Assessing the Drivers of Firm Participation in Global Value Chains: Empirical Evidence from Tanzania

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Bringing Rigour and Evidence to Economic Policy Making in Africa

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List of abbreviations and acronyms

AERC	African Economic Research Consortium
ASIP	Annual Survey of Industrial Production
AIS	Agriculture Innovation Systems
ASEAN	Association of Southeast Asian Nations
BoT	Bank of Tanzania
FDI	Foreign Direct Investment
FTAs	Free Trade Agreements
FYDP	Five Year Development Plan
GVCs	Global Value Chains
ITU	Innovation and Technology Upgrading
MSMEs	Micro, Small and Medium Enterprises
MNCs	Multinational Corporations
NVCs	National Value Chains
OLS	Ordinary Least Squares
RandD	Research and development
REPOA	Research on Poverty Alleviation
RTAs	Regional trade agreements
RVCs	Regional Value Chains
TES	Tanzania Enterprise Survey
URT	United Republic of Tanzania
VAPW	Value Added Per Worker

Abstract

Using firm-level data from the recently available Tanzania Enterprise Survey (TES) 2022, this paper provides empirical analysis of drivers of firm participation in global value chains (GVCs), and implication of such participation on firm performance in Tanzania. The findings show that, firm size, awareness of external markets, investment in Research and Development (RandD), and engagement in innovation and technology upgrading are significant drivers of firm participation in GVCs for Tanzania. The paper confirms the widely acclaimed conclusions in the literature that firm participation in GVCs is positively and significantly associated with higher firm performance. However, despite the positive role of GVC, the extent of firm participation appears low for Tanzania, mainly on account of low level of capacity of often small and informal firms. The findings underscore the need to increase government's efforts to improve environment and incentive for small firms to formalize and grow. The results are also supportive of the need for policy to promote regional integration, investment in RandD, innovation, and technology upgrading.

Key words: *Firms; GVC participation; Firm performance.*

JEL classification codes: *L25; L2.*

1. Background and motivation

Participation in global value chains (GVCs) can lead to positive spill-over effects, such as the acquisition of new know-how, innovative activities and the ability to source goods and services at competitive prices. These factors play an important role in sustaining growth of industrial sector in developing countries. Given increased pace of GVCs activities, policy makers and researchers have increasingly considered GVCs as a driving force for industrialization and attempting to develop policies to engage domestic firms in GVCs (Li & Liu, 2014). Indeed, developing countries have formulated favourable policies (mainly industrial and trade) to support firms' integration into GVCs. In the case of Tanzania, the current development policy framework, as enshrined in the third Five Year Development Plan (FYDP III), recognizes the role of fostering firm participation in global and regional value chains in realizing its key objective of building a competitive industrial sector. Notwithstanding the said benefits of GVC participation and the government's efforts, firm participation in GVCs in Tanzania industrial sector is low. According to the recently available Tanzania Enterprise Survey (TES) 2022 data set, and using similar definition of firm participation in other studies (imports and exports indicators), only 2.2% of firms in the industrial sector participated in GVCs in 2021. Another related (albeit dated) survey data for Tanzania is the Annual Survey of Industrial Production [ASIP] for 2016 (URT, 2018), which shows that only 3.4% of firms participate in GVCs. These figures are apparently much lower compared to 21.4% for firm participation in GVCs in North Africa and an average of 18% in sub-Saharan Africa (see Urata and Baek, 2020). Earlier research on Tanzania by Mkenda and Rand (2020), Mpunga (2016), and Lwesya (2021) explain the low level of firms participation in international markets to include constraints related to global competition, i.e., lack of market information, low standard of products produced locally, lack of knowledge of marketing regulations and standards; and supply-side constraints, i.e., poor physical infrastructure (roads, power, communication, and ICT infrastructure) and low access to credit.

Using the case study of Tanzania, this study examines the level and determinants of firm participation in GVCs, and analyse its implications on performance of industrial manufacturing firms. The study is part of the second phase of the African Economic Research Consortium (AERC) project on Value Chain Development, Trade and Economic Transformation in Africa. Although the literature on firm participation in GVCs is abundant (see Gopalan et al., 2022; Urata and Baek, 2020; Skenderi, 2013; Clarke, 2008; etc.), to the best of our knowledge this paper is the first empirical work on firm participation in GVCs in Tanzania using the most recent firm survey (TES, 2022) data.

