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### **Factors influencing the participation of Vietnamese enterprises in global value chains: insights from automobile production and assembly, electronics, and textile industries**

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#### **Abstract**

This study aims to examine the factors influencing the global value chain position of enterprises from Vietnam's leading industry sectors. The panel data analysis was conducted based on 208 observations from 52 automobile production and assembly, electronics, and textile enterprises from 2016 to 2020. The multiple linear regression model was utilized to analyze the factors influencing the participation of such industry sectors in the global value chain. The results indicate that technological capability has the most significant positive influence on the participation of Vietnamese enterprises in the global value chain, followed by FDI and business size. In contrast, business age does not have a discernible effect. These findings bring some policy implications for improving the country's position in the global value chain, focusing on the automotive, electronics, and textile industries.

**Keywords:** Global value chain, Business position, Automobile industry, Electronics industry, Textile industry

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## 1. Introduction

From 2010 to 2020, Vietnam became one of the countries whose industry obtained medium-high global competitiveness (Nguyen and Chaudhary, 2019). At the same time, Vietnam's key sectors are integrating more and more profoundly into the global value chain (GVC). Particularly in the electronics and automobile component manufacturing industries, businesses not only engage in low-valued stages like processing and assembling but, in some cases, produce the end products by themselves based on their designs, which results in higher returns (Nguyen and Chaudhary, 2019). In 2011, electronics, computers, and components exports only accounted for 4.8% of the total export turnover. However, by 2021, this proportion increased to 15.2% (GSO, 2022). Similarly, by implementing closed-loop supply chain models, Vietnam's textile and garment industry currently makes up 4-5% of the global textile and garment market share (Ngo, 2018).

Regarding value creation, Vietnam's manufacturing industries focus mainly on production activities in the assembly line and product processing stages (Tran, 2019). Typically, the auto industry only participates in the low segment of the automotive value chain and has not yet mastered core technologies such as engines, control systems, and powertrains. Besides, there is no system of large-scale material suppliers and component manufacturers in the automotive industry (Tran, 2018). In addition, Vietnam's electronics industry has a low domestic rate (5-10%) and is still at an early stage in the electronic production chain. As a result, it is significantly dependent on FDI enterprises. Meanwhile, Vietnam's textile and garment industry mainly focuses on the processing stage. This partly explains why the participation level of Vietnam's manufacturing sector is still relatively low compared to other countries in the region despite its tremendous integration into the global supply chain (Dang, 2017). The next challenge is identifying the factors influencing businesses' positions in Vietnam's key industries.

A literature review on the factors affecting industry/enterprise's participation in GVCs reveals that this field has been noticed by many organizations and scholars worldwide, such as OECD (2015), IMF (2016), Tinta *et al.* (2018), Kotturu and Mahanty (2017), Krammer *et al.* (2018), Jurowetzki *et al.* (2018), and Hofstetter *et al.* (2021). The findings suggest that two categories of elements affect how much an industry sector participates in the GVC: non-policy or structural factors (e.g., enterprise participation degree, enterprise scale, corporate ownership) and policy factors (such as trade performance indicators) (Song and Wang, 2017; Tinta *et al.*, 2018).

Several studies have also demonstrated the significance of these factors in promoting the local industry sectors' participation in GVCs, such as gaining access to technical knowledge and fostering their learning and innovation capabilities (Kotturu and Mahanty, 2017). A mixed-method approach employing quantitative and qualitative methodologies is used widely in studying the main factors driving GVC involvement. This method has also been used in analyzing GVC participation in several industries, including Vietnam's manufacturing and agricultural sectors (Tran *et al.*, 2013; Torres de Oliveira *et al.*, 2021). Other significant sectors of Vietnam are electronics, textiles, and automobile components manufacturing. Although the Vietnamese government has been actively promoting these industries in recent years,

their position in the GVC remains very modest. Synthetic studies on the factors affecting the position of these sectors in the GVC are also limited and are mainly investigated by industry (Monteiro *et al.*, 2013; Nguyen and Chaudhary, 2019; Tran and Hoang, 2020; Urata and Baek, 2020). Continuing previous findings, this study pays special attention to analyzing and evaluating the elements exerting a significant influence on leading sectors' GVC participation, which crucially contributes to positioning Vietnam in the GVC.

