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Firm Characteristic Determinants of Vietnamese Textile and Garment Enterprise Participation in Production Networks

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Abstract---*This paper provides an empirical analysis of Vietnamese textile and garment enterprise participation in global production networks. Based on the overview of Vietnamese textile and garment industry and general information of Vietnamese textile and garment enterprises, it proposed a model and implemented an empirical investigation to identify firm characteristic determinants of Vietnamese textile and garment enterprise participation in production networks. It is the results of combination between some firm characteristic determinants of previous studies and specific features of Vietnamese textile and garment firms. The results suggest that firm size, productivity, foreign ownership, and human capital are the important firm characteristics that determine Vietnamese textile and garment enterprise participation in production networks.*
Keywords---*firm characteristics, garment enterprises, global production networks (GPN), production networks, Vietnamese textile.*

Introduction

In 2020, Vietnam's total export turnover reached 29,8 billion USD, up 3.7% compared to 2019. The textile and garment industry ranked third with about 35 billion USD, contributing 12.38% to total export turnover in 2020 (Ministry of Industry and Trade, 2021). Over the past decades, Vietnam's textile and garment industry has always played an important role in the development of the economy. It is generally a well accepted argument that Vietnamese textile and garment enterprises have been generating employment, alleviating poverty, and distributing wealth care, among others. Promoting a sustained and strong growth of Vietnamese textile and garment enterprises, however, has always been, and continued to be, a challenging task. Vietnamese textile and garment enterprises are inherently constrained by many obstacles such as their low financial capacity, shortage of skilled labour, high employee turnover, lack of advanced technology. They usually face much stronger business challenges relative to their foreign counterparts (Kaya, 2015; Duffield et al., 2010).

Production networks of textile and garment have been growing in popularity in the world during the past four decades (Gereffi, 1999). The textile and garment industry is a sector with a long history, which developed countries focused to boost in the first decades of the 20th century. Global apparel industry has experienced many times of moving its production since 1950. It is possible that the next transition of global apparel industry will happen from large companies of developed countries to enterprises of least developing countries such as Vietnam. It is commonly argued that global production networks do not necessarily pose a threat for textile and garment enterprises in developing countries; in fact, it could present favourable business opportunities. An ideal way for this to occur is by increasing the extent of the textile and garment firms' participation in regional production networks. A better understanding of firm characteristics that likely determine possibility of Vietnamese textile and garment firms' participations in production networks is, therefore, needed. This paper aims to propose a model of determinants affecting Vietnamese textile and garment enterprise participation in production network. Also, it suggests some of firm characteristics, analyzing the results of previous study and features of textile and garment firms in Vietnam. The rest of this paper is organised as follows. Section 2 gives overall information about Vietnam textile and garment industry and Vietnamese textile and garment enterprises. Section 3 discusses pertinent literature to provide a

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framework for the analysis and to establish some testable hypotheses. Section 4 presents the intended model for the empirical exercise. Section 5 summarizes and gives the directions of further research in future (Hendricks & Singhal, 2001; Bhushan, 1989).

Overview of Vietnam textile and garment industry and Vietnamese textile and garment enterprises

Over the past decades, Vietnam's textile and garment industry has always played an important role in the development of the economy. From 2013 to 2019, the textile and garment industry is the second largest export industry and one of the industries that always has the largest growth rate with 17% annually (Ministry of Industry and Trade, 2020). In 2019, the export value of textile and garments reached 38.8 billion USD, increasing 7.8% compared to 2018 and contributing to 14.7% of the country's total export turnover and 19% of the total GDP. In 2020, due to a shortage of raw materials, and demand slowing down from major markets such as Europe and the United States because of the Covid-19 epidemic, the export of textile and garments only reached 29.8 billion USD, achieved the third place (Ministry of Industry and Trade, 2021).

Although Vietnam's textile and garment export turnover in 2020 dropped sharply, Vietnam has reached the second largest textile and garment export position in the world. This happened because the global aggregate demand fell by about 20%, from 740 billion USD to 600 billion USD. The major textile and garment exporting countries in the world such as India and Bangladesh fell deeply from 15% to 20%. Even China's garment exports fell 6.6%. The reason was that these competitive countries were under long quarantine due to the Covid-19 epidemic, while Vietnam was the only country in the group of five largest textile and garment exporting countries in the world that had not been quarantined and had not stopped production. In addition, Free Trade Agreements have had a significant effect on minimizing order shortages (Ministry of Industry and Trade, 2021).

