EXPORT AND TECHNOLOGICAL INNOVATIVENESS AT SMALL AND MEDIUM ENTERPRISES IN VIETNAM

Ho Ngoc Hong An* - PhD. Nguyen Quynh Huong**
Assoc.Prof.PhD. Dao Ngoc Tien - Mai Thi Quynh Anh****

Abstract: ***Technological innovativeness is of utmost importance for enabling enterprises to adapt and grow in the global market. This paper investigates the causality between export activities and technological innovativeness among Vietnamese Small and medium enterprises (SMEs). In this study, we utilized a dataset covering 7,639 small and medium enterprises in Vietnam. We employed Spearman's correlation analysis, Variance Inflation Factor (VIF) tests, and a logit regression model to process and analyze the data. Our findings demonstrate that export participation significantly increases Vietnamese SMEs' probability of technological innovativeness, the introduction of new products, the enhancement of existing products, and the application of novel production processes.***

• Keywords: *export; technological innovativeness; SME; Vietnam*

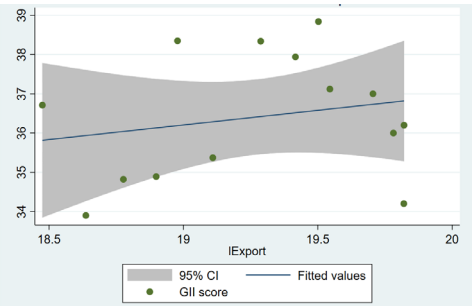
JEL codes: C01, F14, O39

Date of receipt: 04th Jun., 2025
Date of delivery revision: 10th Jul., 2025
Date of receipt revision: 05th Aug., 2025
Date of approval: 28th Sep., 2025
DOI: https://doi.org/10.71374/jfar.v25.i5.28

1. Introduction

Though there still exist a few obstacles, export activities in Vietnam do bring benefits to the economy, one of which is increasing innovativeness. As depicted in Figure 1, Vietnam's active exportation has shown some positive impacts on its Global Innovation Index (GII) score, the measurement of innovativeness performance of a country, over the past few years.

Figure 1: Vietnam's GII score as a function of export values, 2011- 2024



Source: Authors' own compilation using data from the General Statistics Office of Vietnam (2025), the International Trade Center (Trade Map), and World Intellectual Property Organization (WIPO) (2011 - 2024)

In Vietnam, SMEs constitute a major part of all active enterprises. Vietnamese SMEs embody great potential for their growth rate of revenue, promising to be at the heart of Vietnam's socioeconomic development strategy. Statistically speaking, performance is positively correlated with the presence of innovation both on the regional and national scale (Long and Anh, 2017). Technological innovativeness can improve the enterprise's performance. Meanwhile, the Vietnamese government has been supporting firms enthusiastically in technological innovation by enacting the Intellectual Property Rights, regulation on Science and Technology Enterprises, and Decree 80/2021/ND-CP, which provides technological assistance for SMEs. However, these policies do not focus on improving the firm's innovation capacity and seem to rule out a great number of SMEs that are not part of clusters or value chains (OECD, 2021). Export and technological innovation had a two-way causal relationship (Filipescu et al., 2013). Further investigation into the causal relationship between export and technological innovativeness is vital. This study presents the effect of export engagement on the initiation of tech-driven innovativeness at Vietnamese SMEs.

2. Literature review

2.1. Overview of technological innovativeness

There are 5 main forms which innovativeness takes: "(1) the launch of a new product or upgraded version of an already existing one; (2) the application of a new production process or commercial handling; (3) the opening of new markets; (4) the creation of a novel input supply source; and (5) the creation of new market organizations through the emergence or

** R.E.E M&E company, Vietnam*
*** Foreign Trade University, Hochiminh city campus, Vietnam; Corresponding author: nguyenquynhhuong.cs2@ftu.edu.vn*

collapse of a monopoly" (Schumpeter, 1942, 1934). The definition of innovativeness is "an introduction of a product, or process, or method that is new or considerably improved and related to marketing, organization in business practices, workplace organization, or external relations" (OECD and Statistical Office of the European Communities, 2005).