The remainder of this study is organized as follows. Section 2 provides the literature review of factors influencing the GVCs participation. Subsequently, a conceptual framework on the factors affecting GVCs in the current context of Vietnam is suggested. Section 3 describes the data collection process and the method used to analyze data collected from automobile production and assembly, electronics, and textile enterprises, the most crucial industries in Vietnam. Sections 4 and 5 present key research results and discussions. Finally, recommendations on governmental policies to help enterprises ameliorate those factors and improve their position in GVCs are proposed.

## **2. Literature review**

Porter (1985) introduced the value chain concept under the context of a single country's industrial sector. It could be interpreted as all the activities working harmoniously to manufacture and sell products at the highest profit. Thanks to the rapid development of the global economy after World War II, the application of this concept, however, has extended over the years and is no longer limited to just one country. Instead, industry sectors/ enterprises in different countries, with their advantages, gradually become participants in various stages in the value chain. This has resulted in the formation of a value chain that operates based on cooperation between enterprises from different economies, which is called a "global value chain" (GVC) (Kaplinksy and Readman, 2001). GVC refers to the movement of a product or service from conception, design, raw material procurement, and intermediate entry stages to manufacture, marketing, distribution, and delivery to end users (ESCAP, 2009). Furthermore, APEC (2010) describes GVCs as value chains that operate in multiple economies. GVCs are different from traditional value chains regarding the geographical scope of value creation, such as regions or countries.

At the early stage of GVCs research at the enterprise level, the work of Harvie *et al.* (2010) was a pioneer study focusing on enterprises, especially small- and medium-sized enterprises (SMEs). Using data from large-scale field surveys carried out among firms in several Asian countries, such as Indonesia, the Philippines, Vietnam, and the People's Republic of China (PRC), these authors examined the determinants of SMEs that encourage enterprises to participate in GVCs. The research results indicate that a firm will engage in GVCs if it satisfies the accompanying two circumstances: (i) it supplies at any level in a GVC; (ii) it either imports transitional sources or exports a portion of its products. Besides, high efficiency, foreign possession, propitious monetary access, dynamic development movement, and positive and testing administrative/ enterprising perspectives are fundamental for SMEs to join GVCs.

GVCs participation by firms can also be typically measured using enterprise import and export data. More specifically, enterprises are assumed to participate in GVCs when importing inputs and exporting outputs from/to other countries. Wignaraja (2012) analyzed the elements influencing SMEs' participation in GVCs in five ASEAN nations, including Thailand, Malaysia, Indonesia, Philippines, and Vietnam, by employing the regression model with data provided by the World Bank. Assessment results illustrate that foreign ownership and firm size are significantly positive, while enterprise age is negatively correlated in every regression. Besides, for all enterprises and SMEs in GVCs, credit accessibility has a positive effect and is statistically significant.

When examining the factors affecting the degree of GVC participation at the enterprise level, some highly typical studies in this field were synthesized, as summarized in Table 1.

**Table 1.** Critical studies on influencing factors on GVC participation

| Study                            | Research focus   | Sample size  | Analysis method         | Results   |
|----------------------------------|--|--|-------------------------|---|
| Urata and Baek (2020)            | The important factors of participation in GVCs, especially in Asian businesses and countries | 111 countries and 38,966 enterprises in Asia in the period of 2009-2018, focus on SMEs | Factor analysis and SEM | Enterprise-related factors, such as enterprise size, foreign ownership, high-tech capabilities, and high labor productivity, are important to enterprises. Country-related factors, educated people, well-developed infrastructure, openness to trade and foreign direct investment flows, efficient logistics, and effective governance positively affect the participation of enterprises in GVC. |
| Arudchelvan and Wignaraja (2015) | Characteristics of SMEs that have an impact on participation in GVCs of Malaysian firms      | 234 importers and exporters in Malaysia in 2012  | Factor analysis and SEM | The technological capability of an enterprise, as captured by the ownership of a foreign technology license and R&D share of sales, was positively and significantly associated with SME involvement in GVC. Foreign ownership, however, was not demonstrated to be a significant predictor of GVC participation.   |

