Global Value Chain Participation of Firms in West Africa: Empirical Insights from Ghana and Nigeria

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Working Paper GVC-II-008

AFRICAN ECONOMIC RESEARCH CONSORTIUM
CONSORTIUM POUR LA RECHERCHE ÉCONOMIQUE EN AFRIQUE

Bringing Rigour and Evidence to Economic Policy Making in Africa

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AERC Working Paper GVC-II-008
African Economic Research Consortium, Nairobi
November 2024

THIS RESEARCH STUDY was supported by a grant from the African Economic Research Consortium. The findings, opinions and recommendations are, however, those of the author and do not necessarily reflect the views of the Consortium, its individual members or the AERC Secretariat.

Published by: The African Economic Research Consortium
P.O. Box 62882 - City Square
Nairobi 00200, Kenya

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Abstract

Global value chains (GVC) have become an important developmental issue. However, empirical studies on the peculiar nature of the GVC participation of firms are sparse, especially in West Africa. Thus, this study empirically examines the factors that constitute the major drivers of firm GVC participation and the institutional obstacles to firm GVC participation. The study discusses how such factors could be surmounted. We use the logit model as the empirical strategy and the World Bank's Enterprise Survey (ES) database for two biggest West African countries: Ghana and Nigeria. The findings show that firms in West Africa face constraints that militate against their participation in GVC. Also, we find crucial factors that can influence firms' participation in GVC, which differ relatively between Ghana and Nigeria. In essence, medium and large-scale firms have higher likelihood to participate in GVC than small-scale firms. Similarly, the legal status of the firm helps in enhancing the firms' participation in GVC, as firms that are shareholding or partnership firms are more likely to participate in GVC than sole proprietorship firms. Also, firm location serves as an advantage to the firm GVC participation, as firms in cities with a human population of over one million are more likely to be engaged in GVC. The finding of the study is relevant to industry players and firms, particularly on the mode of participation in GVC and in helping policy makers in creating a favourable policy ambience for GVC participation of firms, which could enhance corporate relations among domestic firms and international players to spur firms' productivity and participation in GVC.

Keywords: *Export; Firm size; Global value chain (GVC); Institutions; Productivity; West Africa*

JEL codes: *F14, F23, O24, O55, O57*

1. Introduction

Global value chains (GVC) have recently become an essential developmental concept prominent within the development community. Thus, the world has witnessed the continuing expansion of Global Value Chains (GVCs) (World Bank, 2020). In the works of Gereffi and Fernandez-Stark (2011), a value chain is elucidated as a framework encompassing a series of essential activities integral for guiding a product or service from its initial conception to its ultimate utilization and even further, encompassing aspects such as design, production, marketing, distribution, and the provision of post-sales support. Therefore, the concept of GVC entails the distribution of activities globally within a value chain across interconnected networks of firms (Gereffi and Fernandez-Stark, 2011), and it involves a collection of intra-sectoral linkages within firms and other sectors that facilitate the geographical and organizational restructuring of global production (Ha, Dung and Thanh, 2023; Karakara and Osabuohien, 2024).

GVC participation can improve firms' efficiency and production by providing opportunities for cost-effective sourcing of imports or exports. Furthermore, firms participating in these networks, especially those from developing countries, have the potential to gain technological knowledge and expertise through their engagements within GVC networks (Brancati et al., 2017). GVC evaluations have traditionally focused on matters related to economics and competitiveness. These assessments have put forth four trajectories for firms operating within GVCs to enhance their economic position: "*product upgrading, process upgrading, functional upgrading, and chain or inter-sectoral upgrading*" (Humphrey and Schmitz, 2002). Yet, more recently, there has been a notable shift towards acknowledging the social and environmental dimensions within GVC analyses. This shift involves an exploration of themes such as labour laws, workforce development, gender dynamics, and the establishment of sustainable value chains (Barrientos et al., 2011; Gereffi and Lee, 2012).

Some studies assert that many industries or firms indicate that GVC is geographically focused on a few emerging nations such as Brazil, China, and India (Gereffi and Luo, 2014). Dhyne and Rubínová (2016) indicate that most of the firms within the economy function as suppliers to other enterprises. Despite that, these suppliers are essential in the GVC. As the economy progresses, local firms (suppliers) could wield a significant influence within the GVC, as they can leverage the domestic market as a foundational platform for enhancing their capabilities and establishing strong connections with major global corporations operating within the GVC.

The study on Sub-Saharan Africa (SSA) by the European Centre for Development Policy Management (ECDPM, 2014) focusing on value chains and industrialization summarized those countries positioned at the lowest echelons of, for example, engaging in assembling for foreign markets, are unlikely to develop the necessary expertise, institutions, or consumer markets essential for establishing and maintaining complete industries. The ECDPM further indicates that the ongoing movement towards streamlining supply chains presents significant obstacles for smaller countries and enterprises that grapple with significant scale and purchasing power constraints. These developmental considerations have prompted researchers to extend the scope of the GVC framework in pursuit of a more comprehensive range of potential paths for firms' GVC participation.

Theoretical and empirical studies on the peculiar nature of such firms in the GVC are often neglected (Brancati et al., 2021), especially in SSA. For instance, Obeng, Mwinlaaru and Ofori (2022) concluded that SSA's engagement in GVC is low compared to other regions. Also, Montfaucon et al. (2022) opined that there is low GVC participation in African economies and firms. In addition, de Melo and Twum (2021) similarly indicated that firms in SSA are not well integrated into the GVC. This is because SSA has a scarcity of downstream firms capable of converting imports from foreign economies into partially processed and finished products. The region does not have the requisite technology to enhance productivity within its downstream sectors or convert its raw materials into intermediate or end products suitable for export. However, should one expect two different African countries, such as Ghana and Nigeria, to be differently engaged in GVC? And why they have such low GVC participation?

Thus, in this study, we empirically explore the nature of firms' GVC participation in West Africa. Specifically, we proffer answers to the following research inquiries: i) What are the drivers and obstacles to West Africa's firms' GVC participation? ii) What are the options (potentials) for West Africa's firms to harness to participate in GVC? iii) how do institutions mediate the GVC participation of firms in West Africa? Our study is unique because we used aggregate measures and disaggregating them in examining firms' GVC participation. The subsequent sections of this paper are structured as follows: after this introduction, we present insights from the literature and theoretical underpinning in section two. The third section discusses the data and empirical strategy used for the study, followed by analysis and discussion of results in section four, while the last section concludes with some policy implications.

2. Insights from extant studies and theoretical underpinning

In this section, we provide a discourse on the key drivers and obstacles to GVC participation of firms based on extant literature. The last sub-section briefly explains the theoretical underpinning of the study.

Drivers of firms' GVC participation

GVC participation refers to the share of a country's exports that use value-added imported from another country (backward linkage) or are exported to another country for additional processing (forward linkage), calculated as a share of gross exports (De Melo and Twum, 2020). A firm's participation in a GVC is influenced by several key factors. These include the availability of resources such as labour, natural resources, and access to foreign capital; the size of the domestic market and its surrounding areas; geographical factors such as transportation connections through sea, land, and air routes; and the quality of institutions (Badr, 2019; Fernandes et al., 2022; Coulibaly et al., 2022; World Bank, 2020; Urata and Baek, 2020). The geographic location of a firm also plays a crucial role in its likelihood of integrating into GVCs (Badr, 2019; Fernandes et al., 2022). Firms situated in major urban or industrial areas are more likely to participate in GVCs compared to those located elsewhere. However, existing research does not address whether a small-scale firm located in an industrial area, leveraging its inherent advantages, might find it easier to engage in GVC activities than a large-scale firm situated elsewhere. Given the relatively low level of GVC involvement in SSA, there is potential for countries in the region to learn from the concept of locational advantage for firms in enhancing their engagement in GVCs (Obeng et al., 2022; van Biesebroeck and Mensah, 2019).

Furthermore, factors such as firm size and access to credit denote financial capabilities that contribute positively to a firm's potential to invest in developing technological skills and capabilities, consequently bolstering higher productivity conducive to GVC participation (Urata and Baek, 2020; Dung and Thanh, 2022). Miao and Fortanier (2018) and the Organization for Economic Co-operation and Development–OECD (2019) also found that the size of a firm is a significant factor in its participation in GVCs, with differences observed between small and medium-sized enterprises (SMEs) and larger corporations when analysing their impact

and trade patterns globally. Smaller firms appear to lack the financial resources, market presence, technological capabilities, and expertise necessary to enhance productivity and thus get engaged in GVCs. Consequently, SMEs are less likely to engage in GVC activities compared to their larger counterparts. In addition, the experience of managerial teams and entrepreneurial attitudes play a significant role in determining whether existing resources and capabilities are directed towards amplifying production efficiency and, consequently, participation in GVCs (Harvie et al., 2010).