2. Research problem and rationale

Generally, existing studies predominantly rely on trade related indicators including exports and imports to measure firm participation in GVCs. However, firm participation in GVCs goes beyond trade related activities and may include firms with partnerships with Foreign Direct Investments (FDIs) where a local firm participates in GVCs indirectly through transactions with FDIs. One of the objectives of MNCs establishing a foreign affiliate in developing country such as Tanzania is to construct GVCs where the foreign affiliate assembles products with imported parts and components before exporting. Similar studies conducted earlier, including Wignaraja (2013), have also found a positive relationship between foreign ownership and GVC participation in Association of South Eastern Asian Nations (ASEAN). Nonetheless, despite the different forms of firm participation in GVCs, the extent and impact of GVC participation is likely to vary between countries, reflecting the different policy and business environments for firms, which are usually country-specific (Urata & Baek, 2020). Thus, in the case of Tanzania, we do not know which forms of GVC participation are best associated with higher firm performance, and which conditions impede or promote such participation. Furthermore, it is not clear if participating in GVC contributes to growth performance of firms.

3. Literature review

This section provides a brief review of selected empirical studies, as summarized in Table 1, from which we highlight a few broad issues and features with implications on our choice of methodology.

First, and overall, the literature is generally affirmative on the positive impact of firms' participation in GVC for a developing country such as Tanzania. Secondly, although different studies have identified different determinants of firms' participation in GVC, we observe some familiar drivers of participation. These include firm size (higher participation for large firms), productivity, access to finance, foreign ownership, and investment in R&D, etc. For example, Urata and Baek (2020) found that the drivers of GVC participation differ markedly depending on firm characteristics. In particular, firm size and foreign ownership appear to be more important drivers compared to others. Other studies have analysed a particular driver of GVC. For example, Hoekman and Sanfilipo (2022) analysed the effect of proximity to FDI in enhancing GVC participation in Africa, noting that FDI is particularly strong in manufacturing compared to other sectors. Coulibaly et al. (2023) found that firms that participate in GVCs in Côte d'Ivoire and Cameroon were more productive and live longer compared to those that do not participate. Thirdly, some studies go extra step to identify benefits of GVC participation. Generally, the literature shows that exporters of intermediate products benefit relatively more from GVC participation compared to firms that sell final products. Underlying this empirical finding is the idea that intermediate products are traded through GVCs. For example, the available evidence suggests that developing countries have been quickly gaining momentum in their participation in trade on parts and components (Foster-McGregor et al., 2015). Finally, since the current study focuses on Tanzania, our review of relevant studies shows that the existing studies on Tanzania are mainly descriptive with relatively small scope in terms of limited sample size, sector of focus, and depth of analysis, hence limited empirical evidence.

Our study uses the recently available enterprise survey (TES 2022) data set that covers almost all sectors of the economy with most of the firm characteristics used in most of the existing empirical studies. Such data advantages allow us to enhance comparability of our results with those of existing empirical studies. However, the empirical strategy will be limited to the use of one time cross-sectional data, which, as in the case of other studies that didn't use a panel data, denies us opportunity to account for endogeneity problem and control for confounding factors.

Table 1: Summary of reviewed previous studies

Author and Year	Objectives	Indicator of Firm Participation in GVC	Methodology for Analysis	Data	Major Conclusions
Urata and Baek (2020)	To determine firm level and country level factors that affect the probability and the level of GVC participation by firms	Two indicators: Firms that imports and exports; and GVC participation index[1]	Descriptive analysis, Probit and Tobit estimation	Used cross-sectional data of 38,966 firms found in 111 countries in Africa, America, Europe, and Oceania. The data is sourced from three data sets (World Bank, namely Enterprise Surveys, Global Development Indicators, and Logistics Performance Index)	High labour productivity, firm size, foreign ownership, high technological capability for a firm to participate in GVC
Arudchelvan and Wignaraja (2015)	To assess characteristics of SMEs participating in GVCs in Malyasia	Being part of R/GVC (dummy variable)	Used descriptive analysis and Probit estimation method	The study used cross sectional data of 234 firms in Malaysia	Size of SME and technology capability were found to have positive effect of GVC participation
Hoekman and Sanfilipo (2022)	To assess what types of FDI are more likely to influence participation in global value chains (GVCs)	Dummy variable (both import and export); and ownership of internationally recognized certification	The study used panel fixed effects for analysis	Combined data on the location of FDIs within and across African nations (from FDI markets database) with firm-level survey data (WBES) and information on sectoral input-output relationships (from the multi-region Eora database)	Domestic firms located near FDIs that offer potential supply or demand linkages are more likely to engage in GVCs. Proximity to FDI projects in the same sector is less likely to affect GVC performance of domestic firms

