbasi (2011), the main impact of globalisation is a trend towards convergence and integration in all economic, political, cultural, and social fields. This convergence trend leads to the loss of diversity in economic, political, and social spheres. As diversity is considered to be the source of innovation, its loss in the process of globalisation can negatively affect national innovation in general and businesses in particular. This negative relationship exists not only in Vietnam—a developing country—but also in Germany, a country with a high level of development as reported by Sander and Janovsky (2016), Santoro et al. (2019b) and Liñán et al. (2020). Due to the lack of empirical studies examining the impact of macro-level globalisation on enterprise innovation at a micro level, it is difficult to compare the current research results with those of others.

In addition to the KOFGI that measures globalisation at the macro level, the study examined the impact of globalisation on innovation through micro-transmission channels, including competition and knowledge transfer (see Goronidchenko, 2010 and Nguyen et al., 2011). With regard to competition, the results showed that competition in general, has a positive impact on the innovation of enterprises (expressed by the positive coefficient on the competitive variables). In particular, high competitive pressure from foreign enterprises in the process of globalisation increases the likelihood of businesses innovating, a finding echoed by Gorodnichenko (2010) and Nguyen et al. (2011).

The process of globalisation not only increases the pressure from foreign businesses but also it increases the competitive pressure of domestic enterprises

working to improve the productivity of enterprises. It also unfortunately facilitates illegal trade activities (EMCDDA, 2016), which increases competitive pressure in certain regions. The results support the hypothesis that these forms of competition are capable of promoting innovation by firms. Goronidchenko (2010) showed similar results.

Table 1
Estimation result with KOFGI for the whole sample

Model variable	A1 new_product	A2 new_improve	A3 new_tech
Globalisation			
KOFGI	–0.035***	–0.100***	–0.082***
	[–12.030]	[–30.270]	[–20.400]
Competition			
com_foreign	0.0973*	0.128***	0.0267
	[1.928]	[3.027]	[0.557]
com_domestic	0.135***	0.278***	0.0318
	[3.211]	[7.855]	[0.754]
com_state	0.082**	–0.013	0.0164
	[2.021]	[–0.394]	[0.424]
com_smuggling	0.0341	0.146***	0.138***
	[0.613]	[3.191]	[2.668]
Knowledge Transfer			
sales_fdi	0.0204	0.188***	0.039
	[0.254]	[2.920]	[0.574]
Export	0.144**	0.137**	0.0545
	[2.180]	[2.290]	[0.916]
Import	0.156*	0.053	0.156**
	[1.874]	[0.692]	[2.088]
Firm Characteristics			
capacity_full	–0.237***	–0.224***	–0.106**
	[–4.107]	[–5.105]	[–2.065]
invest_rd	–0.045	0.134	–0.036
	[–0.462]	[1.623]	[–0.439]
invest_training	–0.0969	–0.407***	–0.545***
	[–0.995]	[–4.946]	[–6.550]

(*continued on next page*)

Table 1: (*continued*)

Model variable	A1 new_product	A2 new_improve	A3 new_tech
firm_size	0.092***	0.206***	0.234***
	[5.033]	[12.830]	[13.620]
firm_age_ln	0.060**	–0.000	–0.003
	[2.432]	[–0.029]	[–0.132]
skilled_worker	–0.064	0.094***	–0.008
	[–1.604]	[2.880]	[–0.200]
professional_labour	0.657***	0.098	1.135***
	[2.821]	[0.490]	[5.390]
Training	0.172***	0.219***	0.343***
	[3.987]	[5.751]	[8.472]
Network	0.048	0.090**	0.020
	[0.901]	[2.047]	[0.415]
Owner Characteristics			
owner_female	–0.147***	–0.178***	–0.051
	[–4.254]	[–6.162]	[–1.548]
owner_age_ln	–0.076	–0.333***	–0.185***
	[–1.065]	[–5.498]	[–2.727]
Industry fixed effects	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Constant	Yes	Yes	Yes
No. of observations	14,802	14,802	14,802
No. of firms	5,017	5,017	5,017

Note: Table 1 shows the results of the equation (1) estimation using the Probit model with the KOFGI index representing the globalisation at macro level for the full sample. Z-statistics is shown in square brackets. ***, **, * represent 1%, 5%, and 10% significance level respectively.