Several empirical studies have also investigated the drivers of participation in GVCs at the firm and country levels. Country-specific factors, such as resource endowments, geographical positioning, political stability, open trade policies, foreign direct investment (FDI) inflows, and the quality of institutions (Badr, 2019; Urata and Baek, 2020; Fernandes et al., 2022; Coulibaly et al., 2022) exemplify the influence of the business environment on firms' capacity to engage in GVCs. Firm-specific elements, including firm size, foreign ownership, technological prowess, advantageous financial access, and proactive innovation initiatives delineate the internal landscape of firms, fostering their potential as participants within GVCs (Antras and Chor, 2022; Chor, 2019).

Efficiency is also regarded as one of the most important determinants of GVC participation. Notably, technological prowess, innovation initiatives, and possession of foreign licenses, certifications, and patents emerge as pivotal elements directly enhancing production efficiency, thereby fostering GVC involvement (Harvie et al., 2010; Rigo, 2021). Institutional quality is another crucial determinant of GVC participation (Badr, 2019; Urata and Baek, 2020; Fernandes et al., 2022). In a recent study by Montfaucon, Nigatu and Majune (2022), Africa's involvement in GVCs was scrutinized through macro and micro perspectives, using data from three distinct sources. The analysis leveraged databases built upon global input-output tables, customs-level data, and survey data to construct GVC measurements. The study revealed that aggregated data might obscure GVC participation levels in Africa, highlighting the significance of country-level and micro-level analyses for a more precise understanding. Moreover, the study demonstrated a positive correlation between political stability and backward GVC participation within the examined countries. Additionally, FDI was observed to have a positive association with backward GVC participation, both at the firm and country levels of analysis.

Also, other factors such as infrastructure (e.g., logistical performance), effective governance, cheaper unit labour costs, increased openness to inward FDI, and generally higher GDP per capita (Fernandes et al., 2022) influence firms' GVC participation. Brancati, Pietrobelli and Mazzi (2021) investigated the factors influencing a firm's propensity to engage in GVCs and the extent of its participation, using World Bank's Enterprise Surveys (WBES) data. The research revealed that a firm's technological capability plays a pivotal role, particularly for SMEs, enabling their GVC involvement and heightening their engagement within GVC networks. Firm-related factors such as elevated labour productivity, substantial firm size, foreign ownership,

and advanced technological capacity also affect their GVC participation. According to OECD (2015) study on developing countries' participation in GVCs, the size of the domestic market influences the structure of the industries (e.g., a higher proportion of the manufacturing sector in GDP).

Van Biesebroeck and Mensah (2019) obtained data from two distinct datasets (firm-level WBES and UN COMTRADE dataset) to generate a unique and comprehensive picture of how SSA countries participate in GVCs. It describes in depth the nature of the underlying data and how it is used to create several GVC participation indicators. The study found that most SSAs have relatively low levels of GVC engagement, especially in their manufacturing sectors. Also, while some countries have experienced an increase in GVC engagement over time, this trend is far from being universally consistent across the region.

Many studies have evaluated the influence of participation in GVCs on various metrics of SMEs performance. For instance, López González and Kowalski (2017) conducted firm-level analyses using cross-sectional regression and firm survey data. They employed the share of foreign intermediates and the share of foreign ownership as proxies for GVC participation. To gauge the performance of SMEs, they used indicators such as propensity to export and labour productivity. Notably, both proxies for GVC participation positively correlated with both indicators of SMEs' performance. Similarly, in a separate study conducted by Hewavitharana (2021), the author identified a positive connection between GVC participation and SMEs' profitability.

Miao and Fortanier (2018) undertook comprehensive descriptive analyses of how firms of varying sizes engage within GVCs. Their research revealed a heterogeneous pattern of GVC participation between SMEs and larger firms concerning trade patterns and their resulting impacts. Notably, SMEs often engage in GVCs through indirect exports, supplying goods to larger exporting domestic or multinational enterprises. Kowalski et al. (2015) established that the key determinants of GVC participation include structural factors such as geographical location, market size, and developmental level. The study underscored the significance of trade and investment policy reforms, alongside enhancements in logistics, customs procedures, intellectual property protection, infrastructure, and institutions, all of which play pivotal roles in shaping GVC participation. Various studies have highlighted the significance of transportation infrastructure and trade facilitation.

Obstacles to firms' GVC participation

Firms often encounter obstacles when trying to integrate into GVCs, such as the complexity of international trade procedures and taxation issues (Dovis and Zaki, 2020). Higher tariffs, particularly in sectors where they are prevalent, can hinder firms, especially smaller ones, from entering GVCs. Therefore, policies promoting trade liberalization, including comprehensive trade agreements that standardize

regulations and streamline border processes, play a crucial role in facilitating GVC integration. Regolo (2017) emphasized that new products tend to be exported to markets that are easily accessible, often due to geographic and cultural proximity. Consequently, participation in GVCs can drive the emergence of new trade patterns, potentially strengthening regional trade agreements (RTAs).

Financial constraints are one of the biggest obstacles firms encounter when trying to participate in GVCs (Reddy, Chundakkadan and Sasidharan, 2021; Urata, 2021). Limited access to finance, particularly for small and medium-sized enterprises (SMEs), constrains firms' ability to invest in technology, innovation, and market expansion required for GVC participation. The World Bank (2016) investigated the participation of SMEs in GVCs in low-income countries. The study reveals that many SMEs engage in exporting indirectly by supplying components to larger firms, which then incorporate these parts into their exports. The study identifies significant challenges that hinder the successful participation of SMEs in GVCs, categorizing them as internal and external to the firms. Internally, the challenges include formalizing business operations, enhancing productivity, acquiring technological and managerial expertise, and fostering innovation. Externally, the obstacles involve limited access to trade finance and information on export opportunities and procedures, along with high transportation costs, insufficient infrastructure, and regulatory ambiguity. To address these challenges, the study suggests various policy interventions such as education and training programmes, creating conducive environments for technology adoption and enhancement, facilitating trade processes and logistics efficiency, improving physical and digital connectivity, assisting in obtaining quality certifications, and expanding access to financial resources.

While numerous studies have investigated the determinants and barriers to firms' participation in GVCs, there remains a notable gap in empirical research, particularly concerning the unique characteristics of firms within GVCs, especially in the context of West Africa. Therefore, this study aims to address this gap by empirically examining the specific factors that serve as significant drivers and limitations to firms' participation in GVCs. The study will focus on Ghana and Nigeria, two prominent economies in West Africa, to shed light on the challenges faced by firms in these countries regarding GVC participation. The study seeks to identify the key obstacles hindering their integration into GVCs by delving into the peculiarities of firms operating in these contexts.

Theoretical underpinning

Global value chains (GVCs), encompassing developing, emerging, and developed countries, have risen as a prominent characteristic of global trade and investment landscapes. The process of manufacturing commodities, spanning from raw materials to final goods, is progressively fragmented and executed wherever the essential expertise and resources can be sourced at competitive costs and with high quality (Karakara and Osabuohien, 2020a). Engagement in GVCs is typically assessed through

the lens of either forward participation or backward participation (Balaki and Mamba, 2022). Businesses can become part of GVCs by involving themselves in various forms of coordinated activities spanning a few countries, all aimed at bringing a product from its inception to its final utilization (e.g. Gereffi et al., 2014). These activities encompass a wide spectrum, ranging from farming, extraction of natural resources, research and development, diverse manufacturing processes, design, management, marketing, distribution, post-sale services, and other functions.

Theoretically, studies have proposed that either the fragmentation theory or the new trade theory can be employed to expound on participation in GVCs. The fragmentation theory examines the determinants of GVC development and participation by analysing the position of various production stages (Arndt and Kierzkowski, 2001; Jones and Kierzkowski, 2018). GVCs materialize when production processes are segmented into multiple phases and distributed across diverse countries. This segmentation occurs when firms can achieve cost savings in labour and production by relocating these fragmented production components compared to their original position. This is possible when the expenses associated with connecting geographically separated production components are minimal, and the costs of establishing the GVC network are manageable.

In essence, suppliers' fixed costs and average productivity levels play a pivotal role in determining the inclusion of potential source countries in GVCs (Tintelnot, 2017; Antras et al., 2017). The new trade theory elucidates how firms decide to establish or engage in GVCs (Melitz, 2003; Helpman et al., 2004). The theory opines that the disparities among firms in terms of efficiency, fixed costs, and variable costs (firm heterogeneity) play a pivotal role in motivating GVC involvement. Participating in international trade comes with substantial trade-related expenses, in which only highly efficient firms can profitably absorb and offset such costs (Antras et al., 2017; Blaum et al., 2018).

3. Data and empirical strategy

The data

The World Bank's Enterprise Survey (ES) data for the two West African countries, namely Ghana and Nigeria, are used for the study[6]. The data is collected on registered business activities. "Registration" is defined according to the established convention for Enterprise Surveys in study countries.