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Table 1 Continued

Author and Year	Objectives	Indicator of Firm Participation in GVC	Methodology for Analysis	Data	Major Conclusions
van Der Marel et al. (2021)	To explore the relationship between the use of service inputs, participation in GVCs, and firm productivity	Measured firm's integration in GVCs from the intensity of a firm's internationalization strategy, i.e., how many international activities the firm uses in combination[2]	Descriptive analysis and fixed effects to account for sector-specific heterogeneity and instrumental variable to account for endogeneity and reverse causality issues	Used panel data set of 13,937 firms covering the period 1990–2017, sourced from prowess database	Firms integrated in GVCs have a higher productivity premium relative to domestic firms, with the productivity premium increasing with the extent of integration into GVC
Coulibaly et al. (2023)	Assess characteristics of firms that participate in GVCs in Ivory Coast and Cameroon	Created a dummy variable with values 1 if a firm is both exporting and importing in the same year according to customs data while showing a positive production and labour value in the firms' census data; and 0 otherwise	Descriptive analysis and panel fixed effects regression	Panel data of firms created by combining national firm-level census data and customs data covering 2013 and 2016 years for each country, i.e., Ivory Coast and Cameroon	Firms engaged in GVCs are larger, more productive, and live longer than one-way-traders or domestic firms. Surprisingly, however, there are more GVC firms than pure exporters, a sign of the challenges faced by firms in those countries if they want to sell abroad
Kweka and Sooi (2020)	Analysed the role of linkages with large/ MNCs firms on the performance of SMEs in Tanzania	Trade indicators; having a relationship with technology intermediaries; and operating in sectors with high presence of large firms	Descriptive analysis, panel random and fixed effects, and case study analysis using desk review	National census data set, i.e., Annual Survey of Industrial Production data (ASIP) for the period 2008–2016	Linkage between SMEs and large firms in Tanzania is low and is driven by production capacity, membership in sector association, and nature of industrial activities
Boys and Andreoni (2020)	Assess how NVCs and RVCs offer different opportunities for upgrading and competitiveness than GVCs in textile sector	No definition of GVC firm provided	Descriptive analysis and desk work	(i) ASIP data (ii) Trade data from UN COMTRADE and (iii) primary data obtained from firm survey	GVC firms focus on a narrow range of lower-value functions because of being foreign owned and the structure of AGOA trade rents, while RVC and NVC firms perform a wider range of functions

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Table 1 Continued

Author and Year	Objectives	Indicator of Firm Participation in GVC	Methodology for Analysis	Data	Major Conclusions
Thomas and Makundi (2021)	Examine the role of GVC in strengthening AIS through the case study of avocado farming in Siha District,	Avocado farmers exported their produce and imported some of their inputs.	Descriptive and qualitative analysis	Collected primary data from 100 avocado farmers, and 14 key informants from the AIS	GVCs have influenced AIS, particularly in terms of technological capabilities building for small-scale producers of avocado
Lwesya (2021)	To assess the challenges and constraints which obstruct the participation of SMEs in GVCs	This is a desk work study with no definition of GVC firm	Desk review	Data was sourced from reviewed policies, strategies and previous studies	The major challenges for SMEs internationalization in Tanzania are international marketing related constraints and global competition, supply-side constraints, unfriendly investment climate, and financial constraints

Source: Authors' own construction.

4. Data

To measure the extent and analyse the drivers of GVC participation in Tanzania, we used the recently available Tanzania Enterprise Survey 2022 (TES 2022) data set which was collected by Research on Poverty Alleviation (REPOA) in 2022. The TES 2022 data set is a cross sectional data of 1,585 firms, including MSMEs and large firms operating across all regions in Tanzania. Besides firm characteristics information, i.e., location, sector, size, form of ownership, etc., the data contains information on production, trade and investment activities, business environment challenges, and business linkage structure. According to the TES documentation report, the sample was selected using stratified random sampling, in which three levels of stratification were used: activity/sector, establishment size, and region. The stratification ensured acceptable level of precision for estimates within size (small, medium, and large) at the different levels of regional and sectoral stratification.