Empirical studies have showcased the important role of technological innovativeness at both national and firm scales. Initially, increasing production productivity was prioritized over environmental quality in developing countries (Mughal et al., 2022). To achieve sustainability in socioeconomic development, technological innovativeness is crucial to mitigating environmental pollution and fostering economic growth (Ahmad et al., 2023). The labor market has also benefited from the implementation of innovation activities, which generate employment prospects and considerably influence the employment structure (Goos et al., 2019). Besides, the causality between technological innovation and export practices is proven to be positive but non-linear (Márquez-Ramos and Martínez-Zarzoso, 2010). These innovations allow exporting firms to catch up with global advances (Azar and Ciabuschi, 2017) as well as "facilitate the firm's export intensity", regardless of the propensity to export (Fonchamnyo and Wujung, 2016). The importance of innovativeness encourages "the research and development of new technologies and processes, more efficient production techniques, and improved products", which, accordingly, enhances the enterprise's competitiveness (Kafouros et al., 2008).

2.2. Overview of small and medium enterprises (SMEs)

According to Article 6, Decree 39/2018-ND-CP (the official guide to the Vietnamese government's classification of SMEs), SMEs are classified by size, including micro, small, and medium-sized enterprises. Detailed indicators are shown in Table 1 below.

Table 1: Classification of SMEs in Vietnam

Sector	Indicators	Firm size		
		Micro	Small	Medium
Agriculture, forestry, and aquaculture Industry and construction	Annual average quantity of staff participating in social insurance	1-10	11-100	101-200
	Total revenue of the year (billion VND) Or Total capital (billion VND)	≤ 3 ≤ 3	≤ 50 ≤ 20	≤ 200 ≤ 100
Trade and services	Annual average quantity of staff participating in social insurance	1-10	11-50	51-100
	Total revenue of the year (billion VND) Or Total capital (billion VND)	≤ 10 ≤ 3	≤ 100 ≤ 50	≤ 300 ≤ 100

Source: Decree 39/2018-ND-CP

SMEs' entrepreneurs have the willingness to take risks and great adaptation capabilities (Ong et al., 2010). SMEs' overdependence on customers imposes certain constraints on their R&D activities, productivity, and, in turn, profitability (Laforet and Tann, 2006; Raymond and St-Pierre, 2004; Shouyu, 2017).

2.3. Theoretical background and proposed model

Entering the international market and selling goods and services abroad motivates firms to innovate, whilst export involvement helps them spread the market risk and better allocate resources for innovation activities (Wang et al., 2020). As firms enter the export market, there is a high likelihood that they will execute technological innovation. According to Hadjimanolis (2000), export engagement was positively associated with small firms' innovativeness practices. Similar findings were also recorded in research by Hue (2019), with an empirical framework for decisions made by Vietnamese firms to innovate. Our research question is whether participating in export activities can have a positive effect on Vietnamese SMEs' implementation of technological innovativeness.

3. Methodology

3.1. Model specification

Following Hadjimanolis (2000) and Hue (2019), we divide Technological innovativeness into 4 types: technological innovativeness is applied in SMEs (techinn in Model 1), SMEs introduce a new product (newproduct in Model 2), product modification (productimp in Model 3), or new process (new process in Model 4). Then, the proposed research model can be transformed into 4 equations as follows:

Model 1:

$$techinn_{i,t} = \beta_0 + \beta_1 export_{i,t} + \beta_2 fsize_{i,t} + \beta_3 ownership_{i,t} + \beta_4 gender_{i,t} + \beta_5 age_{i,t} + \beta_6 competition_{i,t} + \beta_7 govast_{i,t} + \varepsilon_{i,t}$$

Model 2:

$$newproduct_{i,t} = \beta_0 + \beta_1 export_{i,t} + \beta_2 fsize_{i,t} + \beta_3 ownership_{i,t} + \beta_4 gender_{i,t} + \beta_5 age_{i,t} + \beta_6 competition_{i,t} + \beta_7 govast_{i,t} + \varepsilon_{i,t}$$

Model 3:

$$productimp_{i,t} = \beta_0 + \beta_1 export_{i,t} + \beta_2 fsize_{i,t} + \beta_3 ownership_{i,t} + \beta_4 gender_{i,t} + \beta_5 age_{i,t} + \beta_6 competition_{i,t} + \beta_7 govast_{i,t} + \varepsilon_{i,t}$$

Model 4:

$$newprocess_{i,t} = \beta_0 + \beta_1 export_{i,t} + \beta_2 fsize_{i,t} + \beta_3 ownership_{i,t} + \beta_4 gender_{i,t} + \beta_5 age_{i,t} + \beta_6 competition_{i,t} + \beta_7 govast_{i,t} + \varepsilon_{i,t}$$

Where:

Techinn: Dummy = 1 if the firm participated in at least 1 of 3 forms of innovativeness activities (new process, new product, or product development)

0: otherwise.