The second channel for globalisation affecting businesses at the micro level is the knowledge transferred from foreign enterprises through import and export activities and transactions with foreign-invested firms. The results showed that the variables of this group are positive and statistically significant correlated with innovation. This implies that enterprises with strong relationships with foreign

companies are more likely to innovate than others. Although Nguyen et al. (2011) found no evidence to support the positive impact of exports on the innovation of enterprises; the current research supports the argument that imports have a significant role in encouraging innovation, especially in the case of product and process innovation.

In addition to the variables that represent globalisation at the micro and macro levels, the study also examined variables that inform the characteristics of both businesses and owner/manager. It found that the variable firm_size has a negative coefficient, implying that large businesses are more likely to innovate than small businesses. This result is consistent with most empirical studies on innovation and Schumpeter's (1943) theory (see, for example, Becheikh et al., 2006). This is also consistent with observations that large enterprises often benefit from economies of scale, have advantages in resources, and are in a better position than small businesses in the market (Love & Roper, 2015).

The variable firm age is positively correlated with the propensity to innovate new products. This finding contradicts the belief that young businesses have higher levels of dynamism and thus, have better innovation capabilities. However, it may be that businesses that are long-established have the necessary reputation and experience to reinforce cooperative relationships with research centres as well as with foreign businesses and thus, have a higher propensity to innovate.

In the variable group representing the quality of human resources of the enterprise (including skilled_worker, professional_labour, and training), skilled_worker does not appear to increase the innovation ability of enterprises except for the improvement of existing products in the model A2–new_improve. Thus, a high percentage of skilled workers is only useful in the case that businesses wish to improve their existing products. It appears that skilled workers may face difficulties in developing new products or technology. On the other hand, the proportion of workers with a college/university degree (professional_labour) is positively correlated with innovation in most cases. This implies that enterprises should seek to improve the education level of their employees. The positive and statistically significant coefficient on training suggests that enterprises need to focus on training for employees (including new and existing workers) to facilitate innovation.

The variable network is included in the model to control for social capital. According to Nguyen et al. (2018), enterprises with large social capital reserves have more resources to innovate. In the current study, evidence was provided to support this hypothesis in the case of product improvement (model A2–new_improve).

Investment in research and development and training activities may be regarded as an important input for innovation (Kuncoro, 2012). However, in this study, we do not find convincing evidence of the link between these kinds of investment and innovation. The coefficients on variables invest_rd and invest_training are not statistically significant.

The capacity_full variable measures the level of resources already used by the business. The negative coefficient on this variable indicates that if the enterprise has used all of its production resources and is unable to increase production with existing resources, then the enterprise will be less likely to innovate. This result is similar to Nguyen et al. (2011).

Regarding owner characteristics, the study considered the impact of age and gender of the owner/manager on the ability of the enterprise to innovate. In relation to age, it appears that young owners/managers can stimulate innovation. In terms of gender, businesses with male owners/managers are more likely to innovate than ones with female owners/managers. This result is inconsistent with those of Beroc (2015) whose sample was Central and Easter European SMEs. Thus, the differences could be cultural, particularly in the context of the role of women. Vietnam is heavily influenced by Confucian ideology, and the level of women's participation in economic, political, and social activities is low compared with European countries . Indeed, female owners and managers accounted for only 30% in the current study.

The impact of each aspect of globalisation was analysed replacing KOFGI with KOFEcGI, KOFSoGI, and KOFPoGI. The regression results of this model are shown in Table 2. The following section discusses variables that measure economic, social, and political globalisation as the rest of the variables showed no difference in sign and statistical significance.

It was found that economic and political globalisation have a positive impact on innovation propensity while social globalisation has a negative impact. Opponents of globalisation have argued that the process of globalisation imposes Western culture on countries that do not have this cultural tradition. Social globalisation can, therefore, be considered as a mechanism to promote imperialism in the field of culture and society (Danaeefard & Abbasi, 2011) with the dominance of Western culture jeopardising cultural identities, beliefs, values, and even the language of most countries facilitated by communication and information technology. Social diversity can be related to socialisation in society, which is related to innovation propensity. Economic globalisation through the promotion of flow of goods and investment capital can create favourable conditions for business and innovation

activities. Finally, political globalisation can create a stable environment for businesses and it can positively impact on the innovation of businesses.

After regressing the model (1) with the entire observations in the sample, regression resuts were validated using a sample that included only businesses with six years of observation. Estimation results with this sub-sample were not significantly different from the test results for the whole sample. Regression results with sub-samples are presented in Appendices 3A and 3B.

