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Digitalization and Global Value Chain Participation: Microdata Evidence from a Transitional Country

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Abstract

In the context of Fourth Industrial Revolution, digitalization has been recognized as a key driver of long-term development in developing countries. This study aims to explore the impact of digitalization on the global value chain (GVC) participation of Vietnamese enterprises between 2005 and 2023. Utilizing a probit model, the findings show that digitalization positively affects firms' GVC participation. The results are robust across various definitions of GVC participation. The study also finds that labor productivity, costs at custom gates, and import licenses play important roles in promoting firms engaged in GVCs. Meanwhile, firm age does not have significant effect on GVC engagement. Regarding heterogeneous effects, digitalization has a more profound effect on medium-sized firms than on large ones. Based on these findings that we propose several policy implications to encourage Vietnamese firms to adopt digitalization and deepen their involvement in global value chains.

Keywords: Digitalization, global value chains, Vietnam.

JEL: F14, F15, F23.

1. Introduction

In recent years, the rapid development of digitization has laid a solid platform for innovation in many aspects of the global economy. Without exception, international trade among countries has experienced a great transformation. Digitalization allows enterprises to narrow geographical barriers, and reduce market entry costs, thereby facilitating connectivity with global markets (Cassetta et al., 2020). As a result, firms' relationship with foreign suppliers, distribution networks, and customers are strengthened, creating a strong foundation for firms to engage in global value chains (De Marchi et al., 2018; Jean et al., 2010).

Global value chains refer to fragmented production processes with different stages taking place across various countries (Antràs, 2020). According to Korwatanasakul and Hue (2023) and Hoang et al. (2025a),

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global value chains offer opportunities for enterprises to upgrade quality, obtain financial stability, promote efficiency and improve competitiveness. Furthermore, global value chains is considered as a powerful mean for technological transfer (Rigo, 2021). Therefore, by participating in GVC, firms can get greater access to international knowledge and technological know-how, which is a crucial driver contributing to their long-term growth (Adeyeye et al., 2013; Fernandez-Stark & Gereffi, 2019; Pan et al., 2024).

Since digitalization and global value chains play important roles in the development of enterprises, the relationship between them has attracted a lot of interests from scholars across the world (Foster & Graham, 2017; Gopalan et al., 2022; Reddy & Sasidharan, 2023). However, research on the impacts of digitalization on global value chains participation in Vietnam remains scarce. Unlike the work of Vu et al. (2022), we utilized a dataset of 4,224 Vietnamese enterprises to explore this nexus throughout four time periods, including 2005, 2009, 2015, and 2023. We show that digitalization positively affects GVC participation. The results are robust across various definitions of GVCs. The paper also finds that labor productivity, costs at custom gates, and import licenses play an important role in promoting firms engaged in GVCs. Meanwhile, firm age has no obvious influence on GVC engagement. Regarding heterogeneous effects, digitalization has more profound effects on medium firms than on large enterprises. Accordingly, we offer several policy recommendations aimed at promoting digital adoption among Vietnamese enterprises and enhancing their participation in global value chains.

The remaining sections of this study are structured as follows. Section 2 provides the literature review. Section 3 describes the methodology and data. In Section 4 and 5, we present the empirical findings and conclusions, respectively.

2. Literature review

Rahman (2003) investigates the role of internet on supply chain management using a questionnaire survey of 140 Indian enterprises and discovered that internet is a powerful channel for promoting interactions between customers and suppliers, thereby stimulating supply chain restructuring. As one of the first studies, this work has motivated several scholars throughout the world to dig deeper into the relationship between digitalization and global value chain. For example, Chen and Kamal (2016) explore how information and communication technology effects US multinational corporations' decisions to reorganize production across national borders by analyzing a transaction framework. The findings show that adopting ICT allows corporations to expand production fragmentation by cutting internal and external coordination expenses. This finding is strengthened by the research by Fort (2017), highlighting a positive link between technology and production fragmentation.