Table 2 shows the distribution of firms in the data set by sector and firm size. Note that we adopted firm size definition provided in the Tanzania MSME policy (see United Republic of Tanzania [URT], 2003) which groups firms based on number of employees, i.e., micro (1-4 employees), small (5-49 employees), medium (50-99 employees), and large (100+ employees).

Table 2: Distribution of firms in the TES 2022 data set by sector and size

Sector	Small	Medium	Large	Total	Structure (%)
Agriculture, forestry and fishing	107	5	20	132	8.3
Construction	5	2	4	11	0.7
Financial and insurance activities	54		11	65	4.1
Manufacturing	251	5	74	330	20.8
Mining and quarrying	14	1	6	21	1.3
Other activities	36		3	39	2.5
Professional, scientific and technical	11		1	12	0.8
Public administration and public service	8	4	1	13	0.8
Education and human health	59	1	29	89	5.6
Tourism	144	1	33	178	11.2
Wholesale and retail trade; repair	532	1	112	645	40.7
Transportation and storage	36		14	50	3.2
Total	1,257	20	308	1,585	100

Source: Authors' analysis of the TES 2022 data set.

From Table 2, we observe that the enterprise sector is dominated by small firms operating in wholesale and retail and manufacturing sectors. In addition, we also present summary statistics for some important variables related to the study in Table 3. Note that some firms did not have information in some variables, and that is why the number of observation (N) in Table 3 is lower than the total number of firms presented in Table 2.

Table 3 shows that the proportion of importers, i.e., 10% is higher than that of exporters at 8%, suggesting that it is generally more difficult to export than to import. It should be noted that the importer/exporter estimate does not include indirect exporters or importers as the survey did not collect such information. The proportion of female-owned firms is 25% (male-owned is 75%), and that the proportion of FDIs is much smaller (3%) compared to domestic owned firms (97%). The data set also indicates high proportion of informal firms, i.e., 82%, reflecting the large size of informal sector, given dominant share of small firms—a feature also documented in previous literature (see URT, 2021).

Table 3: Basic summary statistics

Variable	N	Mean	SD	Minimum	Maximum
Importer	1,500	0.1	0.26	0	1
Exporter	1,500	0.08	0.27	0	1
Informal firms	1,500	0.82	0.38	0	1
Female owned firms	1500	0.25	0.43	0	1
Foreign owned firm (FDI)	1,500	0.03	0.17	0	1
Firm age	1,500	11.45	10.33	1	123
Total employment	1,500	17.63	111.24	1	3500
Sales (million Tsh)	1,419	2,710	56,700	0.10	2,010,000
Total production costs (million Tsh)	1,406	2,370	37,200	0.05	1,000,000
Value added per worker (million Tsh)	1,311	75.90	926	-	30,300

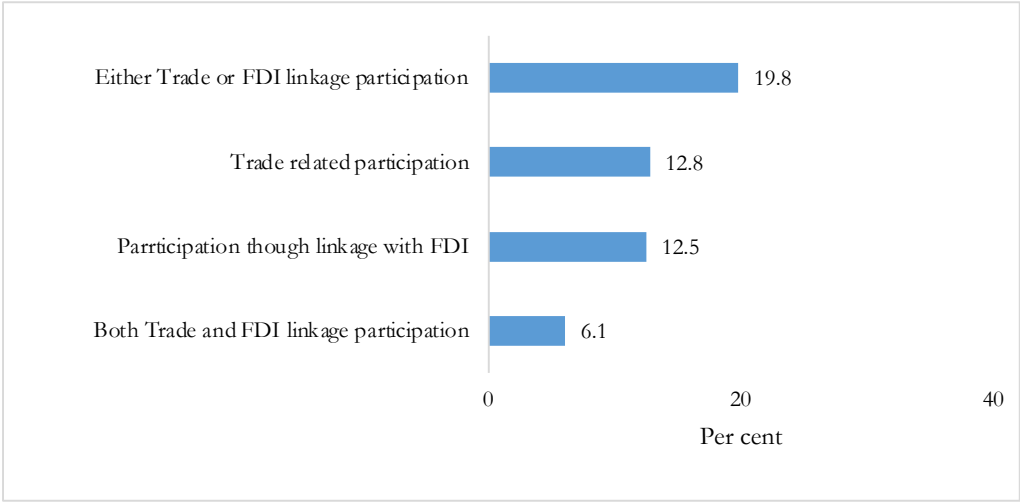
Source: Author analysis of TES 2022 data set.