**Table 1.** Critical studies on influencing factors on GVC participation (*continued*)

| <b>Study</b>                | <b>Research focus</b>   | <b>Sample size</b>  | <b>Analysis method</b>                        | <b>Results</b>  |
|-----------------------------|---|---|---|---|
| Harvie <i>et al.</i> (2010) | Some firms' characteristics determine greater ASEAN SME participation in production networks.               | About 350 ASEAN SMEs  | Questionnaire survey; Factor analysis and SEM | Firm size, firm age, profit, and foreign ownership significantly determine the participation of SMEs in production networks, while labor productivity and location are not crucial characteristics.   |
| Kotturu and Mahanty (2017)  | Determinants of SME integration into GVCs focusing on Indian automotive component manufacturing enterprises | 62 automotive component suppliers (SMEs) of a TNC, one of the largest vehicle manufacturers in India.   | Questionnaire survey and factor analysis      | SMEs producing auto components revealed that competitiveness on "quality" is the most important priority, followed by competitiveness on "cost". The remaining priorities, in descending order of importance, are "time", "innovation", "flexibility", "reliability" and "service".   |
| Lu <i>et al.</i> (2018)     | The impact of financial capability on GVC participation in some Asia countries                              | 200,000 firms in some Asia countries from 2000 to 2006.   | An econometric analysis for PRC firms         | Firm size, R&D, market concentration, processing trade, SOEs, foreign firms, and H–M–T firms positively affect a firm's GVC participation, while firm age has a negative impact.  |
| Nguyen (2019)               | Factors influencing the participation of Vietnamese small and medium enterprises in the GVC                 | 2,600 enterprises in Vietnam in 2015, including individual business households, private enterprises, partnerships, cooperatives, limited liability companies, joint stock companies | Factor analysis                               | Firm size, Technological innovation, and Business environment contribute to promoting the participation of enterprises in the chain. Meanwhile, Firm age and Ability of finance assessment have no significant impact on a firm's GVCs participation. Regarding business types, limited liability accompanies account for the highest participation rate in the chain, whereas the group of individual business households has the lowest involvement rate. |

**Table 1.** Critical studies on influencing factors on GVC participation (*continued*)

| Study                                   | Research focus   | Sample size  | Analysis method | Results   |
|---|--|--|-----------------|---|
| Torres de Oliveira <i>et al.</i> (2021) | Factors affecting the export activities of Vietnamese enterprises, thereby influencing their GVCs participation. | Approximately 2,600 privately owned manufacturing firms from 2005 to 2015, located in 10 cities and provinces in Vietnam | PSM             | All the verified characteristics have a significant influence on Vietnamese enterprises' exports. |

**Source:** Authors' compilation

As shown in Table 1, the selection of variables for the research model of influencing factors typically focuses on four business characteristics that significantly impact an enterprise's participation in GVCs: firm size, firm age, FDI capital proportion, and technological capabilities. Many studies have demonstrated that the size of an enterprise contributes to an increase in its activities in the chain (Verwaal and Donkers, 2002; Monteiro *et al.*, 2013; OECD, 2015; Krammer *et al.*, 2018; Banga, 2019). Similarly, the operation time of a firm is also a control variable of its business results. More years of operation contribute to the accumulation of experience for enterprises, boosting their export activities and involvement in the chain, according to Krammer *et al.* (2018). According to many studies, firm age's influence is negative as young businesses are frequently more active and have a stronger propensity to participate in the chain (Cieslik *et al.*, 2014; Banga, 2019). In addition, Tran (2018) argues that the rapid expansion of globalization, internationalization, and integration has led to closer connections between nations along the GVC through FDI. In terms of technological capability, by applying advanced technologies, specifically digital technology, SMEs have been expanding their networks and delving deeper into GVCs (Banga, 2019).