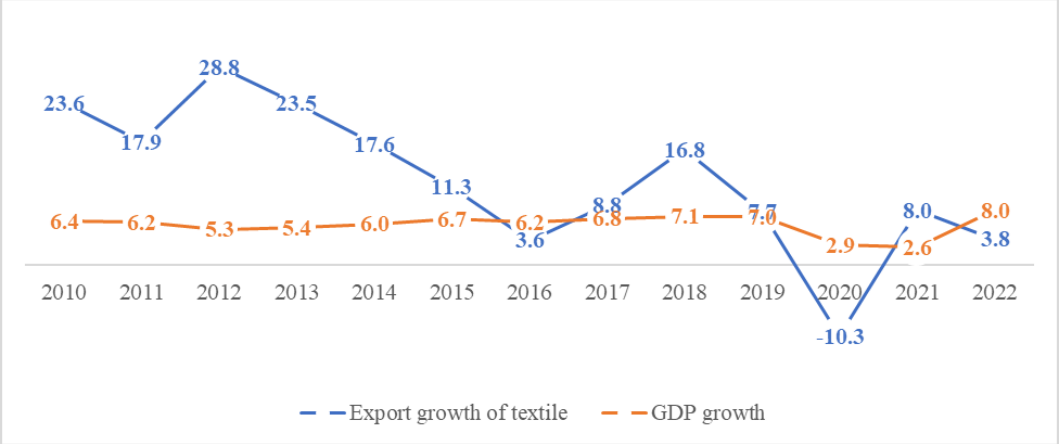

Figure 1. Vietnam's textile and garment export growth in the period 2010 – 2022
Source: General Statistics Office of Vietnam

The main export markets of Vietnam's textile and garment industry are the United States, European Union, Japan, Korea and China. According to the report of the Vietnam Textile and Apparel Association, Vietnam's export market share in the United States and European Union in 2019 both grew by 0.2% - 1.32% compared to 2018. Although the export volume to the United States in 2020 is down 5.8% compared to 2019 but for the first time in decades, Vietnam accounted for over 20% of the apparel market share in the United States. The reason was that as a result of the United States - China trade war, large brands have been gradually shifting orders from China to Vietnam (Ministry of Industry and Trade, 2021). Vietnam is currently still ranked fourth on the world map in terms of textile and garment exports, after China, the EU and Bangladesh (Ministry of Industry and Trade, 2020). The number of employees in the textile and garment industry is about three million people, accounting for over 10% of the country's industrial workers. The average annual labor growth rate is over 10%, higher than the average of all processing and manufacturing industries. With the evidence, the textile and garment industry is a key industry for the economic and social development of Vietnam (Ernst & Kim, 2002; Coe et al., 2017).

The global production network of the textile and garment industry is a production network dominated by retailers, led by retailers or major brands in the world and with the participation of many manufacturers in different regions of developing countries (Gereffi & Korzeniewicz, 1994). Since the 1980s until now, the global production

network of the textile and garment industry is opening up in both breadth and depth. In 1980 only Hong Kong, Korea, Taiwan, China and the United States were the main exporters. By 2000, new billion-dollar members of the global manufacturing network had joined including the Philippines, Bangladesh, Sri Lanka and Vietnam. Vietnam has grown rapidly, with textile and garment export turnover from 11.2 billion USD in 2010 to nearly 40 billion USD in 2019 after less than a decade (Tran, 2021).