Focusing on East Africa, Foster and Graham (2017) utilize a qualitative method to examine the influence of digitalization on GVC participation of Rwandan tea companies and found that digital infrastructure plays an important role in boosting these firms' deeper involvement in global value chain. Applying a similar research approach, Foster et al. (2018) analyze how internet connectivity impacts GVC engagement of enterprises in three sectors, namely tea, tourism, and business process outsourcing, in Kenya and Rwanda. Their findings indicate that improved internet

access provides opportunities for enterprises to participate in GVCs.

Using unbalanced panel data for 4875 Indian manufacturing enterprises from 2001 to 2020, Reddy and Sasidharan (2023) demonstrate that there is a positive relationship between digitalization and GVC participation. In addition, they also provide strong evidence that small firms and those in low-technology industries seem to gain more advantages since digitalization encourages their integration into a global value chain. Similar outcomes are observed for the case of Spain (Sanchis Llopis et al., 2024), emphasizing that digitalization has both direct and indirect impacts on firms' GVC involvement.

From a broader perspective, Gopalan et al. (2022) investigate the importance of digitalization in deepening GVC participation by employing database from 52 developing nations between 2006 and 2018. The empirical findings reveal that digitalization has a positive impact on GVC participation, implying that higher levels of digitalization lead to greater GVC participation. Additionally, digitalization not only benefits large organizations, but also facilitates the integration of financially constrained firms and those located in small agglomerations into GVCs. Sharing the line of research, other scholars have supported these outcomes (Gniniguè et al., 2023; Korwatanasakul, 2023). Investigating 27 African countries over the period of 2005-2018, Nasser and Ouerghi (2023) find that digital infrastructure and skills serve as key drivers of GVC participation in these nations. However, their effects differ across backward and forward GVC participation. If digital skills fall below a specific threshold, digital infrastructure has a negative impact on both forward and backward GVCs. In contrast, when digital skills exceed the threshold, digital infrastructure has only a positive effect on backward linkage. Meanwhile, regardless of the digital infrastructure level, digital skills have a consistent and considerable impact on African countries' participation in GVCs.

More recently, Ha (2024) applies multiple econometric techniques to explore how digital business affects global value chain participation in 25 European countries from 2012 to 2019. The findings indicate that the impact of digitalization on GVCs presents an inverted U-shape. This suggests that rising digitization pervasiveness creates additional risks and uncertainties, prohibiting participation in GVCs. Nonetheless, if the prevalence of digitalization rises above a certain level, GVC activities will expand. Additionally, Fan et al. (2024) emphasize that the digitization of services enhances significantly GVC involvement while investigating 17 manufacturing industries in 65 nations from 2000 to 2018.

In the context of Vietnam, Vu et al. (2022) use data from 12,317 small and medium-sized enterprises to examine the relationship between information technology and integration into global value chains. Their findings reveal that increased information technology enables micro-, small-, or medium-sized enterprises operating in high-quality business environments to engage more deeply in GVCs. However, there is no discernible influence of information technology on GVC involvement for micro-sized enterprises in a low-quality business environment, implying that IT usage may not promote these firms to participate in GVCs.

In sum, there has been relatively little research on how digitalization affects GVC participation of Vietnamese enterprises. As a result, our research focuses on analyzing this relationship, providing policy recommendations

for managers and policymakers to encourage enterprises to adopt digitalization while promoting them to participate in global value chains.

3. Methodology

Data

In this study, we utilize firm-level data retrieved from the World Bank Enterprise Surveys (WBES) to investigate how digitalization impacts GVC participation. This comprehensive database offers a rich source of economic information across multiple countries from 2005 to 2023, capturing general and detailed information of enterprises, including trade activity, innovation, research and development (R&D), institutional frameworks, taxation and regulations, competition, business finance, and challenges to doing business and among others. Focusing on the case of Vietnam, we analyze the key variables of interest, digitalization and GVC participation, along with other control variables in the four-year time frames of 2005, 2009, 2015, and 2023.