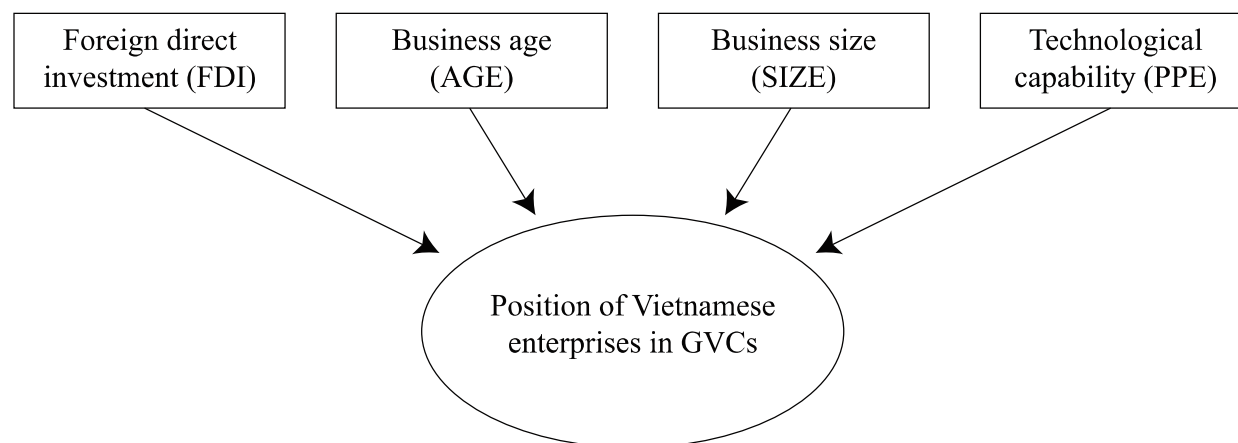
Regarding the research methods, the econometrics model and SEM have been used by Harvie *et al.* (2010), Arudchelvan and Wignaraja (2015), Urata and Baek (2020) to analyze the impact of factors affecting the participation level of enterprises in GVCs. These methods are highly effective in testing an economic theory by building economic models. Based on the estimation results with a specific sample, we can evaluate the relationship between the dependent and independent variables in the model. Meanwhile, other studies used the propensity score matching (PSM) method (Torres de Oliveira *et al.*, 2021) to estimate the effect of a solution or an intervention by matching the treatment and control observations. Torres de Oliveira *et al.* (2021) consider engaging in a particular activity, for instance, innovation, as participation in one intervention practice that has the consequence of changing the exporting probability. Therefore, PSM is only acceptable when comparing innovation and non-innovation trends to assess a company's export performance. In addition, applying PSM facilitates the estimation of propensity scores of binary variables and exports.



Regarding research data, two types of data are used in the model: primary and secondary. For primary data, several studies have designed questionnaires for enterprises to retrieve information, such as those of Harvie *et al.* (2010) and Kotturu and Mahanty (2017). However, the making of questionnaires is still limited in the studies since it takes time to ask questions and receive responses from businesses, prolonging the research duration. Additionally, creating a questionnaire for companies worldwide that will yield accurate data while minimizing errors is exceedingly challenging. Consequently, to ensure the accuracy of the results, studies usually prioritize the use of secondary data compiled from reliable national and global sources and organizations, as in studies done by Arudchelvan and Wignaraja (2015), Urata and Baek (2020), Torres de Oliveira *et al.* (2021).

In Vietnam, recent studies related to the analysis of factors influencing Vietnam's position in the GVC have also received the attention of many scholars (Nguyen, 2019; Luu, 2020; Tran, 2021). Most of these studies use qualitative methods such as synthesis, comparison, and analysis to identify the influencing elements and propose solutions to promote participation in GVC in some typical industries of Vietnam. Nevertheless, there are relatively few empirical studies on the factors influencing the position of Vietnam in GVC from the government and macro perspective. Some of them have referred to several meaningful variables that significantly affect the role of Vietnam in the GVCs. Those factors include foreign ownership, especially the proportion of FDI capital, favorable financial access, firm size, firm age, and the innovation of technology.

In this study, we evaluate the variables influencing the position of enterprises in GVC in three crucial industries of Vietnam: the automobile production and assembly, electronics, and textile industries. Based on the literature review on GVCs, a multiple linear regression model is proposed to illustrate the dependent relationship between the position of Vietnamese enterprises in the GVCs and significant determinants, including the proportion of FDI capital in enterprises, business size, business age, and technological capabilities. More specifically, a theoretical framework is proposed for studying elements influencing the participation of Vietnamese enterprises in GVCs as follows:



**Figure 1.** Conceptual framework model

**Source:** Authors' suggestion

### 3. Data and methodology

#### 3.1 Model specification

In this study, to evaluate the factors influencing Vietnam's enterprise positions in GVCs in chosen industries, we considered an enterprise's GVC participation as the variable depending on a group of independent variables (enterprise factors). The measurement variables are presented respectively as follows.