5. Empirical analysis and results

The structure and extent of firm participation in GVCs

Using descriptive analysis of the TES data, we begin by measuring the extent and form of firm participation following methodology by Urata and Baek (2020) that defined firms participating in GVC as those that import raw materials and intermediate goods or export their goods and/or services. As noted earlier, we extend this definition to include FDI related GVC participation occurring from the partnerships between local firms and MNCs. Indeed, one of the objectives of MNCs establishing a foreign affiliate in developing country such as Tanzania is to construct GVCs where the foreign affiliate assembles products with imported parts and components before exporting. Similar studies conducted earlier, including Wignaraja (2013), have also found a positive relationship between foreign ownership and GVC participation in ASEAN countries. Clearly, by extending this form of GVC participation, the estimated proportion of firms participating in GVC in the TES 2022 data increases to 19.8% (Figure 1). The extended form of GVC participation is also useful way to capture possible underestimation of indirect trade (re-exports and re-imports) that is not captured in the TES data set but fully captured in the comparator study (i.e., Urata and Baek, 2020), and who found that firm participation in GVCs in sub-Saharan Africa is 18%. Perhaps in common with most other low income countries, we observe that trade related participation is more common among Tanzanian firms compared to participation through linkage with FDIs. Firms that engaged in both trade related GVC and through linkage with FDIs were the fewest (6% of all firms).

Figure 1: Distribution of firm participation in GVCs



Source: Author analysis of TES 2022 data set.

We then estimate the extent of firm participation in GVCs across different firm characteristics such as size, sectors, and gender, etc. In general, the sectoral variation matters as the nature of activities determine the need for such firms to participate or less so in GVC. The estimated results of GVC participation by sector (Table 4) show that construction, transport and storage, and the manufacturing sectors have the highest incidence of firms participating in GVCs, while public administration and public services and education, human health and social work activities have the lowest incidence. Plausible explanation of the sector variation in the extent of GVC participation is that it reflects dynamics of growth and nature of the activities. For example, the high extent of participation by the construction sector reflects the enormous growth performance of construction activities in recent years in response to urbanization and large public infrastructure investments (see URT, 2021) which has led to high imports of construction related inputs. According to Bank of Tanzania (BoT) (URT, 2023),the share of construction related imports in total merchandise import bill was estimated at 11% during 2019–2023 period. In addition, the World Development Report (see World Bank, 2020) shows that, construction—alongside manufacturing and transport—is one of the sectors that have high levels of integration in the GVCs. On the contrary, the estimate of GVC participation for the agriculture sector is low, reflecting the fact that the sector is associated with low level of agriculture commercialization due to limited access of farmers to external markets (see URT, 2017; URT, 2021). The agriculture sector is also associated with low presence of FDI. According to data from BoT (URT, 2022), agriculture sector accounted only for 2.7% of total FDI inflow in Tanzania during 2016–2021 period. In the services sectors, almost none of the finance and insurance activities participate in GVC owing to the fact that such activities are mainly domestic. The professional and public administration services activities are only associated with FDI/technology related form of GVC participation. In general, sectors with high incidence of GVC participation in all forms include transport, manufacturing, and construction.