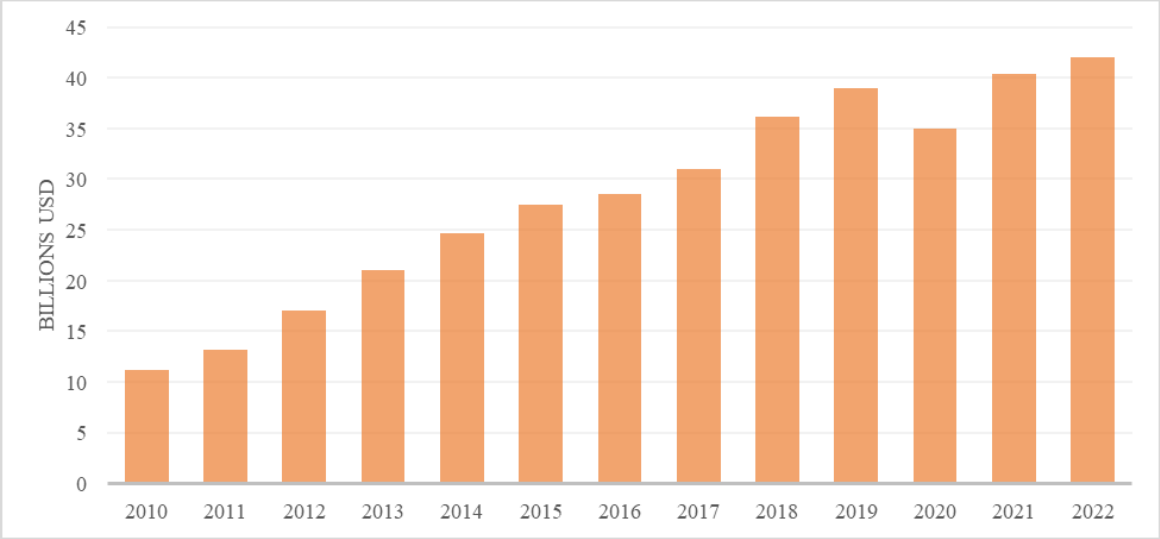

Figure 2. Export turnover of Vietnam's textiles and garment industry in the period 2010 - 2022
Source: General Statistics Office of Vietnam

The growth of export turnover of Vietnam's textile and garment in recent years has shown an increase in the level of participation of Vietnamese textile and garment enterprises in the global production network. Having this result, in addition to the development of domestic textile and garment enterprises, it is the great contribution of foreign direct investment flows to Vietnam. According to statistics, FDI enterprises accounted for nearly 70% of the export value of Vietnam's textile and garment industry (Nguyen et al., 2021). Particularly for the textile and garment industry, in 2019 the total number of textile and garment enterprises nationwide reached more than 6,000, of which the number of FDI enterprises in the textile and garment sector was 1,283, accounting for about 20%. FDI capital into textiles and garments from 2015 to now has reached over 1 billion USD, specifically in 2015 FDI capital reached a record of 4.13 billion USD with 189 projects. In 2016, FDI capital was 2.57 billion USD and the number of projects skyrocketed with 234 projects. In the next three years from 2017 to 2019, FDI in textile and garment decreased but still reached from 1.5 billion to more than 2 billion USD per year. FDI inflows into textiles and garments in recent years have been mainly poured into projects of raw materials such as weaving, dyeing, yarn, and fiber. The reason why FDI in textiles and garments has increased sharply since 2015 is because foreign enterprises have taken advantage of opportunities brought from the CPTPP and EVFTA Agreements (Linh et al., 2010).

Foreign direct investment enterprises, in addition to exporting for themselves, also help transfer technology, stimulate research and development activities of the industry, train human resources with management skills. management and high production for domestic enterprises. This helps domestic textile enterprises improve their production base; opportunities to produce higher quality goods for export. The production linkage between foreign direct investment enterprises and domestic enterprises in the textile and garment industry also helps to develop and expand the global production network. It can be said that the global textile and garment production network with the presence of foreign-invested enterprises has created a great driving force for the development of this industry in Vietnam (Timpe & Kallrath, 2000; Lanza et al., 2019).