In Ghana, the urban centres for the data collection were Accra, Tema, Takoradi, and North (i.e., Kumasi and Tamale). Each of these urban centres was divided into many zones, numbering a total of 180 zones. At least four interviews were completed per zone. A total of 729 interviews were conducted in Ghana. An equal proportion of services and manufacturing firms were covered. For Nigeria, regional stratification for the Nigeria Enterprise Survey (ES) was defined by 19 States: Abia, Abuja, Anambra, Cross River, Enugu, Gombe, Jigawa, Kaduna, Kano, Katsina, Kebbi, Kwara, Lagos, Nasarawa, Niger, Ogun, Oyo, Sokoto and Zamfara. The sample design for the Nigeria Enterprise Survey was generated to obtain interviews on 2,640 establishments, but 2,272 establishments were interviewed. A stratified random sampling was used on three levels of stratification: industry, establishment size, and region.

The database structure indicates that two different versions of the survey instrument were used for all registered establishments. The eligible manufacturing industries were surveyed using the manufacturing questionnaire (which includes a standard set of core variables, plus manufacturing-specific questions), while the eligible services were covered using the services questionnaire.

Empirical strategy

We measure firms' GVC participation by specific GVC factors and an aggregate of those factors. Thus, we have a binary outcome-dependent variable following Karakara and Osabuohien (2020b). Therefore, Let P_i represent the probability of a firm participating in GVC, say by exporting its product. In contrast, the probability of not participating in GVC is given as 1 - P_i. We do not observe P_i because Y is a

latent variable. Instead, we observe the outcome $Y = 1$ if the firm engages in GVC by exporting its product and $Y = 0$ if it does not; this gives us the model specification in equation (1);

$$P_r\ (Y_i = 1) = P_i \tag{1}$$

$$P_r\ (Y_i = 0) = 1 - P_i \tag{2}$$

The probability of a firm participating in GVC is represented in equation (3) as:

$$Pi = E(Y = 1|X) = \frac{1}{1 + e^{(\beta_0 + \beta' Xi)}} \tag{3}$$

X is a vector of independent variables, and β is a vector of their respective coefficients.

Equation (3) is simplified to ease our understanding of the modelling. It shows a non-linear relationship between the regressors and the parameters, which can cause estimation problems when the Ordinary Least Squares (OLS) estimation technique is applied. Thus, simplifying and reformulating equation (3), in terms of the odds ratio of the probability of a firm being a GVC participant or not, will result in equation (4):

$$\left[\frac{Pi}{1 - Pi}\right] = \frac{1 + e^{(\beta_0 + \beta' Xi)}}{1 + e^{-(\beta_0 + \beta' Xi)}} \tag{4}$$

$\left[\frac{Pi}{1-Pi}\right]$ is the odds ratio of a firm being a GVC participant and can thus be simplified in equation (5):

$$\left[\frac{Pi}{1 - Pi}\right] = e^{(\beta_0 + \beta' Xi)} \tag{5}$$

When we take the natural logarithms of equation (5), it gives us the logit model with the log of the odds ratio, L, which is linear in X and the parameters; *L* is called the logit model and is summarized in equation (6).

$$Ln\left[\frac{Pi}{1 - Pi}\right] = Li = \beta_0 + \beta' Xi \tag{6}$$

We followed the works of Montfaucon, Nigatu and Majune (2022) and Van

Biesebroeck and Mensah (2019) who measured GVC as an aggregate of two conditions. First, a GVC firm should engage in export either directly or indirectly. Second, it should directly import inputs and supplies for its production process. Thus, we employed the same binary logistic model for the estimation. Thus, the model's dependent variable (GVC participation) is stated in equation (7).

$$GVC_i = \begin{cases} 1 \; if \; the \; firm \; export \; directly \; or \; indirectly \\ and \; directly \; imports \; inputs \; and \; supplies \\ 0 \; if \; otherwise \end{cases} \quad (7)$$

Where GVC_i is GVC of participation of firm *i*

Aside from the aggregate measure, we disaggregate the GVC into the determinants of the firm likelihood of exporting either directly or indirectly. These two models separately investigate whether the firm exports its product indirectly (sold domestically to a third party that exports products) and whether the firm exports directly.

The independent variables of the study are: the age of the firm, the location of the firm in each country, the population of the place where the firm is located, the gender of firm ownership and the gender of the top manager, legal status of the firm (i.e., shareholding or partnership or sole proprietor), competition, top manager experience, whether firm have internationally recognized quality certification, financial constraint, productivity (measured by annual sales[7]), type of firm (small, medium or large scale), whether firm is a subsidiary firm, and institutional obstacles (i.e., customs and trade; tax rate, political instability, and corruption). It is important to note that we did not include other institutional variables (such as the quality of infrastructure, and non-tariff barriers, such as technical barriers to trade (TBT) and sanitary and phytosanitary (SPS) that may affect firms' GVC participation, due to availability of data. We adopted the logit model because the model operates under the logit distribution (i.e., Gumbel distribution) and is preferred for large sample sizes. Also, the logit is preferred over the Tobit model because we studied a binary dependent variable and not a censored case where the Tobit model is preferred.

4. Results and discussion

Descriptive statistics and distribution of variables

The descriptive statistics and distribution of variables of the study are presented in Table 4.1. Table 4.1 reveals that, in the two countries, most of the firms have been in operation for more than five years, with Ghana and Nigeria having about 86.38% and 86.27%, respectively. This means that most of the firms in Nigeria do not enjoy the tax-free policy for younger firms that have been established for less than five years. In the Ghanaian sample, most of the firms are in Accra (48%), the national capital, followed by Tema (about 22%), the industrial hub of Ghana. In the Nigerian case, most of the firms are in Lagos, followed by Kano and then Nasarawa, with Ogun State registering the least of less than 1% of the firms (see Table A2 in the Appendix).

Across both countries, most firms are in cities with more than one million populations. In the case of Ghana, it is 67%, and Nigeria is 53%. This is a good indicator as the higher population density could drive demand for the products and services these firms produce, and hence their growth will be enhanced to enable them to participate in GVC. On gender, regarding firm ownership and top management, Table 4.1 further reveals that both countries have male-dominated firm ownership, with Nigeria (82%) and Ghana (73%) having higher gender disparity in firm ownership. The gender of the top manager shows an even wider disparity, as most of the firms in all the countries have more than 87% male-dominated firm managers.

The Ghanaian and Nigerian firms are mostly sole proprietorship firms as the greater proportion of their firms (Ghana with 62.3% and Nigeria with 79.8%) operate as sole proprietors. It is also observed that competition is stiffer among the Ghanaian firms than the Nigerian firms, as 69% of the Ghanaian firms face competition as against 46% of the Nigerian firms, respectively. Regarding managerial experience, Ghana firms have more top managers that have on average, 16.5 years of experience in the industry they operate, as opposed to 12.9 years in the Nigerian case. Generally, all the countries' firms have top managers having more than a decade of industry experience. Most firms across the countries are established and operated as a whole firm on their own, not a subsidiary of another larger firm. In Ghana, about 90% of the firms are established and operated as solely established and operated on merit and Nigeria has a little above 76% of such firms.

Table 4.1: Descriptive statistics and distribution of variables

Descriptive and distribution of variables		Number and percentages of variables			
		Ghana	Nigeria		
Variable	**Measurement**	**Percent**	**Obs**	**Percent**	**Obs.**
Age of firm	Number of years the firm has operated (Less than five years)	13.62	73	13.73	244
Region of operation	Accra*	48.13	258	A	A
	North*	21.08	113		
	Takoradi*	8.96	48		
	Tema*	21.83	117		
Firm locality	The population of the city where the firm is located (Over one million)	67.16	360	53.18	945
Gender of the firm owner	Gender of the owner of the firm (Female)	27.43	147	17.56	312
Gender of the top manager	Gender of the top manager of the firm (Female)	12.13	65	11.25	200
The legal status of the firm	Shareholding with trade	0.56	3	2.59	46
	Shareholding without trade	3.92	21	3.94	70
	Sole proprietorship	62.31	334	79.80	1,418
	partnership	33.21	178	13.67	243
Competition	Firms compete with others (Yes)	68.84	369	45.98	817
Managerial experience	Top manager's years of experience in the industry	16.52¥	536	12.89¥	1,777
Subsidiary firm	The firm is part of a larger firm (Yes)	10.45	56	23.64	420
Firm type	The size of the firm by number of employees (Small-scale firms)	86.94	446	90.15	1,602
Internationally recognized quality certification	The firm has a recognized international certification (Yes)	10.26	55	10.19	181
Export indirect	The firm exports its products through another firm (Yes)	11.01	59	23.64	420
Export direct	The firm exports its products directly (Yes)	10.63	57	21.89	389

Source: Authors' estimations
Note: * means city in Ghana; and "*A*" are cities in Nigeria listed in the Appendix (see Table A2). ¥ = mean values