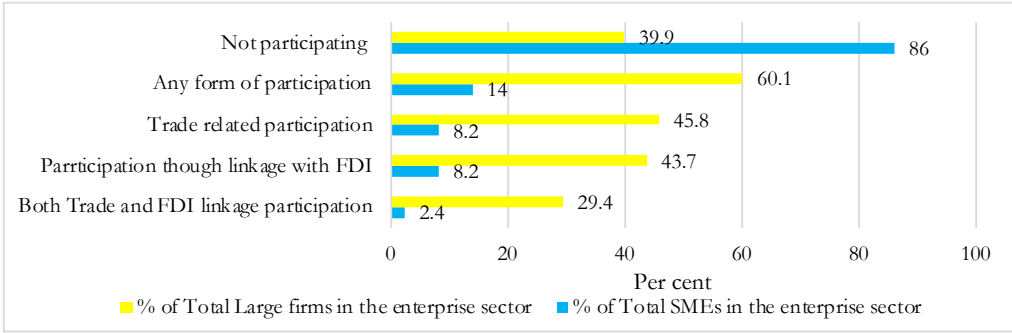
Table 4: Incidence of firm participation in GVC across different sectors

Sector	Number of Firms	Total Participation (Trade or FDI) (%)	Trade Related Participation (%)	Participation through Linkage with FDI (%)	Both Trade and FDI Linkage Participation (%)
Construction	10	40.1	33.8	37.3	17.5
Transportation and storage	48	28.3	28.3	9.5	9.5
Manufacturing	316	24.7	18.5	17.0	10.8
Mining and quarrying	21	23.8	3.7	3.5	1.9
Tourism	163	17.9	14.3	7.8	4.1
Wholesale and retail trade	616	16.7	8.9	9.8	2.0
Agriculture	124	16.6	13.4	5.2	2.0
Financial and insurance	63	14.4	0.0	14.4	0.0
Professional and technical	11	10	0.0	10.0	0.0
Education	79	8.9	5.1	6.7	2.9
Public administration	10	8.7	0.0	8.7	0.0
Other activities	39	8.5	8.5	7.3	7.3
All firms	1,500	19.8	12.8	12.5	6.1

Note: 'All firms' means the proportion of all firms across all sectors participating in GVC (total trade, technology or both).
Source: Author analysis of TES 2022 data set.

In Figure 2, we estimated the distribution of GVC participation based on firm size, i.e., small (MSMEs) compared to large firms. The estimates show that GVC participation is prominent among large firms compared to small firms, consistent with the standard findings in literature that GVC participation is more common among large firms compared to SMEs (Lunati et al., 2008; Urata, 2021).

Figure 2: Distribution of firm participation in GVCs by size



Note: As noted previously, we have adopted firm size definition provided in Tanzania national MSME Policy (2003) which groups firms based on number of employees such that MSME is any firm that employs 1-99 employees while large firm is one that employs 100+ employees.
Source: Author analysis of TES 2022 data set.

More generally, we explored variety of other firm characteristics to compare actual variation between firms that participate versus those that don't participate in GVC. The aim is to examine how significant are the underlying characteristics differences using t-tests. The findings (Table 5) show that firms that participate in GVCs have significantly higher productivity, defined herewith as value added per worker (VAPW) or wage per worker. In addition, such GVC firms are formally registered, have business and strategic plan, are aware of regional trade preferences (RTAs/FTAs) and conduct R&D activities compared to the firms that do not participate in GVCs. Note that, other familiar firm characteristic such as access to finance (proportion of firms that were able to access loans) is not statistically different between the two groups. Table 5 also shows that the proportion of women owned firms that participate in GVCs is significantly lower than those not participating in GVCs, underlying significant gender differences in GVC participation in favour of men than women. In terms of sectors, the share of firms in the manufacturing and transport and storage activities that participate in GVCs is significantly higher than in other sectors.

The TES 2022 data set also provides information on the challenges that limit firms from participating in GVCs. These challenges include those that prevent firms from expanding to regional and international markets, accessing knowledge transfer from FDIs/MNCs, and in hiring foreign experts. Following, we have estimated the proportion of firms that have identified a certain challenge as a per cent of total number of firm—such that the percentage estimates add up to 100%. The results (Table 6) show that lack of finance was the most frequently cited bottleneck limiting learning from GVCs followed by difficult requirements, intellectual property rights, and lack of skilled workers. Furthermore, limited production capacity was a critical barrier for majority of firms seeking to expand their exports to regional and international markets, followed by inability to meet stringent market requirements and lack of market information. These challenges have also been identified in previous literatures or policy documents (see Lwesya, 2021; URT 2021; and URT, 2017). On hiring foreign experts, firms cited access to visa and work permit as the main challenge.