Table 2
Estimation result with KOFEcGI, KOFSoGI and KOFPoGI for the whole sample

Model variable	B1 new_product	B2 new_improve	B3 new_tech
Globalisation			
KOFEcGI	0.114***	0.275***	0.067***
	[3.046]	[13.790]	[2.698]
KOFSoGI	–0.315***	–0.271***	–0.102***
	[–9.102]	[–16.820]	[–5.033]
KOFPoGI	0.268***	0.094***	0.014
	[11.880]	[9.335]	[1.096]
Competition			
com_foreign	0.097*	0.128***	0.027
	[1.928]	[3.027]	[0.557]
com_domestic	0.135***	0.278***	0.032
	[3.211]	[7.855]	[0.754]
com_state	0.082**	–0.013	0.016
	[2.021]	[–0.394]	[0.424]
com_smuggling	0.034	0.146***	0.138***
	[0.613]	[3.191]	[2.668]
Knowledge Transfer			
sales_fdi	0.020	0.188***	0.039
	[0.254]	[2.920]	[0.574]
Export	0.144**	0.137**	0.0545
	[2.180]	[2.290]	[0.916]

(*continued on next page*)

Table 2: (*continued*)

Model variable	B1 new_product	B2 new_improve	B3 new_tech
Import	0.156*	0.053	0.156**
	[1.874]	[0.692]	[2.088]
Firm Characteristics			
capacity_full	–0.237***	–0.224***	–0.106**
	[–4.107]	[–5.105]	[–2.065]
invest_rd	–0.045	0.134	–0.036
	[–0.462]	[1.623]	[–0.439]
invest_training	–0.097	–0.407***	–0.545***
	[–0.995]	[–4.946]	[–6.550]
firm_size	0.092***	0.206***	0.234***
	[5.033]	[12.83]	[13.62]
firm_age _ln	0.060**	–0.000	–0.003
	[2.432]	[–0.0285]	[–0.132]
skilled_worker	–0.064	0.094***	–0.008
	[–1.604]	[2.880]	[–0.200]
professional_labor	0.657***	0.098	1.135***
	[2.821]	[0.490]	[5.390]
Training	0.172***	0.219***	0.343***
	[3.987]	[5.751]	[8.472]
Network	0.048	0.090**	0.020
	[0.901]	[2.047]	[0.415]
Owner Characteristics			
owner_female	–0.147***	–0.178***	–0.051
	[–4.254]	[–6.162]	[–1.548]
owner_age_ln	–0.076	–0.333***	–0.185***
	[–1.065]	[–5.498]	[–2.727]
Industry fixed effects	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Constant	Yes	Yes	Yes

(*continued on next page*)

Table 2: (*continued*)

Model variable	B1	B2	B3
	new_product	new_improve	new_tech
No. of observations	14,802	14,802	14,802
No. of firms	5,017	5,017	5,017

Note: Table 2 shows the estimation results of the equation (1) by the Probit model with the KOFEcGI, KOFSoGI, and KOFPoGI variables which represent the aspects (economic, social, and political) of globalisation at the macro level for the full sample. Z-statistics is shown in square brackets. ***, **, * represent 1%, 5%, and 10% significance level respectively.

CONCLUSION

This study examined the relationship between globalisation and innovation among SMEs in Vietnam between 2004 and 2014. The impact of globalisation was considered at both micro and macro levels. The findings suggested that at a macro level, globalisation has a negative relationship with a propensity to innovate. Economic and political globalisation contribute to promoting innovation while social globalisation restricts it. At a micro level, competitive pressure and the level of knowledge transfer increase due to globalisation and are positively correlated with businesses' propensity to innovate. We also find that large and long-established businesses often have more opportunities for innovation. Training activities and the use of college or university employees also contribute to innovation. The gender and age of the owner/manager are also linked to the innovation ability of the business.

The findings contribute to the literature on globalisation which influences firm innovation. These results contribute to the debate on globalisation. Additionally, Vietnamese policy makers may enhance firm innovation by using policy measures stimulating foreign and domestic investment as well as international trade. Evidence has been presented to support policies that focus on encouraging innovation through both competition and vertical linkages. The results also showed the complex impact of globalisation on the innovation of businesses. On the one hand, competitive pressure and knowledge transfer stemming from globalisation contribute to improving innovation. On the other, globalisation, measured at the macro level of economic, political, and social flows, hinders innovation. The study, therefore, implies that we need to be prudent in assessing the impact of globalisation. As a developing country, Vietnam is now making efforts to integrate in all areas to improve its economic, political, and social development. However, we need to consider the potential risks of globalisation when designing appropriate policies.