##### *Dependent variable*

The dependent variable (GVC) represents the position of Vietnamese enterprises in GVC. In other words, it is an index that measures the value of imported inputs in a country's total exports. The higher this index is, the higher the position of that country gets in GVC. This choice is consistent with previous studies in this field, such as Arudchelvan and Wignaraja (2015), Urata and Baek (2020).

##### *Independent variable*

Based on a comprehensive literature review on groups of factors influencing, this study considers four independent variables in the model, including foreign direct investment (FDI), business size (SIZE), business age (AGE), and technological capability (PPE). To achieve underlying factors, we implemented panel data analysis as deployed in the research of Ines (2019). As a result, we came up with the multiple linear regression model to analyze the factors influencing the position of Vietnamese enterprises on the GVCs as follows:

$$GVC = \beta_0 + \beta_1 FDI + \beta_2 \ln SIZE + \beta_3 \ln AGE + \beta_4 \ln PPE + \epsilon. \quad (1)$$

The SIZE, AGE, and PPE values were transformed into natural logarithms to ensure a normal distribution, while the GVC and FDI variables already in percentage form do not need to be transformed. Three regression methods include the pooled ordinary least squares model, fixed effects model (FEM), and random effects model (REM) used to determine the factor influencing the position of enterprises in the GV. The difference between FEM and REM models lies in whether the characteristics of the observations are random or fixed. If the characteristics or differences between observations are random, then the REM model will be more suitable, and vice versa. However, determining whether these characteristics are random or fixed is tricky. Therefore, to choose between REM and FEM, it is necessary to conduct the Hausman test to select the better model.

#### 3.2 Data

The study uses panel data, cross-section data, and time series. The reliable secondary data sources published by Vietstock Securities Company and public annual financial statements of enterprises focusing on automobile production and assembly, electronics, and textile industries were collected. To ensure the validity and consistency of the research data, the authors only selected enterprises listed on the Vietnamese stock market. In 2020, according to statistics of Vietstock Securities Company, there are 52 listed enterprises operating in these three sectors



in total. More specifically, there are 8 automotive enterprises, 8 electronics enterprises, and 36 textile enterprises. Therefore, for this study, all these 52 enterprises will be the focus of data collection. The data were collected from 2016 to 2020. Therefore, the total number of observations is 208.

The value of goods produced by the enterprise itself, known as “Trade in Value Added” (TiVA), was employed for the estimation of the participation of enterprises in GVC (Nguyen and Chaudhary, 2019). Specifically, TiVA engaged in the import and export process, and the added value part in trade will be calculated as the excess between the export value of the final product and the import value of the raw materials. Therefore, for this study, the position of enterprises in GVC is roughly estimated as follows:

$$GVC = \frac{(Export\ turnover\ of\ final\ products - Import\ turnover\ of\ raw\ materials)}{Export\ turnover\ of\ final\ products}$$

FDI data are measured by the percentage of FDI in the capital structure of an enterprise. Enterprise size (SIZE) is measured by the equity of the enterprise. The age of the business (AGE) is the time from the date of establishment of the business to the end of 31 December 2020. The technological capability of the enterprise (PPE) is measured by the value of the enterprise's fixed assets.

**Table 2.** Description of independent variables and their expected impact

| Variables   | Variable description       | Source                                     | Empirical studies and their impact   | Expected impact |
|-------------|----------------------------|--|--|-----------------|
| <b>FDI</b>  | The FDI capital proportion | Data from Vietstock securities company     | (+): Helpman (1984); Helpman and Krugman (2005); Kaplinsky and Readman (2001); OECD (2015); Krammer <i>et al.</i> (2018); Tran (2018); Banga (2019)                        | +               |
| <b>SIZE</b> | Business size              | Annual financial statements of enterprises | (+): Wiklund and Shepherd (2005); Arudchelvan and Wignaraja (2015); Krammer <i>et al.</i> (2018); Lu <i>et al.</i> (2018); Dang (2019)<br>(-): Harvie <i>et al.</i> (2010) | +/-             |
| <b>AGE</b>  | Business age               | Data from Vietstock securities company     | (+): Krammer <i>et al.</i> (2018)<br>(-): Wiklund (1999); Hossain and Reaz (2007); Wignaraja (2012); Arudchelvan and Wignaraja (2015); Lu <i>et al.</i> (2018)             | +/-             |
| <b>PPE</b>  | Technological capability   | Annual financial statements of enterprises | (+): Gereffi (1994); Vu (2018)   | +               |