Newproduct: Dummy = 1 if the firm launched new product groups, = 0 otherwise.

Productimp: Dummy = 1 if the firm conducted any improvement to their product, = 0 otherwise.

Newprocess: Dummy = 1 if the firm introduced a new production process or technology, = 0 otherwise.

Export: Dummy = 1 if the SME participates in at least 1 type of export (either directly or indirectly), = 0: otherwise.

fsize: Natural logarithm of the SME's total assets.

Ownership: Dummy = 1 if the SME is a household establishment/business, = 0 otherwise

Age: Age of the owner or manager

Gender: Dummy = 1 if the SME's owner or manager is male, = 0 otherwise.

Competition: Dummy = 1 if the SME responds that they face competition, = 0 otherwise

Govast: Dummy = 1 if the SME has received any support from the government, whether it is financial, technical, or other types, = 0 otherwise.

4. Data description and pre-estimation tests

4.1. Descriptive statistics

The study derived firm-level secondary data from UNU-WIDER (hereafter, namely Vietnam SMEs survey). This survey was carried out biannually and covered the enterprise's employee and economic accounts. The Vietnam SME data covers 18 sectors, 9 provinces of Vietnam, in three years: 2011, 2013, and 2015. The data set contains 7,639 observations in total[1]. Table 2, and Figures 3,4, 5, and 6 provide the data description.

Overall, technological innovativeness was widely carried out among surveyed SMEs; about 32.6% of SMEs participated in at least 1 innovativeness activity. The mean value of new product introduction (newproduct) indicates that only 9.8% of the companies launched new products within the time surveyed. The most common innovativeness activity, remarkably, is product modification, with approximately 22.4% of 7,639 observations indicating improvements to their goods and services. In contrast, only 8% of firms innovated their processes within 5 years of the survey.

[1] *The dataset is available online at : https://www.wider.unu.edu/database/viet-nam-sme-database*

Table 2: Summary of data

A. Descriptive statistics of variables					
Variable	Observations	Mean	Standard deviation	Min	Max
Dependent variables					
techinn	7,639	0.326	0.469	0	1
newproduct	7,639	0.098	0.297	0	1
productimp	7,639	0.224	0.417	0	1
newprocess	7,639	0.080	0.271	0	1
Independent variables					
export	7,639	0.062	0.240	0	1
fsize	7,639	14.095	1.743	6.908	20.039
ownership	7,639	0.637	0.481	0	1
gender	7,639	0.607	0.488	0	1
age	7,639	46.140	10.853	17	94
competition	7,639	0.871	0.335	0	1
govast	7,639	0.113	0.316	0	1
B. Number of observations					
Year			**Total Observations**		
2011			2,481		
2013			2,530		
2015			2,628		

Source: Author's summary using Vietnam SME survey data (2011, 2013, and 2015)

4.2. Correlation coefficient matrix

Table 3: Spearman's rank correlation coefficients

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) *techinn*	1.000										
(2) *newproduct*	0.474	1.000									
(3) *productimp*	0.772	0.005	1.000								
(4) *newprocess*	0.423	0.025	0.273	1.000							
(5) *export*	0.096	0.027	0.091	0.103	1.000						
(6) *fsize*	0.126	-0.005	0.155	0.144	0.249	1.000					
(7) *ownership*	-0.122	-0.015	-0.139	-0.127	-0.262	-0.563	1.000				
(8) *gender*	0.008	-0.005	0.018	-0.022	-0.041	-0.064	0.136	1.000			
(9) *age*	-0.055	0.027	-0.075	-0.061	-0.066	-0.090	0.181	0.160	1.000		
(10) *competition*	0.082	-0.007	0.103	0.050	0.031	0.136	-0.107	0.003	-0.077	1.000	
(11) *govast*	0.096	0.002	0.106	0.092	0.096	0.114	-0.103	-0.021	-0.029	0.033	1.000

Source: Author's compilation using Vietnam SME survey data (2011, 2013, and 2015)

Table 3 displays the correlation among variables affecting technological innovativeness activities at Vietnamese SMEs, with a significance level of 10%. The threshold suggests that a coefficient below 0.8 means no serious multicollinearity is detected. It is also notable that the correlation between *techinn* and *newproduct*, *productimp*, *newprocess* is r1,2 = 0.474, r1,3 = 0.772, r1,4 = 0.423 since *techinn* is reconstructed from the other three variables and they are not included in the same model.