Analytical Framework and testable hypotheses

Production processes now involve sequential production blocks that locate across countries. Different stages of production are located in different countries and undertaken by different firms, consequently products traded between different firms in different countries are components instead of final products. This phenomenon is known as fragmentation of production. Fragmentation theory focuses on the location of production processes, where

processes are fragmented or separated into multiple slices and located in different countries to lower total production costs of firms (Jones & Kierzkowski, 2005). The feasibility of fragmented production/distribution (location and by firm) in an industry is heavily influenced by the number of parts and components required in the production of the final product, the greater the variety of technologies utilized in the production of these parts and components, and the economic environment within individual countries and for the region as a whole. Like other sectors, Vietnamese textile and garment enterprises need to overcome barriers related to their size and to develop capacities enabling them to become more intrinsically engaged and competitive in global markets, in order for them to fully participate in regional production networks. Their capacity constraints, or barriers, are multi-dimensional in nature and can be usefully highlighted and explored in the context of the integrative analytical framework summarized in Figure 3. This framework with application is the case of Vietnamese textile and garment enterprise participation in production networks.

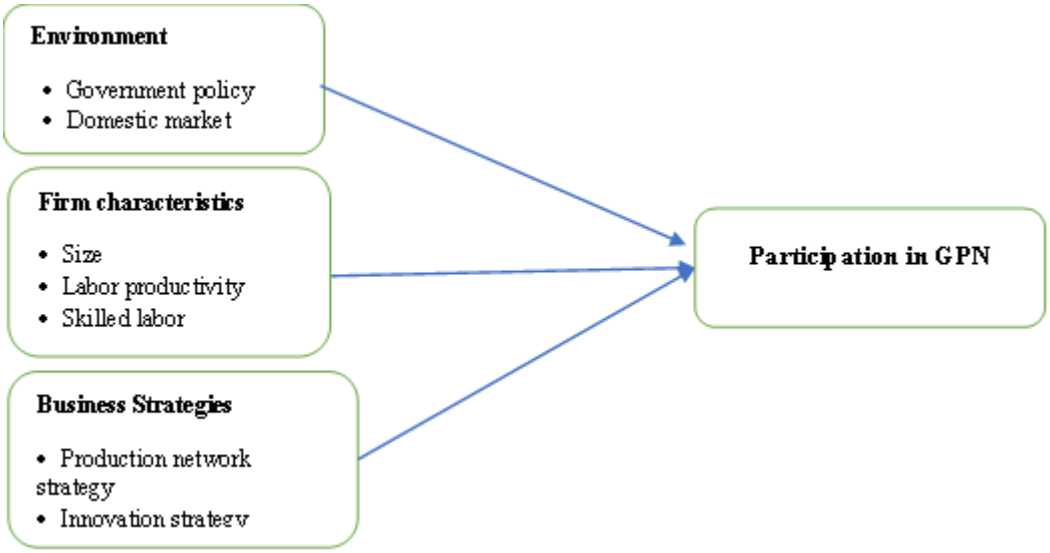

Figure 3. Proposed predictors of participation in GPN
Source: Harvie et al., 2010

Based on the framework, some hypotheses relating to firm characteristics of Vietnamese textile and garment enterprise participation in production networks are proposed. Previous studies have found various characteristics of the firms that participate in GPNs by undertaking an econometric approach, which regresses a firm's GPN participation (dependent variable) on a set of independent variables (firm characteristics). This paper adopts the same approach but extend earlier studies in several ways. First, it focuses on only one sector (textile and garment) in Vietnam, thus it adds some specific characteristics of this sector into the model. Second, it attempts to identify similarities and differences in the firm characteristics between small and medium enterprises and large firms of Vietnamese textile and garment industry in their GPN participation by explicitly considering firm sizes (Le et al., 2019; Luong et al., 2016).

Firm Size

Vietnamese textile and garment enterprises face difficulty in participating in GPNs for several reasons. First, most of Vietnamese textile and garment enterprises are SMEs which are in a disadvantageous situation vis-à-vis production and sales due to their small-scale production and sales. Thus, it is difficult for Vietnamese textile and garment enterprises to exploit the benefits arising from scale economies. Second, Vietnamese textile and garment enterprises are more constrained in terms of the availability of various resources, including financial and human resources, that are required to deal with fixed costs, such as obtaining market information for participating in GPNs. Also, it is challenging for Vietnamese textile and garment enterprises to access external funds from banks and other financial institutions as lenders would prefer to deal with large firms, which tend to borrow large amounts of funds. Previous studies, including Wignaraja (2013); Duval & Utoktham (2014); Lu et al. (2018); Herlina & Kudo (2020) found a

positive relationship between firm size and GPN participation. The author expects firm size to have a positive impact on GPN participation.