**Source:** Authors' compilation

We employed data on product export turnover, import turnover of raw materials, and FDI collected from Vietstock Securities Company. Meanwhile, the data, including the age of the enterprise, the size of the enterprise (measured by equity), and the technological capability (shown by the primary price of fixed capital), are collected from annual reports and audited consolidated financial statements on websites of companies listed on HOSE and HNX.

## 4. Results

### 4.1 Descriptive statistics

The descriptive statistics method gives a specific view of the observed variables. This method uses basic measurement criteria: mean value, standard deviation, minimum value, and maximum value to clarify the characteristics of the observed variables in the research sample. The results of descriptive statistics are presented in Table 3.

**Table 3.** Descriptive statistics

| Variables | Observation | Mean     | Std. Dev. | Max      | Min      |
|-----------|-------------|----------|-----------|----------|----------|
| FDI       | 208         | 4.85e+08 | 1.15e+09  | 30000    | 6.10e+09 |
| SIZE      | 208         | 270.300  | 30.539    | 600.539  | 70.390   |
| AGE       | 208         | 8.621    | 2.578     | 30.100   | 5.013    |
| PPE       | 208         | 105.13   | 36.0143   | 11.75404 | 180.1483 |

**Source:** Authors' calculation

### 4.2 Model correlation analysis

The Pearson test was employed to determine the correlation between variables. The correlation analysis results show that all the independent variables are related to the dependent variable. Simultaneously, there are no independent variables correlated with each other. Therefore, all the variables are kept for further study. It can also be seen that there is almost no multicollinearity. As a result, when testing the model's defects, we can ignore the multicollinearity test (VIF).

**Table 4.** Description of model correlation

|        | GVC    | FDI    | lnSIZE | lnAGE | lnPPE |
|--------|--------|--------|--------|-------|-------|
| GVC    | 1.000  |        |        |       |       |
| FDI    | 0.030  | 1.000  |        |       |       |
| lnSIZE | 0.026  | 0.012  | 1.000  |       |       |
| lnAGE  | -0.051 | -0.040 | 0.155  | 1.000 |       |
| lnPPE  | 0.225  | 0.102  | 0.063  | 0.092 | 1.000 |

**Source:** Authors' calculation

The FEM model has a confidence level of 53.59%, which means that the independent variables can explain 53.59% of the alteration of the dependent variable; the rest is explained

by several other factors. There are two variables, FDI and lnSIZE, which are not significant at a 5% level. In other words, the FEM model results in FDI and business size have no impact on the position of enterprises in GVC.

The REM model has a confidence level of 62.57%, which means that the independent variation in the model can explain 62.57% of the alteration of the dependent variable. The rest is explained by several other factors. Through the coefficient  $P > |z|$  of the REM model, the REM model gives statistically significant FDI and lnSIZE variables while the lnAGE variable is not statistically significant. In other words, the age of the business does not explain the position of the enterprise in GVC.

According to the Hausman test, we get the coefficient Prob>chi2 value of 0.0673 and less than 0.05. Therefore, the chosen model is the REM model. Besides, the defect tests of the model show that the REM model does not have defects. The result of the REM model is the final result of the factors influencing Vietnam's position in GVC of the automotive, electronics, and textile industries.