5. Regression results

Table 4: Logit regression results

	Model 1 *techinn*	Model 2 *newproduct*	Model 3 *productimp*	Model 4 *newprocess*
export	0.0996*** (0.024)	0.0346** (0.016)	0.0524** (0.021)	0.0380*** (0.013)
fsize	0.0180*** (0.004)	-0.0033 (0.002)	0.0216*** (0.003)	0.0166*** (0.002)

	Model 1 *techinn*	Model 2 *newproduct*	Model 3 *productimp*	Model 4 *newprocess*
ownership	-0.0521*** (0.013)	-0.0150* (0.008)	-0.0485*** (0.012)	-0.0189** (0.007)
gender	0.0275** (0.011)	-0.0045 (0.007)	0.0394*** (0.010)	0.0031 (0.006)
age	-0.0013** (0.001)	0.0009*** (0.000)	-0.0020*** (0.000)	-0.0009*** (0.000)
competition	0.0877*** (0.016)	-0.0046 (0.010)	0.1038*** (0.013)	0.0256*** (0.009)
govast	0.1081*** (0.017)	0.0004 (0.011)	0.1034*** (0.016)	0.0507*** (0.011)

Source: Author's compilation using Vietnam SME survey data (2011, 2013, and 2015)

Note: The symbols (*), (**), and (***) represent the significance level of 1%, 5%, and 10% respectively.

4.4.1. Export

The independent variable export has positive coefficients in all four regression models at the significance of 1% - 5%, evidently proving that export positively impacts technological innovativeness activities at Vietnamese SMEs. The coefficient in Model 1 is 0.0996, which means participation in export increases the probability of SMEs applying technological innovativeness by around 9.96%. Therefore, for the purpose of competing abroad, exporting SMEs will tend to implement technological innovativeness in order to enhance their effectiveness and efficiency.

Model 2 shows the coefficient of 0.0346 at the significance level of 5%, meaning that Vietnamese SMEs engaging in export activities are motivated to create new products, with the probability of this event being almost 3.5%.

The coefficient of export in Model 3 is 0.0524 at the significance level of 5%. It explains that export participation increases the probability of Vietnamese SMEs' technological innovativeness by about 5.2%. The positive correlation shows that the benefits gained from export involvement primarily cover product design from customers and feedback from consumers in overseas markets.

At 1% significance level, the coefficient is 0.0380 in Model 4, implying that taking part in exporting markets increases the probability of Vietnamese SMEs' introduction of new processes by approximately 3.8%. Accordingly, extending market coverage motivated the application of a new process.

Overall, participating in export activities has a positive effect on Vietnamese SMEs' capacity for technological innovativeness.

5. Conclusions & recommendations

5.1. Conclusions

Statistical evidence supports the hypothesis that engagement in export activities stimulates technological innovativeness, which are, particularly the launching of new products or upgraded versions of present offerings, or new processes and techniques. The coefficient of export in the model concerning product improvement has the highest value, indicating that export has the most striking effect on SMEs' product improvement, compared to other types of technological innovativeness. Besides export, firm size, competition, and government support are positively correlated with the product upgrade and the launching of new products.

Acknowledgement: *This article is a product of the National Science and Technology Project "Research on solutions to improve innovativeness capacity in export activities of Vietnamese enterprises in the new context" coded KX.01.11/21-30.*

References:

Ahmad, N., Youjin, L., Žiković, S., Belyaeva, Z., 2023. The effects of technological innovation on sustainable development and environmental degradation: Evidence from China. Technol. Soc. 72, 102184. https://doi.org/10.1016/j.techsoc.2022.102184

Azar, G., Ciabuschi, F., 2017. Organizational innovation, technological innovation, and export performance: The effects of innovation radicalness and extensiveness. Int. Bus. Rev. 26, 324-336. https://doi.org/10.1016/j.ibusrev.2016.09.002