Specification model

To explore the impacts of digitalization on GVC participation, we employed a probit panel model following previous literature such as Korwatanasakul (2023) and Gopalan et al. (2022). The empirical specification has the form below:

$$GVC_{it} = b_0 + b_1 digitalization_{it} + b_2 X_{it} + z_j + z_t + e_{i,t} \quad (1)$$

Where, *i* and *t* denote firm and year, respectively. *GVC* is the probability of firm *i* participating in global value chains. The variable *digitalization* is a key independent variable that represents the digitalization transformation of a firm. Meanwhile, X is a vector of control variables that comprises firm characteristics such as firm age (*firmage*), productivity (*lnproductivity*), custom clearance (*custom*) and import licenses (*importlicense).* z_t and z_j are dummy year-fixed and individual-fixed effects, respectively. *e* is standard errors.

Dependent variable

In literature, firms' GVC participation is defined more broadly, requiring detailed information on export and import quantities and values, destination markets, ownership structure, and import and export licenses. According to Delera et al. (2022) and Reddy and Sasidharan (2023), there are four common definitions to identify the GVC participation of firms as follows:

1) *gvc1*: the variable *gvc1* takes a value of 1 if the firm simultaneously imports inputs, and exports final goods, or two-way trader; otherwise, it takes a value of 0.
2) *gvc2*: the variable *gvc2* takes a value of 1 if the firm simultaneously imports inputs, and exports final goods, and has received an international quality certification; otherwise, it takes a value of 0.
3) *gvc3*: the variable *gvc3* takes a value of 1 if the firm simultaneously imports inputs, and exports final goods, and at least 10 percent of its total shares are occupied by foreign investors; otherwise, it takes a value of 0.
4) *gvc*: the variable *gvc* takes a value of 1 if the firm all together imports inputs, and exports final goods, receives an international quality certification, and at least 10 percent of its total shares are occupied by the foreign investors; otherwise, it takes value of 0.

It is straightforward to indicate that the last definition of GVC participation is the strictest one, representing the most precise position of firms in GVCs. Therefore, we will index an enterprise participating in GVCs if the firm all together imports inputs, and exports final goods, receives an international quality certification, and at least 10 percent of its total shares are occupied by foreign investors. To check whether the GVC measurements are sensitive to our estimated outcomes, we also provide estimations for alternative GVC definitions as mentioned previously. However, the economic interpretations are based on the estimated results with the variable *gvc* only, and others are for reference.

Independent variable

There are a wide range definitions of digitalization and digitization process/ transformation of a firm in the existing literature. Generally, digitalization is the use of digital technologies or applying the necessary requirements and technical interpretation to digital technologies. More specifically, digitalization can be defined as the use of various operating systems, distributed systems, cloud computing, block chain or smart contracts, machine learning, artificial intelligence, or web-based application. Following the previous notable works by Rahman (2003), Ahmad et al. (2011), Hagsten and Kotnik (2017) and Vu et al. (2022), we construct digitalization variable (*digitalization*) as the use of internet as a proxy of web based applications. Specifically, *digitalization* equals 1 if a firm uses a website to interact with clients and support its operation, otherwise it equals 0.