Limitations and Further Studies

The research is subjected to some limitations which can be addressed by future research. First, the dataset's coverage is only up to 2014. Future research can examine the same topic with the latest dataset . Second, the research did not take into account the potential endogeneity between innovation and globalisation at micro-level (namely the foreign competition). As proposed by Goronichenko (2010), instrumental variables should be analysed for foreign competition. Unfortunately, the current research survey did not provide sufficient data for that purpose. Future research should tackle this.

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APPENDICES

Appendix 1: Variable Description

Variables	Definition	Source
Dependent variables		
Innovation		
new_product	Binary variable that equals 1 if businesses have introduced a new product between two surveys and 0 otherwise.	Vietnam SME Survey
new_improvement	Binary variable that equals 1 if businesses have significantly improved existing products between two surveys and 0 otherwise.	Vietnam SME Survey
new_tech	Binary variable that is equal to 1 if businesses have applied new technology between two surveys and 0 otherwise.	Vietnam SME Survey
Explanatory variables		
Globalisation		
KOFGI	Globalisation index	Swiss Institute of Technology
KOFEcGI	Economic globalisation index	Swiss Institute of Technology
KOFSoGI	Social globalisation index	Swiss Institute of Technology
KOFPoGI	Political globalisation index	Swiss Institute of Technology
Competition		
com_foreign	Binary variable that equals 1 if firms face high or moderate competitive pressure from foreign businesses and 0 otherwise.	Vietnam SME Survey
com_domestic	Binary variable that equals 1 if firms face high or moderate competitive pressure from domestic businesses in the survey period and 0 otherwise.	Vietnam SME Survey
com_state	Binary variable that equals 1 if firms face high or moderate competitive pressure from state-owned businesses in the survey period and 0 otherwise.	Vietnam SME Survey
com_smuggling	Binary variable that equals 1 if firms face high or moderate competitive pressure from informal trade in the survey period and 0 otherwise.	Vietnam SME Survey

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APPENDIX 1 (*continued*)

Variables	Definition	Source
KnowledgeTransfer		
Import	Binary variable that equals 1 if firms export in the survey period and 0 otherwise.	Vietnam SME Survey
Export	Binary variable that equals 1 if firms import in the survey period and 0 otherwise.	Vietnam SME Survey
sales_fdi	Binary variable that equals 1 if firms incur revenues from foreign-invested firms in the survey period and 0 otherwise.	Vietnam SME Survey
import_ratio	The ratio of import value to total purchases.	Vietnam SME Survey
export_ratio	The ration of export value to total revenues.	Vietnam SME Survey
sales_fdi_ratio	The ratio of revenues to foreign-invested firms to total revenues.	Vietnam SME Survey
Controlling variables		
FirmCharacteristics		
labor_total	Total number of employees in businesses	Vietnam SME Survey
firm_size	Natural logarit of total number of employees in businesses	Vietnam SME Survey
firm_age	The number of years since establishment.	Vietnam SME Survey
firm_age_ln	Natural logarit of the number of years since establishment.	Vietnam SME Survey
capacity_full	Binary variable that equals 1 if businesses have fully used their production resources and 0 otherwise.	Vietnam SME Survey
professional_labor	The ratio of employees with college or bachelor degree to total regular employees.	Vietnam SME Survey
skilled_worker	The ration of skilled workers to total production workers.	Vietnam SME Survey
Training	Binary variable that equals 1 if businesses have training activities for new or current employees and 0 otherwise.	Vietnam SME Survey
Network	Binary variable that equals 1 if businesses is the member of at least one business organisation and 0 otherwise.	Vietnam SME Survey

(*continued on next page*)

APPENDIX 1 (*continued*)

Variables	Definition	Source
invest_rd	Binary variables that equals 1 if businesses have invested in research and development activities and 0 otherwise.	Vietnam SME Survey
invest_training	Binary variables that equals 1 if businesses have invested in training activities and 0 otherwise.	Vietnam SME Survey
OwnerCharacteristics		
owner_female	Binary variable that equals 1 if businesses' owner/manager is female.	Vietnam SME Survey
owner_age	The age of business owner/manager.	Vietnam SME Survey
owner_age_ln	Natural logarit of the age of businesses' owner/manager.	Vietnam SME Survey