**Table 5.** Final model result

| R-squared = 62.57% |   |                       |        |
|--------------------|---|-----------------------|--------|
| Variables          | Correlation coefficient with the dependent variable | Level of significance | Impact |
| <b>FDI</b>         | 0.153   | 0.038                 | ++     |
| <b>lnSIZE</b>      | 0.030   | 0.002                 | +      |
| <b>lnAGE</b>       | -0.037  | 0.607                 | 0      |
| <b>lnPPE</b>       | 0.294   | 0.000                 | +++    |
| <b>Cons</b>        |   |                       | -8.563 |

**Source:** Authors' calculation

## 5. Discussion and policy implications

### 5.1 Discussion

Firstly, the variable of technological capacity of enterprises (PPE) has a positive regression coefficient and is the second largest among the model variables. This suggests that technology has an outstandingly positive impact on the position of a business in GVC. Accordingly, advanced technology allows enterprises to master the stages of creating high-added value in GVC, such as design and production of input materials, instead of only low-added value stages, such as processing and assembling. As a result, technology innovation will enable businesses to improve their position in GVC. This is also entirely compatible with the development context of Vietnam's key manufacturing industries, where enterprises are making great efforts to improve their position in the GVCs by developing new products based on their strengths, adhering to the strict market criteria, and producing in a sustainable, green,

and clean environment. Hence, businesses must constantly incorporate technology into each product to achieve this goal (Song and Wang, 2016).

The result of this study complements the argument of Vu (2018) that owning modern machinery technology makes the business less likely to be replaced by others. Therefore, it can allow enterprises to participate in higher stages of GVC. These three industries (automobile production and assembly, electronics, and textile) are all manufacturing. As a result, the technological aspect, reflected in the machinery and equipment, is an inseparable factor in production. This partly explains the profound influence of the enterprise's technological capability (PPE) on the position of businesses in GVC. Hence, improving technological capacity is essential in the automobile production and assembly, electronics, and textile industries to enhance the position of enterprises in GVC.

Secondly, FDI has a positive regression coefficient and is the second-largest among the model's variables. This implies that FDI can help businesses improve their position in GVC. This result is consistent with the studies of Krammer *et al.* (2018) and Banga (2019). In addition to providing domestic businesses with capital, FDI helps them develop human resources and technological capabilities, enhance competitiveness, and link production through channels of spillover effects (Krammer *et al.*, 2018). There are insufficient domestic raw materials, spare parts, and components for production in Vietnam's leading industries, such as electronics, textiles, automobile manufacturing, and assembly. As a result, the aforementioned manufacturing sectors rely heavily on imported raw materials, which results in low productivity production and high costs. For this reason, attracting FDI into supporting industries for the aforementioned sectors would lay a significant foundation for lowering production costs and enhancing product quality, thereby strengthening Vietnam's position in GVCs.

Besides, the electronics, automobile, and textile industries primarily consist of SMEs with a shortage of capital. Hence, FDI enables them to approach more capital for research and development (R&D) activities and thus gain entry to high-value-added stages. According to statistics from the Vietnam Electronic Industries Association (VEIA, 2021), up to 70% of technological innovation in the electronics sector comes from foreign-invested enterprises. Simultaneously, these companies create spillover effects through all four channels, namely technology, human resources, competition, and production linked to Vietnam's electronics industry, which translates to a positive contribution to the development of this industry (Tran, 2018).

Finally, the business size variable (SIZE) has a positive regression coefficient, suggesting that business size favorably influences the firm's position in GVC. The firm size variable also appeared in the study of Dang (2019). Despite not directly studying enterprises' position in GVC, the research result shows that business size positively impacts business performance. Thus, this paper complements the findings of Dang (2019), Arudchelvan and Wignaraja (2015), and Lu *et al.* (2018). The result has been practically verified in Vietnam and other countries. Enterprises that own GVCs are large-scale corporations. These businesses possess a large amount of capital, which they invest in research and development. As a result, they

can grasp processes that require profound knowledge, such as brand positioning, marketing, and distribution. Meanwhile, Vietnamese small enterprises can frequently only perform at low-value stages, such as component assembly or sewing, based on imported raw materials.

SMEs make up most businesses in the automobile production and assembly, electronics, and textile industries. Hence, the expansion in enterprise size from year to year is not noteworthy. This explains why the SIZE variable has a positive but insignificant influence. Nevertheless, the situation in developed countries shows that large-scale enterprises such as Samsung in the electronics industry or American and European enterprises such as General Motors and Mercedes in the automotive sector control the highest value-added stages in GVC. They are primarily involved in brand positioning, product design, distribution, marketing, and sales. Meanwhile, small businesses in developing countries, such as Vietnam and India, almost only engage in the stages with low added value.