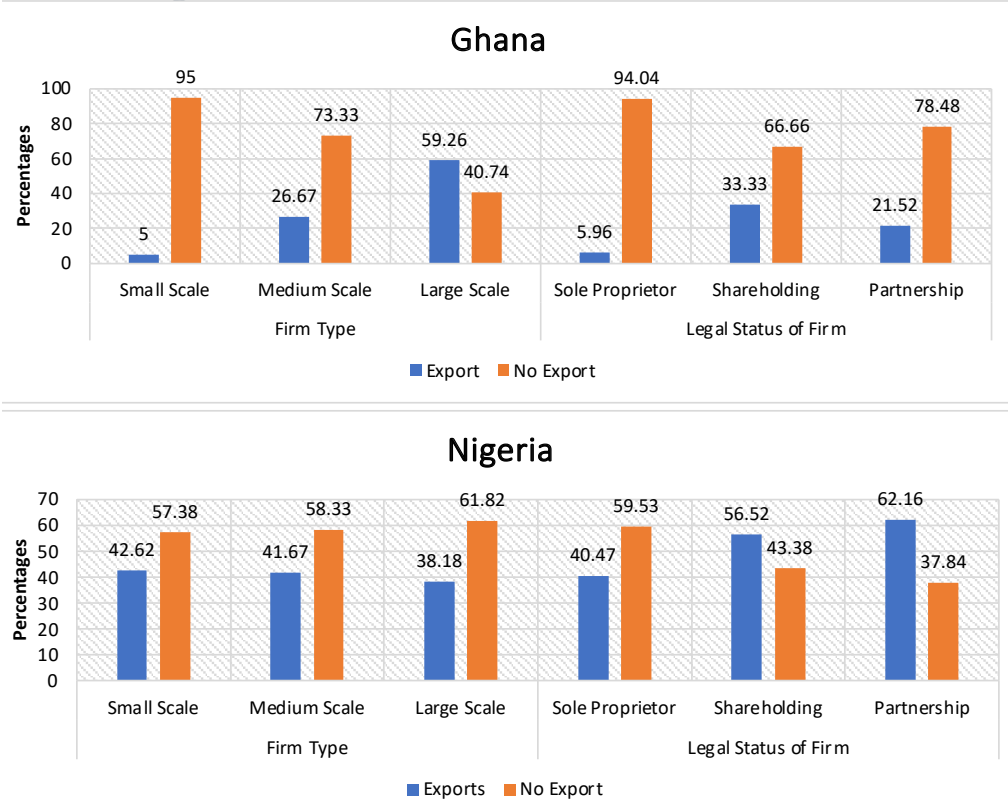
The type of firm operation shows that most firms in both Ghana and Nigeria are small-scale firms in operation. About 87% of Ghana's firms are small-scale, with Nigeria having about 90% small-scale firms. Thus, most of the firms in those

countries are small-scale firms. In both countries, less than 10% of these firms have an internationally recognized quality certification. An internationally recognized quality certification enables a firm to legally and comfortably participate in GVC, at least by exporting its products. Some of the quality certifications include ISO quality certifications (ISO14001, ISO 90000, ISO 1509001), UK International Business Certification, International Standard and Book Number (ISBN), International Communication Body, and World Hotels Organization. Export activities of firms show that most firms either export directly or indirectly through a patent firm.

Firm characteristics and GVC drive

We discussed firm characteristics and GVC participation drive, as captured in Figures 4.1 to 4.3. Considering the percentage of firms that export their product directly, Figure 4.1 revealed that among large-scale firms, the majority (59%) engage in direct export while as low as 5% of the small-scale firms export directly in Ghana.

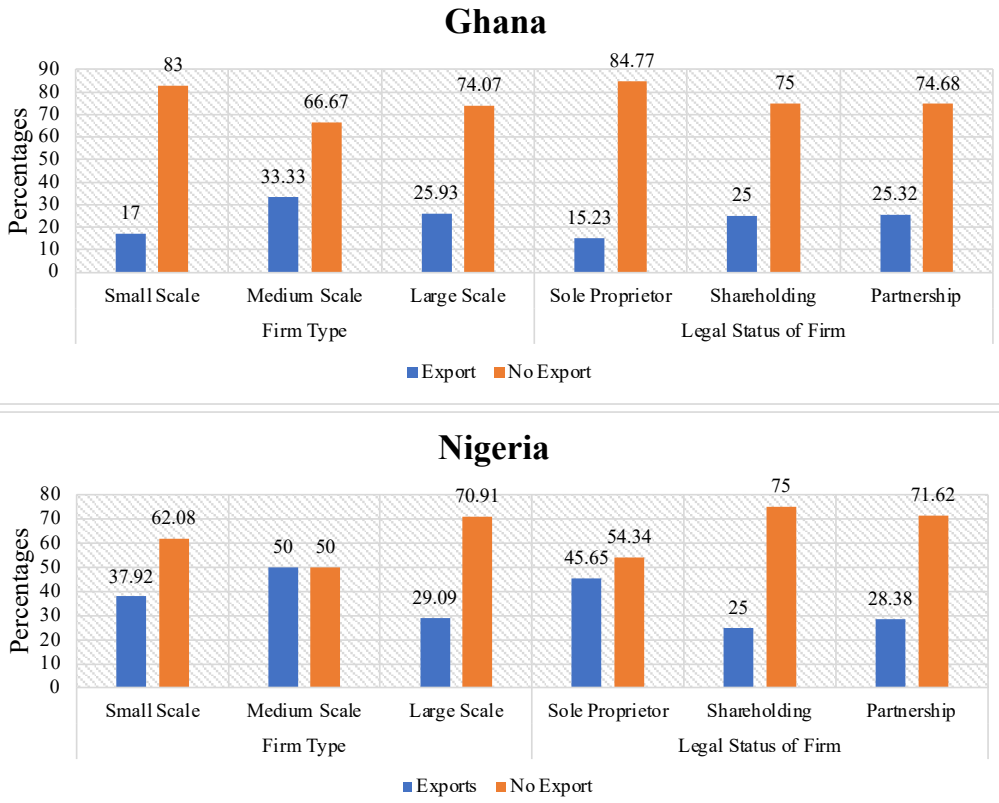
Figure 4.1: Distribution of firms that export their products directly by size and legal status



Source: The authors'

In Nigeria, the proportion of small-scale firms that export directly is relatively higher than that of medium- and large-scale firms. Thus, shareholding and partnership firms in Nigeria are seen to be more directly engaged in exporting than Ghana's proportion. Correspondingly, Figure 4.2 shows the proportion of firms that export indirectly (through other firms). The figure revealed that in Ghana, a lesser percentage (17%) of small-scale firms engage in indirect export compared to 37.9% of small-scale firms in Nigeria. Also, comparatively, more proportionately, sole proprietorship firms (45.65%) in Nigeria export more indirectly than those of Ghanaian firms (15.23%). Thus, in a nutshell, firms in Nigeria proportionately engage in export (direct or indirect) than their counterparts in Ghana. Previous studies (Cusolito, Safadi and Taglioni, 2016; Miao and Fortanier, 2018; OECD, 2019) made conclusions that firm size matters in GVC participation of firms, and that GVC participation is heterogeneous between SMEs and larger firms regarding trade patterns and their impact, where SMEs indirectly participate in GVCs by exporting large domestic or multinational firms.

Figure 4.2: Distribution of firms that export indirectly by size and legal status

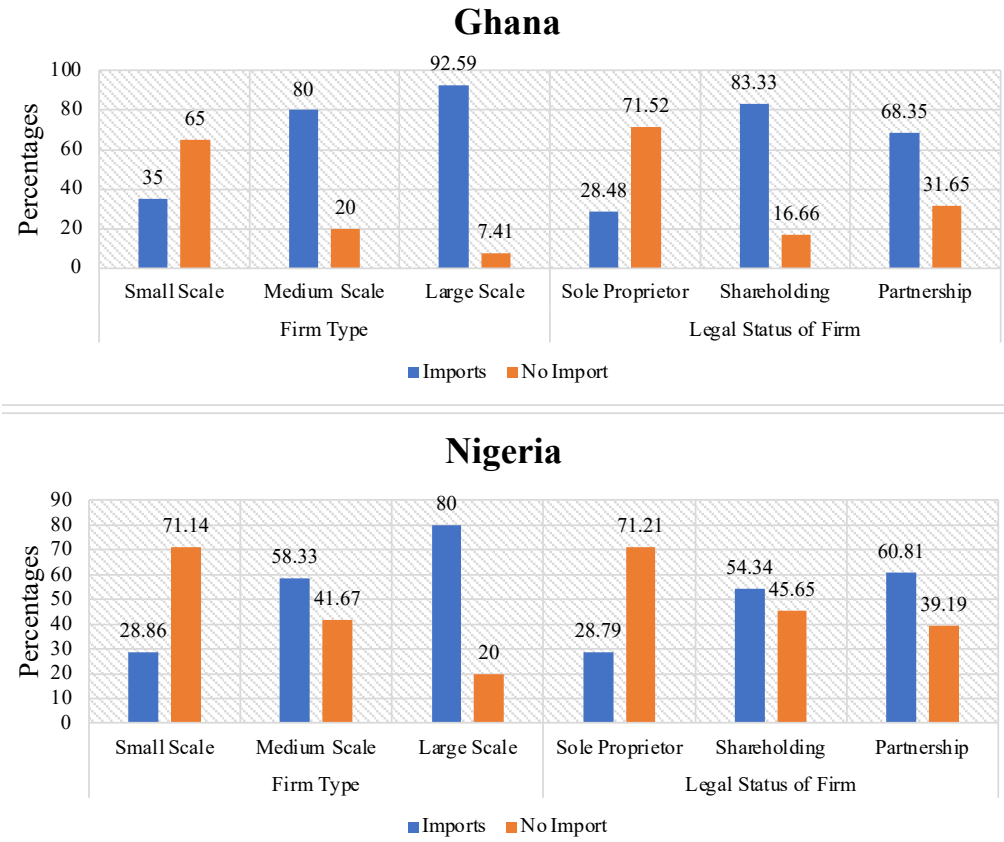


Source: The authors'