Productivity

A firm's productivity is an important factor in its participation in GPNs. This observation is supported by both theoretical and empirical studies. The theory of heterogeneous firms developed by Melitz (2003), shows that only highly productive firms can become exporters by overcoming sunk export market entry costs such as market research and advertising. In other words, productive firms self-select into the export market. A number of empirical studies have supported the prediction of the Melitz model. Amiti & Konings (2007); Mallick & Yang (2013), showed that more productive firms can become exporters in their studies of Indonesia and India, respectively. Examining US data, Bernard et al. (2007) found that importers have similar characteristics to exporters. Indeed, they found that firms that simultaneously export and import register high labor productivity. In their studies of GPN participation by firms, both Harvie et al. (2010); Lu et al. (2018) found a positive impact of labor productivity with statistical significance. Based on these earlier studies, the author expects positive impact of labor productivity on GPN participation by firms (Dewi et al., 2019; Sari & Sedana, 2020).

Foreign Ownership

Foreign ownership is hypothesized to be positively related to the textile and garment enterprises' participation in production networks. Coordinating with foreign firms is clearly a favorable strategy for any enterprise wishing to engage and perform well in production networks. This arrangement allows domestic enterprises to exploit firm-specific assets owned by the foreign partners, and hence improve the competitiveness of the enterprises in global markets. Forming a joint venture with foreign partners helps the enterprises take the advantage of technology transfer and financial support. The significance of foreign ownership, however, may depend on the share of the ownership. Foreign parent companies may restrict the transfer of the firm-specific assets if they do not hold a significant controlling interest over domestic firms. Earlier studies, including Urata & Baek (2020); Harvie et al. (2010); Wignaraja (2013), found a positive relationship between foreign ownership and GVC participation. The author expects foreign ownership to have a positive correlation.

Firm Age

One can hypothesize a positive relationship between firm age and GPN participation. Old firms are competitive as they have survived in tough competition. Old firms have accumulated experiences such as obtaining useful information about possible procurement sources of parts and components and sales destinations of their output, which would help them participate in GPN. One could alternatively postulate the opposite relation, that is, a negative correlation between firm age and GPN participation. This is because young firms tend to be more agile than old firms in adopting new production systems such as GPNs, in order to survive and grow in the market. Wignaraja (2013); Lu et al. (2018) found a significantly negative relationship, while Harvie et al. (2013) did not find any statistically significant relationship (Wouda, 2015; Hongmei & Jingyu, 2010;Li et al., 2019).

Human capital

Within a given activity, a higher level of human capital contributes to a firm's participation in production networks. Higher levels of human capital are generally linked with development of more effective business strategies and more rapid technological learning that can provide a competitive edge at enterprise-level (Van Dijk 2002; Wignaraja, 2012). Although human capital at all levels is important, in the textile and garment industry workers' education and the chief executive officer (CEO)'s education and experience are particularly significant for firms involved in production networks. A literate workforce made up of high school graduates is more productive and adaptive to new technology than one that is not. Furthermore, a CEO with a college degree or vocational training as well as work experience may have a better business attitude (i.e., in terms of risk taking or willingness to implement new business ideas). In very small firms, with few high school-educated workers, much of the firm's human capital may be reflected in the quality of the CEO's education and experience. Accordingly, the author expects higher levels of human capital—in terms of secondary level educated workers or well-educated and experienced CEOs—is positively related to participation in production networks (Gereffi, 2009; Henderson et al., 2002; Wignaraja, 2012).

Proposing a model and hypotheses for the empirical exercise
Research Model

Based on the analytical framework and testable hypotheses in previous section, the author performs a regression analyse for one dependent variable - GPN participation, five independent variables including firm size, productivity, foreign ownership, firm age and human capital. The model for empirical exercise is proposed according to Figure 4.