Additionally, there is a negative correlation between firm age and GVC participation, which can be explained by the fact that fledgling businesses will generally be defter than old ones in approaching and applying new production systems such as GVCs to develop and keep up with market trends. This finding follows the result of Wignaraja (2012) and Lu *et al.* (2018), who discovered a fundamentally negative association, while Harvie *et al.* (2010) supposed that there was no statistically significant relationship. These conclusions refute the thesis that old firms are more likely to participate in GVC as they can overcome obstacles with accumulated business expertise. That is because this experience may not be so pivotal for raising the level of GVC engagement. Hence, moderately young firms might occasionally find that they are more prosperous in expanding their business after participating in GVCs. In conclusion, Vietnam's position in GVC can be assessed through factors of enterprises, including FDI, business size, and technology capability.

## **5.2 Policy implications**

To improve the country's position in GVC, not only the government should promulgate measures and policies to support enterprises but the enterprises also should set up plans and strategies to promote the mentioned factors. Firstly, to address technological capacity issues, the government must set up subsidies for digital transformation for businesses, especially SMEs. With such strong support from the government, Vietnamese enterprises would have more chances to focus more on R&D activities, thereby engaging more deeply with high-value-added stages in GVCs. Secondly, strategies to attract FDI should be emphasized toward prioritizing sectors with high technological content and added value, thereby contributing partly to solving the technology issues in Vietnam. Besides attracting FDI companies to Vietnam, retaining these foreign investors is also urgent for the government. Since 2020, the COVID-19 pandemic has forced many national and local governments worldwide to eliminate barriers, restore production, and prevent supply chain disruption. The Vietnamese government should consider these issues to keep foreign investors in Vietnam for a long time. Finally, SMEs in Vietnam should strategically scale up through integration. More specifically, local SMEs should coordinate closely to achieve collective efficiency based on size (purchasing

inputs), specialization production of components and different parts of a product), and joint actions (joint marketing). This increases their “attractiveness” as suppliers by reducing transaction costs for international buyers sourcing from different companies. For example, for global suppliers in apparel, SME clusters would significantly reduce the transaction costs of collecting input materials and outputs. In more technologically complex GVCs (such as automotive and electronics parts), clustering enables the sharing of investments required by contractors in processing and upgrading products, such as purchasing and adapting new equipment, which are usually beyond SMEs’ technical or financial capabilities as individuals. Thus, joining clusters allows SMEs in the automobile production and assembly, electronics, and textile industries to scale up by combining the advantages of small size (flexibility) with the benefits of scale (economies of scale and scope). Clustering increases the efficient size of the market and reduces the cost of market access for SMEs collaborating. Furthermore, supplier clusters in specific industries may also provide a competitive advantage in location to attract GVC-related FDI.

## 6. Conclusion

Based on the panel data analysis, this study points out many factors possibly influencing the position of Vietnamese enterprises in the automobile production and assembly, electronics, and textile industries in the GVC. Among these, technological capability has been recognized as the most influential factor with a positive impact on the position of enterprises in GVC, followed by the technical capacity of enterprises, FDI, and business size. The findings suggest policy recommendations to improve the country’s position in GVC, focusing on the automobile production and assembly, electronics, and textile industries. These include typical policies such as reforming local administrative procedures transparently and effectively by accelerating digital transformation, clear commitments on technology transfer plans from FDI investors when discussing tax support policies and scaling up the SMEs through amalgamation. Although some research objectives have been achieved, this study still has drawbacks. More specifically, the sample size in this study was constrained due to limited time and financial resources. Furthermore, due to limited data, the study has not yet considered the difference in the level of impact of factors on the level of participation of enterprises in GVC of three sectors. Although this sample size is adequate to meet the model requirement, more data should be collected, and other factors (e.g., human resources) influencing the position of Vietnamese enterprises in GVC should be considered accordingly to extend this work. Even though three selected industry sectors appeared to be an ideal empirical study for analyzing the factors influencing Vietnam’s GVC participation, further research geared towards other sectors in the context of Vietnam would be useful for generalizing and enriching practical understanding of these factors. Finally, further study about the coordination level of different stakeholders possibly impacting the position of three industry sectors in GVC is also needed, which is expected to provide more in-depth knowledge on drivers that further integrate Vietnam into GVCs.

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