Appendix 2: Descriptive Statistical Results

Variable	No. of observation	Average	Deviation	Min	Max
Dependent variable					
Innovation					
new_product	15,757	0.13	0.34	0.00	1.00
new_improve	15,757	0.36	0.48	0.00	1.00
new_tech	15,757	0.14	0.35	0.00	1.00
Explanatory variables					
Globalisation					
KOFGI	15,758	52.53	5.03	44.76	60.25
KOFEcGI	15,758	48.57	3.56	42.44	52.03
KOFSoGI	15,758	46.07	6.86	35.11	55.42
KOFPoGI	15,758	62.39	5.84	55.91	74.34
Competition					
com_foreign	15,758	0.16	0.37	0.00	1.00
com_domestic	15,758	0.54	0.50	0.00	1.00
com_state	15,758	0.33	0.47	0.00	1.00
com_smuggling	15,758	0.12	0.33	0.00	1.00

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APPENDIX 2 (*continued*)

Variable	No. of observation	Average	Deviation	Min	Max
Knowledge Transfer					
Import	15,748	0.03	0.18	0.00	1.00
Export	15,708	0.06	0.24	0.00	1.00
sales_fdi	15,707	0.04	0.19	0.00	1.00
import_ratio	15,747	0.02	0.11	0.00	1.00
export_ratio	15,706	0.02	0.13	0.00	1.00
sales_fdi_ratio	15,707	0.01	0.08	0.00	1.00
Controlling variables					
Firm Characteristics					
labor_total	15,758	16.21	30.87	1.00	300.00
firm_size	15,758	1.98	1.15	0.00	5.70
firm_age	15,721	14.15	10.28	2.00	77.00
firm_age_ln	15,721	2.41	0.71	0.69	4.34
capacity_full	15,758	0.09	0.28	0.00	1.00
professional_labor	15,733	0.03	0.07	0.00	0.89
skilled_worker	14,918	0.47	0.41	0.00	1.00
Training	15,758	0.14	0.34	0.00	1.00
Network	15,757	0.09	0.28	0.00	1.00
invest_rd	15,758	0.49	0.50	0.00	1.00
invest_training	15,758	0.48	0.50	0.00	1.00
invest_rd_ratio	8,296	0.01	0.10	0.00	1.00
invest_training_ratio	8,296	0.00	0.03	0.00	1.00
Owner Characteristics					
owner_female	15,758	0.36	0.48	0.00	1.00
owner_age	15,758	45.66	10.66	17.00	94.00
owner_age_ln	15,758	3.79	0.24	2.83	4.54

Source: Conducted by the authors

Appendix 3A: Estimation result with KOFGI for balanced panel

Model	C1	C2	C3
Variables	new_product	new_improve	new_tech
Globalisation			
KOFGI	–0.026***	–0.108***	–0.088***
	[–5.398]	[–19.97]	[–12.91]
Competition			
com_foreign	0.029	0.098	0.081
	[0.327]	[1.368]	[0.989]
com_domestic	0.0665	0.257***	0.003
	[1.020]	[4.552]	[0.0457]
com_state	0.213***	–0.042	–0.0112
	[3.118]	[–0.745]	[–0.171]
com_smuggling	0.161*	0.127	0.118
	[1.685]	[1.612]	[1.312]
Knowledge Transfer			
sales_fdi	0.056	0.131	–0.054
	[0.377]	[1.132]	[–0.441]
Export	0.092	0.107	0.004
	[0.854]	[1.081]	[0.040]
Import	0.066	0.092	0.285**
	[0.419]	[0.626]	[2.103]
Firm Characteristics			
capacity_full	–0.158*	–0.015	–0.071
	[–1.706]	[–0.214]	[–0.845]
invest_rd	–0.091	0.305**	–0.042
	[–0.566]	[2.269]	[–0.314]
investt_training	–0.073	–0.587***	–0.589***
	[–0.458]	[–4.386]	[–4.396]
firm_size	0.090***	0.262***	0.266***
	[2.903]	[9.447]	[9.008]
firm_age _ln	–0.004	–0.039	0.007
	[–0.088]	[–1.029]	[0.161]
skilled_worker	–0.035	0.062	–0.072
	[–0.546]	[1.168]	[–1.065]