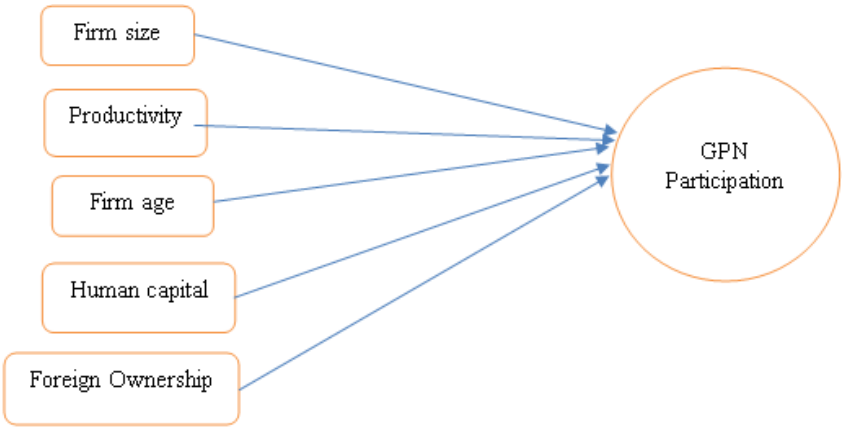

Figure 4. Model for empirical exercise

Research hypotheses

H1+: Productivity has a positive impact on Vietnamese garment enterprises' possibility to participate in the global textile production network.
H2+: Firm size has a positive impact on the possibility of Vietnamese garment enterprises to participate in the global textile production network.
H3+: Firm age has a positive impact on the possibility of Vietnamese garment enterprises to participate in the global textile production network.
H4+: Foreign ownership has a positive impact on the possibility of Vietnamese garment enterprises to participate in the global textile production network.
H5+: Human capital has a positive impact on the possibility of Vietnamese garment enterprises to participate in the global textile production network.

Methodology

Questionnaire and Sample

Empirical work documented in this paper is based on the results of a questionnaire survey conducted during two months at the end of 2022. The sample size is 202 Vietnamese garment firms located in Hanoi, Haiphong, Haiduong and Thaibinh. The questionnaire aimed at collecting information on characteristics of Vietnamese garment firms, and the perceptions of their managers. The survey include: Part 1 – Enterprise information includes information such as business name, year of establishment, total capital of the enterprise. Part 2 – Evaluation of factors affecting the participation in the global production network of Vietnamese garment enterprises: assess the degree of agreement of the respondents with each statement – are the research scales of the respondents. independent variable belonging to the group of factors outside the enterprise. Respondents will rate the statements on a 5-point Likert scale: (1) Strongly disagree, (2) Disagree, (3) Normal, (4) Agree, (5) Strongly agree (Zhang et al., 2016; Yuhua & Bayhaqi, 2013; Zhu & He, 2018; Zhu & Pickles, 2014).

Statistical Method

The Binary Logistic binary regression equation is expressed as:

$$\log_e = \left[\frac{P_i}{1-P_i}\right] = B_0 + B_1X_1 + B_2X_2 + \ldots + B_kX_k$$

Pi: Probability that Vietnamese garment enterprises join the global production network
B0, B1,… Bk: regression coefficient
X0, X1,… Xk: independent variable

A huge application of the Binary Logistic Regression model is its predictive ability. From the regression equation, the predictive function model equation is determined as follows:

$$P_i = E(Y = 1/X) = \frac{e^{(B_0 + B_1X_1 + B_2X_2 + \ldots + B_kX_k)}}{1 + e^{(B_0 + B_1X_1 + B_2X_2 + \ldots + B_kX_k)}}$$

Where Pi = E(Y = 1/X) = P(Y = 1) is called the probability for Vietnamese garment enterprises to participate in the global production network (Y = 1) when the independent variable X is valued at specific value Xi .

Measurement of variables

Firm size (SNHD) is represented by the number of employees. This is commonly used in empirical work as other measures like value-added or output are more susceptible to variations in macroeconomic conditions. Foreign ownership (VNN) is captured by a dummy variable which takes a value of 1 if the firm has any foreign equity. Human capital (TDLD) is proxied by the following variables: (i) a dummy variable which is 1 if the average production worker has high school education; (ii) four dummy variables to capture different levels of educational attainment of the CEO from primary schooling to college education; and (iii) the number of years of work experience of the CEO. In line with the hypothesis on human capital, these variables attempt to capture the average quality of education of workers and the CEO. In addition, the CEO's experience is included. Productivity (NSLD) is proxied by output per unit of labour. Output is proxied by the sales revenue of firms (Abonyi, 2005; Coe & Yeung, 2019; Coe et al., 2008).