Other control variables

To examine whether firm characteristics could influence the probability of firms engaging in global value chains, some control variables are added to our regression. According to Minetti and Zhu (2011), older enterprises frequently have stronger relationships with trading partners and suffer from lower sunk costs when entering overseas markets, facilitating their participation in GVCs. This implies that larger enterprises are more likely to become GVC enterprises (Gopalan et al., 2022; Urata & Baek, 2020). In contrast, Upward et al. (2013) discover that young firms tend to be more adaptable to new production modes due to increased competition for survival, giving them an advantage. Since the impact of this indicator remains a controversial resource, it is necessary to analyze firm age for the case of Vietnam. *Firmage* is calculated as the number of years that a firm has been in operation. Additionally, it is more easier for productive enterprises to participate in global value chains (Gopalan et al., 2022; Melitz, 2003). Therefore, we use the variable *lnproductivity* as a proxy for the firm's productivity, measured by total revenue divided by total labor and expressed in logarithmic form. We also include two dummy variables, namely *custom* and *importlicense*, in our analysis. The first dummy variable, *custom* serves a proxy for custom and trade barriers that may deter import and export activities, especially in developing countries like Vietnam, where low institutional quality and corruption pose challenges. This variable equals 1 if a firm reports paying unofficial costs at custom gates for clearance, and 0 otherwise. It is strongly believed that if a firm pays unofficial fees to officers at custom gates, the custom clearance process may be smoother. Meanwhile, import licensing is considered as an instrument for engaging in GVCs (Dang & Dang, 2020). So, if a firm has an import license of either intermediate goods

or imported goods, or both, it will enhance the ability to engage more in GVCs. As a result, the second dummy variable - *importlicense* takes a value of 1 if the firm has an import license, otherwise it is 0.

4. Empirical results

Table 1 presents the descriptive statistics. The proportion of firms participating in GVCs is relatively low, accounting for only 2.63% of the full sample. However, the figures for alternative definitions of GVC participation, namely *gvc1*, *gvc2*, *gvc3* are much higher, at 12.41%, 6.24% and 5.73%, respectively. This difference arises because the primary GVC definition used in our research is the strictest measure. Regarding digitalization, 49.09% of firms use websites to interact with their clients and support their operations. Meanwhile, the mean age is 13.18 years, whereas the average value for productivity is 16.09. Additionally, the number of firms that possess import licenses for both intermediate goods and imported goods made up 11.34%, whereas approximately 15.09% of enterprises pay unofficial costs at custom gates for clearance.

Table 2 illustrates the results of baseline estimation. In model 1, the estimated coefficient of digitalization is 0.709, statistically significant at the 1 percent level, emphasizing that firms adopting digital technologies are more likely to get involved in global value chains. The same outcome was observed when we controlled for other variables in model 2, strengthening the findings of most of previous literature (Gopalan et al., 2022; Korwatanasakul, 2023; Reddy & Sasidharan, 2023; Vu et al., 2022). Digitalization not only facilitates firms to tap into global markets, but it also supports enterprises in deepening interactions with both domestic and foreign suppliers and consumers, thereby increasing supply and value chains (Abel-Koch, 2016; Lendle & Olarreaga, 2017). In addition, positive effects are observed for alternative definitions of GVC participation in models 3, 4, 5, 6, 7, and 8.

Table 1. Statistics of summary

Variable	Obs	Mean	Std. dev.	Min	Max
gvc	4,224	0.0263	0.1600	0	1
gvc1	4,224	0.1241	0.3297	0	1
gvc2	4,224	0.0624	0.2691	0	1
gvc3	4,224	0.0573	0.2226	0	1
digitalization	4,224	0.4909	0.4828	0	1
firmage	4,221	13.1810	10.6918	1	116
lnproductivity	4,218	16.0925	7.7159	-6.9078	30.4816
custom	4,224	0.1509	0.4181	0	1
importlicense	4,224	0.1134	0.3171	0	1

Source: Authors' calculation.

Regarding control variables, *firmage* has no visible impacts on GVC participation. Meanwhile, there is a positive relationship between productivity and GVC participation, implying that productivity is a key driver of GVC participation. This finding is consistent with prior works (Gopalan et al., 2022; Korwatanasakul, 2023; Melitz, 2003). Moreover, the estimated results for two dummy variables, including *custom* and *importlicense* are positive and significant at 1%. This means that paying unofficial costs at custom gates could promote trading activities of firms, making it easier for them to participate in global value chains. Besides, obtaining an import license is crucial for firms involved in GVCs, as Vietnamese enterprises rely heavily on imported intermediate inputs to maintain production efficiency and support export expansion.