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APPENDIX 3A (*continued*)

Model	C1	C2	C3
Variables	new_product	new_improve	new_tech
professional_labor	0.493	0.627	1.774***
	[1.110]	[1.640]	[4.457]
Training	0.209***	0.206***	0.266***
	[2.889]	[3.155]	[3.823]
Network	–0.0741	0.118*	0.004
	[-0.891]	[1.754]	[0.056]
Owner Characteristics			
respondent_female	–0.167***	–0.216***	–0.034
	[–3.002]	[–4.496]	[–0.608]
respondent_age_ln	0.012	–0.356***	–0.078
	[0.098]	[–3.464]	[–0.681]
Industry fixed effects	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Constant	Yes	Yes	Yes
No. of observations	5,696	5,696	5,696
No. of firms	1,008	1,008	1,008

Note: Appendix 3A shows the results of the equation (1) estimation using the Probit model with KOFGI representing the globalisation at macro level for balanced panel. Z-statistics is shown in square brackets. ***, **, * represent 1%, 5%, and 10% significance level, respectively.

Appendix 3B: Estimation result with KOFEcGI, KOFSoGI, and KOFPoGI for balanced panel

Model	D1	D2	D3
Varibles	new_pro	new_imp	new_tec
Globalisation			
KOFEcGI	0.194***	0.170***	0.027
	[2.940]	[5.445]	[0.670]
KOFSoGI	–0.397***	–0.185***	–0.073**
	[–6.250]	[–7.394]	[–2.241]
KOFPoGI	0.330***	0.0384**	–0.005

(*continued on next page*)

APPENDIX 3B (*continued*)

Model	D1	D2	D3
Varibles	new_pro	new_imp	new_tec
	[7.858]	[2.453]	[–0.234]
Competition			
com_foreign	0.029	0.098	0.081
	[0.327]	[1.368]	[0.989]
com_domestic	0.067	0.257***	0.003
	[1.020]	[4.552]	[0.0457]
com_state	0.213***	–0.042	–0.011
	[3.118]	[–0.745]	[–0.171]
com_smuggling	0.161*	0.127	0.118
	[1.685]	[1.612]	[1.312]
Knowledge Transfer			
sales_fdi	0.056	0.131	–0.054
	[0.377]	[1.132]	[–0.441]
Export	0.092	0.107	0.004
	[0.854]	[1.081]	[0.040]
Import	0.0662	0.0915	0.285**
	[0.419]	[0.626]	[2.103]
Firm Characteristics			
capacity_full	–0.158*	–0.015	–0.071
	[–1.706]	[–0.214]	[–0.845]
invest_rd	–0.091	0.305**	–0.042
	[–0.566]	[2.269]	[–0.314]
invest_training	–0.073	–0.587***	–0.589***
	[–0.458]	[–4.386]	[–4.396]
firm_size	0.090***	0.262***	0.266***
	[2.903]	[9.447]	[9.008]
firm_age _ln	–0.00381	–0.039	0.007
	[–0.088]	[–1.029]	[0.161]
skilled_worker	–0.035	0.062	–0.072
	[–0.546]	[1.168]	[–1.065]
professional_ labor	0.493	0.627	1.774***
	[1.110]	[1.640]	[4.457]

(*continued on next page*)

APPENDIX 3B (*continued*)

Model	D1	D2	D3
Varibles	new_pro	new_imp	new_tec
Training	0.209***	0.206***	0.266***
	[2.889]	[3.155]	[3.823]
Network	–0.074	0.118*	0.004
	[–0.891]	[1.754]	[0.056]
Owner Characteristics			
owner_female	–0.167***	–0.216***	–0.034
	[–3.002]	[–4.496]	[–0.608]
owner_age_ln	0.0115	–0.356***	–0.078
	[0.098]	[–3.464]	[–0.681]
Industry fixed effects	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Constant	Yes	Yes	Yes
No. of observations	5,696	5,696	5,696
No. of firms	1,008	1,008	1,008

Note: Appendix shows the estimation results of the equation (1) by the Probit model with the KOFEcGI, KOFSoGI and KOFPoGI variable which represent the aspects (economic, social, and political) of globalisation in macro level for balanced panel. Z-statistics is shown in square brackets. ***, **, * represent 1%, 5%, and 10% significance level, respectively.