Results and Conclusion

Results

Table 1
Regression coefficients

	B	*S.E.*	*Wald*	*Df*	*Sig.*	*Exp(B)*
NSLD	.001	.001	3.923	1	.048	1.001
QMDN	.001	.000	8.192	1	.004	1.001
SNHD	-.031	.032	.925	1	.336	.969
VNN	1.395	.435	10.260	1	.001	4.033
TDLD	.012	.006	4.377	1	.036	1.012
Constant	-5.439	1.791	9.221	1	.002	.004

a. Independent variables: NSLD, QMDN, SNHD, VNN, TDLD.

The results of Table 1 show that most of the independent variables have a statistically significant impact on the dependent variable (Sig value is less than 5% significance level), except for 01 independent variables, SNHD. The results of the hypothesis testing in the model are summarized in Table 2.

Table 2
Summary of model hypothesis testing results

Hypotheses		Conclusion *(at 5% significance level)*
H_1	Productivity has a positive impact on the posibility of Vietnamese textile and garment enterprises to join the global production network.	Accepted
H_2	Firm size has a positive impact on the possibility of Vietnamese garment enterprises to participate in the global textile production network	Accepted
H_3	Firm age has a positive impact on the possibility of Vietnamese garment enterprises to participate in the global textile production network	Declined
H_4	Foreign ownership has a positive impact on the possibility of Vietnamese garment enterprises to participate in the global textile production network	Accepted
H_5	Human capital has a positive impact on the possibility of Vietnamese garment enterprises to participate in the global textile production network.	Accepted

The regression equation for the research model of the topic can be represented as follows:

$$Ln[P/(1-P))] = -5.439 + 0.001*QMDN + 1.395* VNN + 0.012*TDLD + \varepsilon \text{ (error)}$$

Table 1 has a rather important data column for the results of the logistic regression model, which is the Exp(B) column, which is the odds-ratio for each factor in the model. This ratio measures the change in the prediction probability (risk of occurrence Y) for a 1 unit change in the variable X. It can be understood as: each unit change of X corresponds to the risk (probability) occurs Y increases/decreases Exp(b) times. In this way, the regression results can be interpreted for each independent variable that has a statistically significant impact on the dependent variable in the model as follows:

1. HD has coefficient b > 0, Exp(B) = 3.101; like so: the higher the HD, the higher the probability of participation, the probability of participation will increase 3,101x for every extra HD point.
2. QL has coefficient b > 0, Exp(B) = 3.022; so: the higher the QL, the higher the probability of participation, the probability of participation will increase 3,022 times for each additional QL point.
3. NSLD has coefficient b > 0, Exp(B) = 1.001; so: the higher the NSLD, the higher the probability of participation, the probability of participation will increase by 1,001 times for each additional NSLD point.
4. QMDN has coefficient b > 0, Exp(B) = 1.001; so: the higher the QMDN, the higher the probability of participation, the probability of participation will increase by 1,001 times for each additional QMDN point.
5. VNN has coefficient b > 0, Exp(B) = 4.033; so: the higher the VNN, the higher the probability of participation, the probability of participation will increase by 4,033 times for each additional VNN point.
6. TDLD has coefficient b > 0, Exp(B) = 1,012; so: the higher the TDLD, the higher the probability of participation, the probability of participation will increase 1,012x for each additional TDLD point.

Conclusion

This paper has provided an empirical study on the participation of Vietnamese textile and garment enterprises in production networks. It has attempted to reveal key firm characteristic determinants of Vietnamese textile and garment enterprise participation in production networks. It builds on the analytical framework that considers the mechanics of production networks as well as the capability and capacity of Vietnamese textile and garment enterprises in overcoming the barriers from their disadvantages. The descriptive and econometric analyses suggested that productivity, foreign ownership, firm size and human capital are the important firm characteristics that determine Vietnamese textile and garment participation in global production networks.

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