Endogeneity problems

Ledezma and Villavicencio (2024) and Avenyo et al. (2022) empirically find that skilled labor share and labor intensity do not affect the GVC participation. However, it is believed that higher skilled labor is more able for firms to adapt the digital technology. Given that we use an index of skilled labor ratio measured by the share of skilled labor over total labor (*skilledlabor*) as an instrument variable to run two-stage least squares (2SLS) regression. Note that *skilledlabor* includes permanent skilled, professional, or managerial workers. Then, the first stage regression takes a form as follows:

Table 2. Basic results

	gvc		gvc1		gvc2		gvc3	
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
digitalization	0.709*** (0.174)	0.565*** (0.168)	0.598*** (0.054)	0.459*** (0.058)	0.932*** (0.071)	0.768*** (0.076)	0.307*** (0.082)	0.202*** (0.074)
firmage		-0.009 (0.006)		0.007*** (0.002)		0.014*** (0.003)		-0.014*** (0.004)
lnproductivity		0.094*** (0.032)		-0.011 (0.009)		0.025* (0.015)		0.017 (0.013)
custom		0.587*** (0.162)		0.686*** (0.060)		0.623*** (0.072)		0.516*** (0.075)
importlicense		0.691*** (0.194)		0.798*** (0.072)		0.599*** (0.084)		0.664*** (0.088)
Constant	-2.565*** (0.487)	-3.358*** (0.661)	-0.928*** (0.046)	-1.323*** (0.073)	-1.339*** (0.056)	-1.964*** (0.102)	-1.650*** (0.203)	-1.824*** (0.103)
Year FE	yes	yes	yes	yes	yes	yes	yes	yes
Individual FE	yes	yes	yes	yes	yes	yes	yes	yes
Observations	4,224	4,215	4,224	4,215	4,224	4,215	4,224	4,215
Number of id	3,601	3,593	3,601	3,593	3,601	3,593	3,601	3,593

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculation.

$$digitalization_{it} = a_0 + + a_1 skilledlabor_{it} + a_2 X + + \theta_j + \theta_t + e_{i,t} \quad (2)$$

Where, *X* represents a vector of control variables, as outlined in the equation (1), including *firmage, lnproductivity, custom*, and *importlicense*. Similarly, θ_j and θ_t are in turn individual fixed and year fixed effects. e are standard errors.

In the first stage, we find a positive nexus between skilled labor and digitalization, highlighting that a highly qualified workforce enables enterprises to adapt to digital technologies. In the second stage, the estimated coefficient for *digitalization* is positive and statistically significant at the 1 percent level, demonstrating that adopting digital technologies can facilitate firms' engagement in GVCs. These findings suggest that skilled employees have an indirect impact on GVC participation, which sharply contrasts with earlier works such as Avenyo et al. (2022) and Ledezma and Villavicencio (2024). Notably, *firmage* exhibits a significant negative effect, while the results for the other control variables are consistent with the baseline estimations.

Linear probability model (LPM)

It is undoubtable that estimates from a nonlinear probit model using fixed effects estimators can be significantly biased due to incidental parameter problems (Wooldridge, 2018). To address this, we employ a linear