In Figure 4.3, we capture the import of inputs or supplies for production by firms in both countries. The figure revealed that most large-scale firms (93% in Ghana and 80% in Nigeria) import their inputs or supplies for production. A similar trend is observed among medium-scale firms in both countries. Also, most shareholding and partnership firms in both countries import inputs and supplies to engage in production. However,

proportionately, Ghana has the majority (83.33% of shareholding and 68.35% partnership firms) of these firms importing inputs and supplies than that of the Nigerian firms (54.34% of shareholding and 60.81% of partnership).

Figure 4.3: Distribution of firms that import inputs directly by size and legal status



Source: Authors'

Econometric estimations analysis

The estimation results of the aggregate measure of GVC participation, which is used to capture the determinants of firm GVC participation are shown in Table 4.2. The table revealed that the firm's age in operation influences its GVC participation. Firms that have been in operation for less than or equal to five years have less probability of being GVC firms than firms that have been in operation for more than five years in both countries. Also, geography matters, as firms that are sited in cities with a population below 250,000 have a reduction in the probability of being a GVC firm by 19% and 20% in Ghana and Nigeria, respectively, compared to firms located in cities of over one million. This finding is similar to Karakara and Osabuohien (2024), where it was noted that geography matters in a firm becoming a GVC firm using the case of Nigeria and Rwanda. Also, female ownership and top managers of firms have some

influence on the firm participating in GVC. Firms owned by females or with female top managers are less likely to be GVC firms than male-owned or male-top manager firms in Ghana. However, it is not significant in both cases on GVC participation.

Table 4.2: Determinants of GVC participation (marginal effects at representative values)

Variable	Ghana	Nigeria
Age of firm (< =5 years)	-0.0942* (0.0536)	-0.1004* (0.0572)
Firm locality	(Base category: City of over one million)	
Between 250,000 and 1 million	-0.095* (0.0561)	-0.1061* (0.0625)
Below 250,000	-0.1886** (0.102)	-0.2008*** (0.1012)
Gender of the owner (Female)	-0.0145 (0.056)	-0.0465 (0.0281)
Gender of top manager (Female)	-0.067 (0.078)	-0.050 (0.016)
Have IRQC (Yes)	0.4806***(0.2321)	0.5112***(0.2521)
Financial constraint (No)	0.3221**(0.1701)	0.5304***(0.2581)
Productivity (Total annual sales)	0.2119** (0.1081)	0.3542***(0.1721)
The legal status of the firm	(Base category Sole Proprietorship)	
Shareholding firm (with traded shares)	0.4101* (0.32)	0.5021*** (0.076)
Shareholding firm (without traded shares)	0.0322 (0.0671)	0.1204** (0.0511)
Partnership	0.0923* (0.0542)	0.3421** (0.036)
Competition (No)	0.0035 (0.0401)	0.0076 (0.0821)
Subsidiary firm (Yes)	0.040* (0.061)	0.090 (0.02)
Firm type	(Base category: Small-scale)	
Medium scale	0.480* (0.061)	0.351* (0.023)
Large scale	0.301** (0.081)	0.42*** (0.014)
Top manager experience	0.016* (0.021)	0.019* (0.041)
Log Likelihood	-165.4702	-754.3041
Pseudo R^2	0.1324	0.1207
Prob>Chi^2	0.0000	0.0000
Observations	202	335

Note: The standard errors are within brackets; (***) significant at 1% level; (**) significant at 5% level; (*) significant at 10% level.

We found that firms that have an internationally recognized quality certification (IRQC) are more than likely by up to 48.1% in Ghana and 51.1% in Nigeria to engage in GVC than firms without such IRQC. The finding is in line with Wignaraja (2013), who showed that firms' possession of foreign licenses significantly impacts their

participation in the GVC. Thus, in Table A3 (in the Appendix), we estimated the factors that could influence a firm's ability to acquire an IRQC and it is quite revealing. Also, increases in firm productivity and firm access to finance both positively and significantly impact firm GVC drive up to 32% and 53% in Ghana and Nigeria, respectively, in the case of finance and up to 21% and 35% in Ghana and Nigeria in the case of productivity increases. Karakara and Osabuohien (2024) equally acknowledge this in their study on Nigeria and Rwanda.

Shareholding firms are more likely to be GVC firms than sole proprietorship firms. This likelihood is high and significant in both Ghana and Nigeria when a firm is a shareholding with traded shares. In the case of Ghana, the probability is 41%, and in Nigeria it is 50%. This finding can be attributed to the fact that shareholding firms might have international shareholders that can help influence the firms' international market penetration. Also, shareholding firms could raise finance easily to engage in expansion to enable them to move to international export and import of their products and inputs, respectively. The same trend was observed for partnership firms versus sole proprietorship firms. A partnership firm in Ghana is 9.2% more likely to be a GVC firm than a sole proprietorship firm. In the case of Nigeria, a partnership firm is 34.2% more likely to be a GVC firm than a sole proprietorship firm. This is so because partnership firms may have international partners that could influence their international presence, thereby boosting their GVC participation.

Also, in both countries, firm type (small, medium, or large scales) determines GVC participation. Compared to small-scale firms, medium-scale firms have a 48% chance and 35% chance in Ghana and Nigeria, respectively, to be GVC firms. Again, large-scale firms are similarly more likely to be GVC firms than small-scale firms. The number of years of the top manager's experience in the industry where the firm operates affects the likelihood of the firm being a GVC firm. An increase in the years of experience of top managers by one year will increase the chances of the firm becoming GVC by 1.6% and 1.9% in Ghana and Nigeria, respectively. To check our model, we ran a multicollinearity test by employing variance inflation factor (VIF) method. Following Hair et al., (2015), multicollinearity is not a concern if VIF <5, as is the case in the results presented in Table A4 (see the Appendix).

Further, we estimated the probability of firms exporting their products directly or indirectly as reported in Tables 4.3, and 4.4. Table 4.3 captures results relating to firms being able to export their products directly, and Table 4.4 is in the case of exporting indirectly. Table 4.3 indicates that the region of the firm operation determines its probability of exporting its products. In Ghana's case, firms located in Tema, the country's industrial hub, have a 10.5% significant increase in the probability of exporting directly compared to firms located in Accra, Takoradi, or North (Kumasi and Tamale). However, firms in Takoradi and North also have reduced probabilities of exporting directly compared to Accra-based firms.

In a similar vein, as shown in Table 4.3, firms in Tema are less likely (about a 14% decrease) to export indirectly. The case is similar in Nigeria, as Lagos-based firms have increased in probabilities of exporting directly compared to firms in other regions (States). Similarly, firms located in cities with a human population of less than

one million have a reduced probability of exporting their products either directly or indirectly in all the countries. This finding could be attributed to those cities (Tema in Ghana and Lagos in Nigeria) being commercial and industrial cities. Thus, firms would have access to facilities that enable them to export directly.