Filipescu, D.A., Prashantham, S., Rialp, A., Rialp, J., 2013. Technological Innovation and Exports: Unpacking Their Reciprocal Causality. J. Int. Mark. 21, 23-38. https://doi.org/10.1509/jim.12.0099

Fonchamnyo, D.C., Wujung, V.A., 2016. Innovation and Export Performance: An Empirical Insight on the Effect of Innovation on Manufacturing Firms in Cameroon. Appl. Econ. Finance 3, 123-133. https://doi.org/10.11114/aef.v3i4.1682

Goos, M., Arntz, M., Zierahn, U., Gregory, T., Gomez, S.C., Vazquez, I.G., Jonkers, K., 2019. The Impact of Technological Innovation on the Future of Work.

Hadjimanolis, A., 2000. A Resource-based View of Innovativeness in Small Firms. Technol. Anal. Strateg. Manag. 12, 263-281. https://doi.org/10.1080/713698465

Hue, T.T., 2019. The determinants of innovation in Vietnamese manufacturing firms: an empirical analysis using a technology-organization-environment framework. Eurasian Bus. Rev. 9, 247-267. https://doi.org/10.1007/s40821-019-00125-w

Kafouros, M.I., Buckley, P.J., Sharp, J.A., Wang, C., 2008. The role of internationalization in explaining innovation performance. Technovation 28, 63-74. https://doi.org/10.1016/j.technovation.2007.07.009

Laforet, S., Tann, J., 2006. Innovative characteristics of small manufacturing firms. J. Small Bus. Enterp. Dev. 13, 363-380. https://doi.org/10.1108/14626000610680253

Long, P.D., Anh, H.T.M., 2017. Innovation and Productivity of Vietnamese Small and Medium Enterprises: Firm level panel data evidence. Int. J. Econ. Financ. Issues 7, 226-232.

Márquez-Ramos, L., Martínez-Zarzoso, I., 2010. The Effect of Technological Innovation on International Trade. Economics 4, 20100011. https://doi.org/10.5018/economics-ejournal.ja.2010-11

Mughal, N., Arif, A., Jain, V., Chupradit, S., Shabbir, M.S., Ramos-Meza, C.S., Zhanbayev, R., 2022. The role of technological innovation in environmental pollution, energy consumption and sustainable economic growth: Evidence from South Asian economies. Energy Strategy Rev. 39, 100745. https://doi.org/10.1016/j.esr.2021.100745

OECD, 2021. SME and Entrepreneurship Policy in Viet Nam, OECD Studies on SMEs and Entrepreneurship. OECD. https://doi.org/10.1787/30c79519-en

OECD, Statistical Office of the European Communities, 2005. Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data, 3rd Edition, The Measurement of Scientific and Technological Activities. OECD. https://doi.org/10.1787/9789264013100-en

Ong, J.W., Ismail, H.B., Goh, G.G.G., 2010. The Competitive Advantage of Small and Medium Enterprises (SMEs): The Role of Entrepreneurship and Luck. J. Small Bus. Entrep. 23, 373-391. https://doi.org/10.1080/08276331.2010.10593491

Raymond, L., St-Pierre, J., 2004. Customer dependency in manufacturing SMEs: implications for R&D and performance. J. Small Bus. Enterp. Dev. 11, 23-33. https://doi.org/10.1108/14626000410519074

Schumpeter, J.A., 1942. Capitalism, socialism and democracy. New York. https://doi.org/10.4324/9780203202050

Schumpeter, J.A., 1934. The theory of economic development: an inquiry into profits, capital, credit, and the business cycle. Cambridge: Harvard University Press.

Shouyu, C., 2017. Research on the Characteristics of Innovation in Small and Medium Sized Enterprises: A Comparative Analysis of Large Enterprises, in: Proceedings of the 2017 7th International Conference on Social Network, Communication and Education (SNCE 2017). Presented at the 2017 7th International Conference on Social Network, Communication and Education (SNCE 2017), Atlantis Press, Shenyang, China. https://doi.org/10.2991/snce-17.2017.53

Wang, K., Wang, J., Mei, S., Xiong, S., 2020. How Does Technology Import and Export Affect the Innovative Performance of Firms? From the Perspective of Emerging Markets Firms. Complexity 2020, 1-15. https://doi.org/10.1155/2020/3810574