Table 3. Estimated results: 2SLS approach

VARIABLES	First stage	Second stage			
	digitalization	gvc	gvc1	gvc2	gvc3
skilledlabor	0.000*** (0.000)				
digitalization		0.489*** (0.163)	0.755*** (0.088)	0.517*** (0.079)	0.468*** (0.087)
firmage	0.014*** (0.002)	-0.017** (0.008)	-0.006** (0.003)	0.006* (0.003)	-0.024*** (0.005)
lnproductivity	0.023*** (0.006)	0.094*** (0.032)	-0.025*** (0.009)	0.030** (0.016)	0.008 (0.014)
custom	0.232*** (0.050)	0.495*** (0.156)	0.517*** (0.064)	0.527*** (0.074)	0.403*** (0.080)
importlicense	0.492*** (0.066)	0.528*** (0.185)	0.481*** (0.084)	0.427*** (0.090)	0.466*** (0.098)
Year FE	yes	yes	yes	yes	yes
Individual FE	yes	yes	yes	yes	yes
Constant	-1.103*** (0.058)	-2.722*** (0.578)	-0.414*** (0.121)	-1.246*** (0.132)	-1.286*** (0.144)
Observations	4,215	4,215	4,215	4,215	4,215
Number of id	3,593	3,593	3,593	3,593	3,593

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculation.

Table 4. Estimated results with LPM

VARIABLES	LPM				2SLS- LPM				
	gvc	gvc1	gvc2	gvc3	First stage	Second Stage			
					digitalization	gvc	gvc1	gvc2	gvc3
skilledlabor					0.000*** (0.000)				
digitalization	0.405*** (0.094)	0.459*** (0.058)	0.767*** (0.076)	0.202*** (0.074)		0.350*** (0.093)	0.755*** (0.088)	0.517*** (0.079)	0.467*** (0.086)
firmage	-0.007 (0.005)	0.007*** (0.002)	0.014*** (0.003)	-0.014*** (0.004)	0.014*** (0.002)	-0.013** (0.005)	-0.006** (0.003)	0.006* (0.003)	-0.024*** (0.005)
lnproductivity	0.064*** (0.020)	-0.011 (0.009)	0.025* (0.015)	0.017 (0.013)	0.023*** (0.006)	0.065*** (0.020)	-0.025*** (0.009)	0.030** (0.016)	0.008 (0.014)
custom	0.446*** (0.092)	0.686*** (0.060)	0.622*** (0.072)	0.516*** (0.075)	0.232*** (0.050)	0.380*** (0.095)	0.517*** (0.064)	0.527*** (0.074)	0.402*** (0.079)
importlicense	0.504*** (0.106)	0.798*** (0.072)	0.598*** (0.084)	0.663*** (0.088)	0.492*** (0.066)	0.386*** (0.114)	0.481*** (0.084)	0.427*** (0.090)	0.465*** (0.097)
Constant	-2.430*** (0.137)	-1.323*** (0.073)	-1.961*** (0.101)	-1.823*** (0.103)	-1.103*** (0.058)	-1.974*** (0.171)	-0.414*** (0.121)	-1.246*** (0.132)	-1.283*** (0.141)
Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Individual FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pseudo R2	0.133	0.198	0.265	0.120	0.071	0.126	0.202	0.232	0.131
Observations	4,215	4,215	4,215	4,215	4,215	4,215	4,215	4,215	4,215

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculation.

probability model to verify the sensitivity of estimated results from the nonlinear panel data model (Avenyo et al., 2022). The estimated outcomes in Table 4 supported our earlier findings.

Small vs. Large firms

According to Hagsten and Kotnik (2017) and Hoang et al. (2025b), larger enterprises are more likely to adopt cutting-edge technologies. In contrast, small and medium sized enterprises seems to lag behind in terms of digitalization (Cassetta et al., 2020). Moreover, SMEs frequently face challenges in investing in digital infrastructure and expanding networks, which not only hinders their digital transformation but also prevents their integration into global value chains (Costa et al., 2020; Dethine et al., 2020). Therefore, to check whether the impacts of digitalization on GVC participation varies across different types of enterprises, we classified the entire sample into three sub-samples: small, medium and large firms. Table 5 depicts the estimated results.