Table 4.3: Logit estimation results of firm exporting directly

Variable	Ghana	Nigeria
Age of firm (< =5 years)	-0.0632 (0.0467)	-0.0051 (0.0288)
Region of operation (Base category:	Accra	
North (Ghana)	-0.0142 (0.0312)	
Takoradi – (Ghana)	-0.0481 (0.034)	A
Tema – (Ghana)	0.105 (0.0312)	
Firm locality	(Base category: City of over one million)	
Between 250,000 and 1 million	-0.0211* (0.012)	-0.0128** (0.014)
Below 250,000	-0.0312** (0.0170)	-0.0861*** (0.032)
Gender of the owner (Female)	-0.0305 (0.0225)	-0.0634 (0.030)
Gender of top manager (Female)	-0.0331 (0.0511)	0.087 (0.023)
Have IRQC (Yes)	0.1782*** (0.0823)	0.2081*** (0.0762)
Financial constraint (No)	0.0862** (0.0471)	0.0789** (0.041)
Productivity (Total annual sales)	0.3326** (0.181)	0.4201*** (0.211)
The legal status of the firm	(Base category Sole Proprietorship)	
Shareholding firm (with traded shares)	0.3214** (0.176)	0.5221*** (0.2621)
Shareholding firm (without traded shares)	0.0821** (0.045)	0.1924*** (0.0852)
Partnership	0.0228 (0.022)	0.0413 (0.035)
Competition (No)	-0.0482* (0.0290)	-0.0456** (0.024)
Subsidiary firm (Yes)	-0.0132 (0.0321)	-0.0081 (0.012)
Firm type	(Base category: small scale)	
Medium scale	0.1851** (0.099)	0.1183* (0.067)
Large scale	0.5571*** (0.211)	0.6112** (0.331)
Top manager experience	0.0514* (0.0311)	0.0622* (0.0342)
Customs and trade obstacles	(Base category: No obstacle)	
Minor	-0.0224* (0.0134)	-0.0522* (0.031)
Moderate	-0.0327** (0.0174)	-0.1008*** (0.051)
Major	-0.04241* (0.0251)	0.1207*** (0.0572)
Very severe	0.1123*** (0.0381)	-0.2811** (0.099)

continued next page

Table 4.3 Continued

Variable	Ghana	Nigeria
Tax rate obstacle	(Base category: No obstacle)	
Minor	-0.0322 (0.0281)	0.0251 (0.0242)
Moderate	-0.0287** (0.0151)	-0.0241* (0.0141)
Major	-0.0431** (0.0216)	-0.0754** (0.043)
Very severe	-0.1081*** (0.0531)	-0.1002** (0.0521)
Log Likelihood	-102.4221	-803.6211
Pseudo R^2	0.3677	0.3221
Prob>Chi^2	0.0000	0.0000
Observations	525	1,321

Source: Authors' estimation
Note: The standard errors are within brackets; (***) significant at 1% level; (**) significant at 5% level; (*) significant at 10% level. "*A*" is in the Appendix (See Table A2). IRQC means Internationally Recognized Quality Certification.

Table 4.4: Logit estimation results of firm exporting indirectly

Variable	Ghana	Nigeria
Age of firm (< =5 years)	0.0662* (0.0401)	0.0224* (0.0133)
Region of operation (Base category:	Accra	A
North (Ghana)	0.0481** (0.0251)	
Takoradi – Ghana)	-0.1341 (0.0833)	
Tema – (Ghana)	-0.1842** (0.0922)	
Firm locality	(Base category: City of over one million)	
Between 250,000 and 1 million	0.1162* (0.0691)	0.1712* (0.0957)
Below 250,000	-0.0912* (0.0521)	0.4341** (0.231)
Gender of the owner (Female)	0.0142 (0.048)	0.0311 (0.014)
Gender of top manager (Female)	0.0653 (0.0766)	0.0522 (0.0174)
Have IRQC (yes)	-0.0342* (0.0203)	-0.0481** (0.0260)
Financial constraint (No)	0.0721 (0.0522)	0.0556 (0.0345)
Productivity (Total annual sales)	0.4322** (0.2410)	0.5228** (0.2710)
The legal status of the firm	(Base category Sole Proprietorship)	
Shareholding firm (with traded shares)	-0.3351** (0.1710)	-0.2447*** (0.1241)
Shareholding firm (without traded shares)	-0.0335* (0.0281)	-0.1045** (0.0561)
Partnership	0.1254* (0.0751)	0.0921* (0.0547)
Competition (No)	0.0055 (0.0720)	-0.0068 (0.0788)
Subsidiary firm (Yes)	0.0524* (0.0315)	0.0621* (0.0371)

continued next page

Table 4.4 Continued

Variable	Ghana	Nigeria
Firm type	(Base category: Small scale)	
Medium scale	-0.0855* (0.0511)	-0.0421* (0.0255)
Large scale	-0.0661** (0.0348)	-0.00452 (0.0232)
Top manager experience	-0.0033 (0.0045)	-0.0052 (0.0072)
Customs and trade obstacle	(Base category: No obstacle)	
Minor	0.0341* (0.0203)	0.0451** (0.0251)
Moderate	0.0214 (0.0351)	0.0483* (0.0285)
Major	0.1105* (0.0621)	0.1752** (0.0961)
Very severe	0.2112*** (0.0952)	0.2814*** (0.1421)
Tax rate obstacle	(Base category: No obstacle)	
Minor	0.0611 (0.0421)	0.0341* (0.0203)
Moderate	0.0754* (0.0451)	0.0332* (0.0196)
Major	0.1262** (0.0661)	0.1152** (0.061)
Very severe	0.1875*** (0.0941)	0.039** (0.017)
Log Likelihood	-147.5704	-673.5620
Pseudo R2	0.1723	0.1835
Prob>Chi2	0.0000	0.0000
Observations	452	1,421

Source: Authors' estimation
Note: The standard errors are within brackets; (***) significant at 1% level; (**) significant at 5% level; (*) significant at 10% level. "*A*" in the Appendix (see Table A2). IRQC means Internationally Recognized Quality Certification.

The gender of firm ownership and the top manager's gender does not significantly influence firms' GVC participation by way of exporting in the case of Ghana (though the direction of influence is the expected sign). In all the countries, firms that are shareholding companies, either with traded or non-traded shares, and partnership firms have increased in probabilities of directly exporting compared to sole proprietor firms. These increased probabilities are more pronounced among Nigerian firms than among those in Ghana. In the Nigerian case, firms that are shareholding with traded shares have 32.1% increase in the likelihood of exporting directly compared to a sole proprietor. In Ghana, the probability is 52.2%. These probabilities are higher for shareholding firms with traded shares than with shareholding with non-traded shares and are all significant. This is because traded shares' firms could have access to external finance and networks for being listed in the stock market, which could propel them to engage in GVC. However, in line with expectations, shareholding firms with traded shares are less likely to export indirectly by about 33.5% for Ghanaian firms and 24.5% for Nigerian firms (see Table 4.4). Again, partnership firms have an increase in the probability of exporting directly or indirectly in all the countries compared to sole proprietor firms.

Firms not facing any competition are less likely to export directly and is significant in both countries. Competition effect on the export potential of firms has been confirmed by Boffa, Jansen and Solleder (2017) when they concluded that firms' GVC participation by way of imports and exports, including domestic value-added, is positively related to competition. The firms that operate as subsidiaries or branches of parent firms have decreased probabilities of exporting directly but have increases in the probability of exporting indirectly in both countries (Ghana 5.2% increase and Nigeria 6.2% increase). This finding is intuitive; a subsidiary firm may not make decisions and only rely on the parent company to engage in GVC.

The size of the firm also influences its GVC participation ability. In these countries, medium- and large-scale firms have increased in probabilities of exporting either directly or indirectly compared to small-scale firms. Medium-scale firms have a significant increase in the probability of exporting directly (by about 18.5%) and indirectly (by about 8.5%) in Ghana compared to small-scale firms. These percentages increase as we move from medium scale to large-scale firms. Some studies (such as Cusolito, Safadi and Taglioni, 2016; Miao and Fortanier, 2018; OECD, 2019) reached similar conclusions that firm size matters in GVC participation of firms and that GVC participation of firms is differentiated among SMEs and larger firms in terms of trade patterns and their impact.

An increase in the experience of top managers in the industry helps to increase the chances of the firm exporting directly and reduces the chances of exporting indirectly. In a similar vein, firms that are five years or less in operation have less probability of exporting directly. The reason could be that such firms are young and might not have the capacity or the needed finance or connection to the international market through goodwill to enable them to engage in GVC. This finding is in line with the conclusion made by Brancati, Pietrobelli and Mazzi (2021) that younger firms have fewer chances of engaging in GVC than older firms.

Generally, institutional factors affect firms' ability to engage in GVC. As shown in Tables 4.3 and 4.4, the tax rate is an obstacle that significantly affects the ability of firms to export (directly or indirectly) in all the countries. Customs and trade obstacles also significantly affect Ghanaian and Nigerian firms in exporting directly or indirectly. Specifically, customs and trade obstacles positively and significantly influence firms' indirect export potential and negative to firm direct export potentials in both countries. This is perhaps because of bureaucracies in customs and trade procedures; some firms would prefer exporting through other firms as a coping mechanism to circumvent the bureaucracies. For instance, Karakara and Osabuohien (2020c) indicated that strong institutions fostered trade and development when they studied the role of institutions in sustainable development in West Africa. Other scholars (e.g. Dollar and Kidder, 2017) found institutions to play a crucial role in influencing the success of firms in participating in GVC. The summary of key findings from the study is presented briefly in Table A5 in the Appendix.