Clearly, the cited challenges are linked to firm characteristics. For example, as shown in Table 6, we observe that stringent rules and lack of market information and requirements was identified by high proportion of large firms compared to small firms (MSMEs). Further, being satisfied with domestic market was only identified by the small firms reflecting their small size and therefore inability to produce enough for both domestic and foreign markets. Limited production capacity is observed to be a major obstacle for both small and large firms as the obstacle is selected by highest proportion of firms in both categories. Table 7 also shows that obstacles limiting hiring of foreign experts are more prevalent for large than small firms since it is the large firms that are most likely to demand foreign experts compared to small firms. Furthermore, the proportion of small firms that revealed to face no challenge in hiring foreign experts was higher than that of large firms.

Table 5: Comparison of firms participating against those not participating in GVCs

	Firms Participating in GVCs				Firms Not Participating in GVCs			
Variable	**Obs**	**Mean**	**Min**	**Max**	**Obs**	**Mean**	**Min**	**Max**
Value added per worker (millions)	243	93.7*	0.05	30,300	1068	22.2*	0	3,600
Wage per worker (millions)	312	46.3*	0	10,000	1,130	1.6*	0	142
Number of employees	323	78***	1	3500	1,259	6.1***	1	320
Number of years in operation	323	14.4***	1	88	1,259	10.5***	1	123
Female ownership (%)	323	16.9**	0	1	1,259	25.9**	0	1
Registered firm (%)	323	65.6***	0	1	1,259	34***	0	1
Has business and strategic plan, etc. (%)	323	54.6***	0	1	1,259	21.8***	0	1
Aware of RTA/FTA (%)	323	53.9***	0	1	1,259	21.4***	0	1
Access to finance (loan) (%)	323	32.3	0	1	1,259	29.6	0	1
Conducts R&D (%)	323	39.7***	0	1	1,259	11.7***	0	1
Sector (reports only the significant ones)								
Financial and insurance activities (%)	323	1*	0	1	1,259	1.4*	0	1
Manufacturing (%)	323	54.3***	0	1	1,259	39.3***	0	1
Transportation and Storage (%)	323	0.7**	0	1	1,259	0.4**	0	1

Notes: T-tests measures statistical significance of differences of their means for each variable. *** p<0.001, ** p<0.05, *p<0.1; and the stars show the level of significance of the difference between the two groups for a certain variable. * is 10% level of significance, ** is 5% level of significance, and *** is 1% level of significance.
Source: Author analysis of TES 2022 data set.

Table 6: Challenges limiting firms from participating in GVCs

Barriers of Expanding to Regional Markets		Barriers of Technolohy Transfer from MNCs		Barriers of hiring Foreign Experts	
Challenge	**% of all Firms**	**Challenge**	**% of all Firms**	**Challenge**	**% of all Firms**
Limited production capacity	31.2	Financial Constraint	32.4	Visa and Work Permit issues	42.0
Lack of market information and requiremen	23.2	Difficult requirements and intellectual property	25.4	Expats are Expensive and problematic	17.4
Stringent rules (inability to meet m	22.4	Lack of skilled workers	14.4	Language Barriers	8.7
Existence of NTBs	13.6	Low level of productivity	10.4	Lack of information on how/where to find them	4.4
Satisfied with current markets	4	Inadequate knowledge/experience	7.6	No barrier	27.5
I don't Know	1.6	No barrier	9.8		
No barrier	4				
Total	**100**		**100**		**100**

Source: Author analysis of TES 2022 data set.

Table 7: Challenges limiting firm participation in GVCs (small vs. large firms)

Barriers of Expanding to Regional Markets			Barriers of Technolohy Transfer from MNCs			Limitations of hiring Foreign Experts		
Challenge	**% of all MSMEs**	**% of all Large**	**Challenge**	**% of all MSMEs**	**% of all Large**	**Challenge**	**% of all MSMEs**	**% of all Large**
Limited production capacity	31.4	30	Lack of finance (financial constrain	32.9	18.9	Visa and Work Permit issues	35.4	57.1
Lack of market information and requi	21.9	30	Difficult requirements and intellect	24.6	48.6	Expats are Expensive and problematic	20.8	9.5
Stringent rules (inability to meet m	4.8	25	Lack of skilled workers and/or techn	14.4	16.2	Language Barriers	6.3	14.3
Existence of NTBs (Non-Tariff Barrie	13.5	15	Inadequate knowledge/experience	7.7	5.4	Lack of information on how/where to	2.1	9.5
Satisfied with current markets	4.8	0	Low level of productivity (no demand	10.4	8.1	No challenge	35.4	9.5
No barrier	4.8	0	No obstacle	10.0	2.7			
Total	**100**	**100**		**100**	**100**		**100**	**100**

Source: Author analysis of TES 2022 data set.