Models 1, 3, and 5 provide evidence that digitalization positively impacts GVC participation regardless of different firm sizes. However, after controlling firms' characteristics, digitization yields greater benefits to medium-sized businesses than for large enterprises in terms of encouraging their participation in global value chains. Meanwhile, there is no obvious impact of

Table 5. Estimated results with the classification of firm size

	Small firms		Medium firms		Large firms	
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
digitalization	0.537*** (0.191)	0.245 (0.299)	0.546*** (0.193)	0.459** (0.214)	0.361** (0.160)	0.576* (0.318)
firmage		-0.034 (0.023)		-0.017 (0.015)		-0.025* (0.014)
lnproductivity		0.372* (0.202)		0.159*** (0.062)		0.049 (0.070)
custom		0.474 (0.349)		0.453** (0.196)		0.725** (0.310)
importlicense		0.448 (0.405)		0.372 (0.236)		1.088*** (0.348)
Constant	-2.427*** (0.181)	-10.923* (5.819)	-2.245*** (0.161)	-3.147*** (0.417)	-1.927*** (0.322)	-4.286*** (0.713)
Year FE	yes	yes	yes	yes	yes	yes
Individual FE	yes	yes	yes	yes	yes	yes
Observations	1,596	1,596	1,367	1,365	1,145	1,141
Number of id	1,514	1,514	1,308	1,306	1,078	1,074

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculation.

digitalization on the GVC participation of small enterprises. This finding is inconsistent with the result of Reddy and Sasidharan (2023), who report that digitization influences significantly GVC involvement among small enterprises. The reasonable explanation for this inconsistency lies in resources between small and large enterprises. Medium and large firms typically possess a strong capital capability, skilled human resources, and active R&D activities, which facilitate adaptation of advanced technologies. In addition, these large enterprises also possess well-established international networks, making it easier to integrate GVCs. Conversely, small enterprises in Vietnam frequently struggle with resource constraints, constraining their ability to invest in digital infrastructure and access sophisticated technologies. As a result, the older digital tools implemented by these firms may not generate substantial improvements in their participation in GVCs.

5. Conclusion

Using a probit model, this study investigates how digitalization impacts GVC participation among Vietnamese enterprises between 2005 and 2023. The findings reveal that there is a positive relationship between digitalization and GVC participation. Similar outcomes are observed for alternative definitions of GVCs. Additionally, factors such as labor productivity, unofficial costs at custom gates, and import licenses serve as key drivers for enterprises to engage in global value chains. Interestingly, firm age has no

discernible impact on GVC participation. In addition, subsample analysis indicates that digitalization plays a more substantial role in supporting medium and large enterprises in deepening their GVC integration. Conversely, no significant effect is detected for small firms, suggesting that resource constraints may limit the effectiveness of digital technologies in enhancing their global production linkages.

Based on the empirical findings, several policy implications are proposed to promote digital adoption and facilitate deeper GVC participation among Vietnamese enterprises, especially small firm. First, the government should provide targeted financial support, including low-interest rates or favorable loan packages, to help enterprises improve their digital infrastructure and innovation activities, thereby enhancing competitive edge in global markets. Second, prioritizing training employees is essential to boosting the productivity of firms. Third, given the important role of import licenses in enabling international production linkage, simplifying regulatory requirements and streamlining licensing procedures would allow firms to access a wider range of inputs from global suppliers and expand their export capacity. Finally, greater transparency and efficiency in customs clearance are necessary to eliminate informal payments and reduce trade costs. Improving institutional quality at the border will create a more favorable business environment, encouraging enterprises to participate more actively in global value chains.

Even though this study contributes to the existing literature on the relationship between digitalization and GVC participation, several limitations remain. First, data availability poses a significant challenge, restricting the analysis to only four survey years, which may limit the robustness of the dynamic effects over time. Second, some firm-level characteristics that may influence GVC engagement are not included due to data constraints, potentially omitting relevant explanatory factors. Third, this study does not distinguish between the effects of digitalization on different channels of GVC participation, namely backward and forward linkages, which may respond differently to digital adoption. These limitations provide avenues for future research, such as incorporating richer datasets, expanding explanatory variables, and examining how digitalization affects different forms of GVC participation.

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