5. Conclusion and recommendations

The study set out to empirically examine the factors that constitute major factors limiting the participation of firms in global value chains (GVC). It also discussed how such factors could be surmounted, and the mediating role of the institutional framework. We employed the logit model as an empirical strategy and used the World Bank's Enterprise Survey (ES) database for two West African countries: Ghana and Nigeria.

The findings obtained for the two countries are relatively diverse. Some of the main findings from the estimation carried out in the study are briefly summarised herein. The size of the firm greatly influences GVC participation drive. In effect, medium and large-scale firms have a greater likelihood to participate in GVC than small-scale firms. Akin to the above is that the location of the firm serves as an advantage to the firms' GVC participation, as firms in cities with a human population of over one million are more likely to be engaged in GVC than those in cities below one million. In Ghana, firms located in Tema (the industrial hub of Ghana) are more likely to participate in GVC than firms located elsewhere, while for Nigeria, firms in Lagos are more likely to participate in GVC compared to firms in other States in Nigeria.

Furthermore, the legal status of the firm helps in enhancing the prospect of the firm engaging in GVC. Firms that are shareholding (particularly with traded shares) or partnership firms are more likely to participate in GVC than sole proprietorship firms. Also, firms with financial access can expand to achieve higher productivity and subsequently engage in GVC. Likewise, firms that have an internationally recognized quality certification (IRQC) will be more likely to be GVC firms than other firms without IRQC. Also, institutional variables, such as customs, trade obstacles, and tax rates negatively affect firms' direct export ability in Ghana and Nigeria.

Therefore, this study suggests policy recommendations to help drive policies in Africa, particularly in the countries studied. The study submits that firm size matters. Medium and large-scale firms have greater ability to participate in GVC, and thus policies on stimulating firm GVC participation, in the short-run, could focus on medium and large-scale firms. Also, policies supporting small-scale firms in expanding could, in the long-run, help such firms participate in GVC. Small-scale firms could be given a production target and period allowance to start exporting.

Given that the legal status of the firm also matters in firm GVC participation, policies to enhance firm GVC participation should ensure that support includes upgrading firms to become shareholding firms (with traded shares preferred) or partnership firms. Government giving support to firms in Nigeria to become shareholding would positively and significantly impact their export performance. Generally, policies that encourage firms to become shareholders or partners improve their GVC participation.

Listing in the stock exchange market would enable firms to access the international market environment, including international financing.

Policies could concentrate on firms where the top manager has some years of experience in the industry of operation. In Nigeria, top managers who have more than 12 years of experience could help. In the case of Ghana, an average of 16 years should be the target. Further, firms that are a whole established firm and not a subsidiary or branch of another firm should be of policy target. The gender of the firm owner and top manager does not matter so much in the context of Ghana, hence there should not be a gender target as it would not make the desired impact. However, in Nigeria, the gender of firm owners is significant in influencing firm GVC participation.

On institutional variables, Customs and trade barriers negatively affect firms' direct export ability in Ghana and Nigeria. The customs and trade barriers only enhance firms' indirect exports, which implies the need to reduce customs bureaucracies and trade barriers. Also, the tax rate militates against firms' GVC participation in all the countries studied. The tax rate effect becomes pronounced when the rate is severe.

In sum, the study is relevant to industry players and firms, particularly on the mode of participation in GVC. This study is vital in helping public institutions (policy makers) mediate the GVC participation of firms to boost their production, which could subsequently create employment in domestic economies. Pursuing these policies could enhance corporate relations among local firms and international players and spur technology transfer to boost local firms' productivity and participation in GVC. This study made efforts to use complementary data from the World Bank's Informal Enterprise Survey (WEBS) to investigate if informal firms export through formal firms. It was based on activities in the informal sector, including informal cross-border trade that is common in West Africa. However, that dataset did not include variables on export that could be used for GVC. Thus, future studies could take it up, possibly using other data sources to complement the findings of the present study.

Notes

1. Revised Manuscript for the Developing Country Case Study Papers on Value Chain Development, Trade, and Economic Transformation in Africa Phase II.

2. This study is being supported by the African Economic Research Consortium (AERC)'s Developing Country Case Study Papers under 'Value Chain Development, Trade and Economic Transformation in Africa Phase II' (REF: RC23509). The authors appreciate the valuable comments of the resource persons, discussants, and participants at the inception (May 2023), mid-review (September 2023), and Final (January 2024) workshops. A version was also presented at the 64th Annual Conference of The Nigerian Economic Society in Abuja, Nigeria (October 2023). The views expressed are those of the authors.

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6. Efforts were made to use a complementary data from World Bank's Informal Enterprise Survey to see if informal firms export through formal firms. This intuition was based on activities in the informal sector, including informal cross-border trade. However, variables on export that could be used for GVC were not included in that dataset. Therefore, we did not use it, which would have been a good complement for the analysis.

7. As suggested during the last review, we tried to capture productivity as total output/sales per units of inputs (the cost of input). However, when we tried doing that, the total observations for each country reduced drastically as most of the firms had missing data points for the cost of input (labour) variable. Therefore, we resolved to use annual sales as the closest proxy.

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Appendix

Table A1: Summary of some related empirical literature

S/N	Authors/ Year	Focus	Method	Findings
1	Wignaraja (2013)	The five ASEAN countries under consideration are Indonesia, Malaysia, the Philippines, Thailand, and Vietnam	Two different econometric models were used for the investigation; one encompassing all firms within production networks, including both direct and indirect exporters, and another focusing exclusively on firms characterized as sustained exporters, separately for SMEs and all manufacturing firms	In the study's findings, it was revealed that within ASEAN economies during the late 2000s, large firms held a dominant position within production networks, whereas SMEs played a comparatively minor role The study further highlighted a moderate uptick in SME participation within ASEAN economies between the 1990s and the late 2000s, with this increase measured by the proportion of SME exports Examining the factors influencing SME participation in production networks, the study identified several positive determinants, including firm size, foreign ownership, a workforce with education, experienced CEOs, efforts to cultivate technological capabilities, and access to credit from commercial banks. Conversely, the study noted a negative relationship with firm age Among the obstacles encountered by SMEs, supply-side factors emerged as significant barriers. These included challenges such as limited access to finance, elevated electricity costs, variable quality of transportation systems, and a shortage of adequately educated workers

continued next page

Table A1 Continued

S/N	Authors/ Year	Focus	Method	Findings
2	Raei, Ignatenk, and Mircheva, (2019)	189 countries and 26 sectors	The study harnessed the expansive and recently developed Eora MRIO Database to delve into the degree of participation of both developed and emerging economies in GVCs and to assess the determinants and outcomes of such participation Specifically, the Eora MRIO Database furnished a comprehensive view of input-output connections among 189 countries and 26 sectors, encompassing services, which spanned from 1990 to 2013. This invaluable dataset enabled the computation of various indicators to measure the extent of GVC participation The research strategy involved an approach that disentangled the gross exports into their value-added constituents, predicated on the location where value-added was generated and its intended purpose. This method led to the breakdown of gross exports into two principal components: foreign value-added (FVA) embedded in a country's gross exports (reflecting backward linkages), and domestic value-added (DVA) within exports.	Engaging in GVCs yields favourable outcomes on multiple fronts. Notably, GVC participation exerts a positive influence on income per capita, encompassing its constituent elements such as investment and productivity. Furthermore, the share of trade related to GVC activities also contributes positively to factors such as human capital and productivity. This productivity is assessed as a residual within the equation used for income decomposition Using the gravity model framework, the study found that geographic distance discourages GVC participation, but economic size encourages it, as found in the traditional gravity literature The promotion of GVC engagement is also influenced by various structural factors. These factors include shared attributes such as geographical contiguity, colonial history, language, currency, free trade agreements, and a stable exchange rate relationship In addition, robust contract enforcement and adherence to the rule of law significantly enhance a country's ability to participate in GVCs, both as an exporter and importer Furthermore, the quality of a countries institutions, its infrastructure, and the level of unit labour costs play pivotal roles in determining GVC participation. It was observed that industries situated further upstream and those within the services sector tend to be more sensitive to trade barriers

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Table A1 Continued

S/N	Authors/ Year	Focus	Method	Findings
3	Arudchelvan and Wignaraja (2015)	Malaysia	The study collected data through a survey involving 234 entities engaged in both exporting and importing activities Cross-sectional probit regression	The extent to which firms engage in GVC trade is significantly influenced by several key factors. Notably, the size of the firm, its technological prowess (measured through indicators such as ownership of foreign technology licenses), and its investment in Research and Development (R&D) play pivotal roles in determining GVC participation Additionally, an insightful descriptive analysis of the barriers to using Free Trade Agreements (FTAs) revealed that the primary obstacle lies in the lack of information. This deficit of information emerges as the predominant reason hindering firms from capitalizing on the benefits offered by FTAs
4	Harvie, Narjoko, and Oum (2010)	Thailand, Indonesia, Malaysia, Phillipines, Vietman, Cambodia, Laos PDr and China	The survey conducted by the Economic Research Institutes for ASEAN and East Asia involved both descriptive and econometric analyses	Size, productivity, financial characteristics, foreign ownership, innovation endeavours, and managerial or entrepreneurial attitude are the crucial form characteristics that determine SME participation in production networks
5		Thailand	Panel fixed-effect regression, using unique panel firm-level data from 2004-2014	Labour productivity, foreign ownership, and R&D have statistically significant effects on GVC participation Firms that have a budget for R&D will produce goods and services of greater quality and with more effectiveness
Firms that have higher labour				

continued next page

Table A1 Continued

S/N	Authors/ Year	Focus	Method	Findings
6	Boffa, Jansen, and Solleder (2017)	Some developing countries	G2SLS, combining firm-level and TiVA data	The study discovered that firms' GVC participation in terms of imports to exports and DVA returning home is positively related to the competitiveness of SMEs
7	Cusolito, Safadi, and Taglioni, (2016)	SMEs in low-income countries	Qualitative approach	The study adeptly delineates the primary challenges that SMEs encounter as they strive to effectively partake in GVCs. These hurdles are classified into two categories: those originating externally and those arising internally within SMEs On the external front, the formidable obstacles encompass constraints such as restricted access to trade finance, and insufficient information concerning export prospects and procedural intricacies, elevated transportation and shipping expenses, deficient infrastructure, and regulatory ambiguities Internally, SMEs grapple with pivotal challenges, including becoming formal enterprises, heightening productivity levels, acquiring technological capabilities and managerial expertise, and fostering an environment conducive to innovation
8	Urata and Baek (2020)	111 countries and 38,966 firms with a focus on SMEs from 2009 to 2018	Econometric analysis Using the data obtained from the WBES	Robust labour productivity, substantial firm size, foreign ownership, and proficient technological competence emerge as crucial requisites for firms aiming to engage in GVCs and elevate their level of integration within GVC networks. Notably, technological capacity is crucial for SMEs
9	Reddy and Sasidharan (2021)	888 SMEs that belong to Indian manufacturing between 2006 and 2016	Firm-level-data obtained from the CMIE Prowess database	The research shows that one of the biggest obstacles Indian SMEs encountered when trying to join GVCs was financial constraints

Table A2: Firms' locational distribution and the regression results in Nigeria

Distribution percentages			Regression results based on state location		
Region/State	**Percentage**	**Obs.**	**Model 1**	**Model 2**	**Model 3**
Abia	3.94	70	-0.231**	-0.093	0.357
			(0.025)	(0.08)	(0.042)
Abuja	6.02	107	0.073	0.062	0.0872*
			(0.031)	(0.071)	(0.027)
Anambra	4.95	88	-0.056*	-0.163**	0.231
			(0.06)	(0.07)	(0.072)
Cross River	5.74	102	0.085	0.093	0.0689
			(0.051)	(0.06)	(0.052)
Enugu	5.18	92	-0.40*	-0.0964*	0.243*
			(0.061)	(0.032)	(0.06)
Kaduna	5.29	94	-0.067	-0.435	0.520
			(0.032)	(0.053)	(0.034)
Kano	8.16	145	0.046	-0.0982	0.128
			(0.08)	(0.047)	(0.062)
Lagos	9.45	168	Base category		
Oyo	3.66	65	-0.240*	-0.401	0.541**
			(0.035)	(0.036)	(0.038)
Gombe	5.97	106	0.173	0.079	0.084
			(0.062)	(0.042)	(0.04)
Jigawa	5.91	105	0.092	0.052	0.105
			(0.021)	(0.076)	(0.042)
Katsina	5.18	92	-0.084	-0.0782	0.085*
			(0.052)	(0.032)	(0.09)
Kebbi	5.80	103	0.053	0.271	0.302
			(0.038)	(0.058)	(0.01)
Kwara	4.90	87	-0.063*	-0.069**	0.095
			(0.028)	(0.050)	(0.064)
Nasarawa	6.30	112	0.0456	0.427	0.510*
			(0.023)	(0.08)	(0.034)
Niger	6.19	110	0.087	0.0897	0.0921
			(0.037)	(0.064)	(0.054)
Ogun	0.79	14	-0.612*	-0.601**	0.732*
			(0.074)	(0.045)	(0.073)

Sokoto	3.55	63	-0.048	-0.721	0.631
			(0.052)	(0.056)	(0.051)
Zamfara	3.04	54	-0.782	-0.820	0.532
			(0.063)	(0.043)	(0.062)

Source: Authors' estimation
Note: The standard errors are within brackets; (***) significant at 1% level; (**) significant at 5% level; (*) significant at 10% level.

Table A3: Determinants of firms having internationally recognised quality certification

Variable	**Ghana**	**Nigeria**
Age of firm (< =5 years)	-0.113* (0.061)	-0.095** (0.046)
Region of operation (Base category:	Accra	A
North (Ghana)	0.100 (0.078)	
Takoradi – (Ghana)	0.1563 (0.117)	
Tema – (Ghana)	0.1562* (0.705)	
Firm locality	(Base category: City of over 1 million population)	
Between 250,000 and 1 million	-0.396 (0.045)	-0.019 (0.022)
Below 250,000	0.046 (0.096)	-0.056* (0.03`)
Gender of the owner (Female)	-0.0249 (0.050)	-0.044 (0.032)
Gender of top manager (Female)	-0.0180 (0.067)	0.023 (0.035)
The legal status of the firm	(Base category Sole Proprietorship)	
Shareholding firm (with traded shares)	0.0764 (0.17)	0.134* (0.082)
Shareholding firm (without traded shares)	-0.0261 (0.069)	0.123* (0.069)
Partnership	0.124* (0.065)	0.132*** (0.05)
Competition (No)	-0.0169 (0.044)	-0.019 (0.023)
Subsidiary firm (Yes)	-0.164* (0.095)	-0.047* (0.03)
Firm type	(Base category: Small scale)	
Medium scale	0.136* (0.0898)	0.074 (0.058)
Large scale	0.226** (0.097)	0.267*** (0.075)
Top manager experience	0.010* (0.003)	0.001 (0.001)
Productivity (Total annual sales)	0.0983**(0.0235)	0.0993***(0.0120)
Financial constraint (No)	0.0885**(0.0132)	0.0776**(0.0042)
Log Likelihood	-123.548	-496.3595
Pseudo R2	0.3032	0.1514
Prob>Chi2	0.0000	0.0000
Observations	536	1,777

Source: Authors' estimations
Note: The standard ersrors are within brackets; (***) significant at 1% level; (**) significant at 5% level; (*) significant at 10% level. "*A*" in the Table A2.

Table A4: Multicollinearity test using Variance Inflation Factor (VIF)

Variables	VIF	1/VIF
Age of firm	1.02	0.955
Gender of the firm owner	1.16	0.754
Gender of the top manager of the firm	1.07	0.822
Firm locality		
A city of over one million population	2.18	0.532
Between 250,000 and one million	2.53	0.328
Below 250,000 population	1.28	0.742
The firm competes with informal firms	1.53	0.701
The legal status of the firm		
Sole proprietor	1.49	0.538
Shareholding (with traded shares)	1.72	0.744
Shareholding (without traded shares)	1.16	0.897
Partnership	1.23	0.869
Top manager experience	1.51	0.821
Whether firm is a subsidiary	1.41	0.738
Productivity	2.04	0.921
Financial constraint	2.12	0.953
Firm size		
Small scale	2.24	0.454
Medium scale	2.53	0.418
Large scale	1.61	0.531
Mean VIF	1.657	

Table A5: Summary of key findings of the study

S/N	Summarised Main Findings of the study
1	Firm size greatly influences firm GVC drive. Medium and large-scale firms have a greater ability to participate in GVC than small-scale firms.
2	The legal status of the firm helps in enhancing the firm prospect of engaging in GVC. Firms that are shareholding (particularly with traded shares) or partnership firms are more likely to participate in GVC than sole proprietorship firms.
3	Firm location serves as an advantage to the firm GVC participation, as firms in cities with a human population of over one million are more likely to be engaged in GVC than those in cities below one million. This is seen in Ghana for firms located in Tema. The industrial hub is more likely to participate in GVC than firms located elsewhere. A similar thing is observed for firms in Lagos as against firms in other States in Nigeria.
4	The firms that achieve productivity increases are likely to be pushed into exporting. Also, firms with financial access can expand to achieve higher productivity and subsequently engage in GVC. Likewise, firms that have an IRQC will be more likely to be GVC firms than other firms without IRQC.
5	Institutional variables, such as customs, trade obstacles, and tax rates negatively affect firms' direct export ability in Ghana and Nigeria but push for indirect export drive of firms.

Mission

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