Empirical analysis on the drivers of firm participation in GVCs

Having assessed the nature and extent of firm participation in GVC, we now turn to empirical investigation to understand the drivers of such participation. Our empirical analysis is conducted using two models. The first model identifies the drivers (correlates) of GVC participation followed by the second model that analyses the association of GVC participation with firm performance.

Since we are using a TES 2022 which is a cross sectional data, we adopt the model by Urata and Baek (2020) that also used a cross sectional data to identify firm characteristics that are significantly correlated with firm participation in GVCs (as defined in the preceding section). The model is specified as follows:

$$GVC_i = \emptyset + \beta_1 lvapw_i + \beta_2 lage_i + \beta_3 reg_i + \beta_4 loan_i + \beta_5 rd_i + \beta_6 sme_i + \beta_7 female_i + \beta_8 itu_i + \beta_9 rta_i + \beta_{10} fdi_i + \beta_{11} docc_i + \beta_{12} sector_i + \beta_{13} region_i \quad (1)$$

Where: $\boldsymbol{GVC_i}$ is the indicator for firm participation in $\boldsymbol{GVC_s}$; *i* refers to firm i and β_j are the coefficients of explanatory variables. The explanatory variables are described in detail in Table 8.

Table 8: Variables used in regression analysis

Regression	Variable Name	Label	Variable Form	Expected Sign
Drivers of participation in GVCs regression (Equation 1)	Participation in GVC through trade	*Trade*	Dummy	N/A
	Participation in GVC through linkage with FDI	*Tech*	Dummy	N/A
	Participation in GVC through trade or linkage with FDI	*Trade/FDI Linkage*	Dummy	N/A
	Participation in GVC through both trade and linkage with FDI	*Both*	Dummy	N/A
	Log of value added per worker	*lvapw*	Continuous	+
	Log of firm age	*lage*	Continuous	+
	Registration status of the firm	*reg*	Dummy	+
	Access to finance	*loan*	Dummy	+
	Firm conducts R&D regularly	*rd*	Dummy	+
	Being a small firm	*sme*	Dummy	-
	Female owned firms	*female*	Dummy	-
	Firm conducted ITU activities in the past 5 years	*itu*	Dummy	+

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Table 8 Continued

Regression	Variable Name	Label	Variable Form	Expected Sign
	Awareness of Regional/Free Trade Agreements	*rta*	Dummy	+
	Foreign owned firms	*fdi*	Dummy	+
	Firm has a business and strategic plan	*docc*	Dummy	+
	Sector	*sector*	Discrete	+/- depending on region
	Region	*region*	Discrete	+/- depending on region

Source: Author's own compilation.

Equation 1 is estimated using probit estimation technique. However, one challenge that is also noted in previous firm-level empirical studies on GVC participation is the endogeneity problem in the explanatory variables that is difficult to address given the fact that our data is cross sectional and not a panel. As a result, the estimation cannot control for confounding factors through the use of fixed effects, and so our estimated results cannot be interpreted as capturing the causal relationship but shows the correlations. The estimates are reported in Table 9 with four specifications that varied the form of GVC participation to include: trade related, FDI related, FDI or trade related, and FDI plus trade related GVC activities.

Table 9: Correlates of firm participation in GVCs

Variable	(1)	(2)	(3)	(4)
	Trade	Technology	Trade/Tech	Trade &Tech
rd	0.0675***	0.0846***	0.122***	0.0430**
	(0.0207)	(0.0206)	(0.0244)	(0.0180)
sme	-0.0837***	-0.0768***	-0.119***	-0.0456**
	(0.0228)	(0.0210)	(0.0259)	(0.0189)
female	0.00315	-0.0386	-0.0106	-0.0780***
	(0.0217)	(0.0242)	(0.0247)	(0.0283)
doc	0.0262	0.0595***	0.0673***	0.0273
	(0.0217)	(0.0211)	(0.0252)	(0.0192)
lvapw	0.00283	0.0143***	0.00964	0.0136***
	(0.00491)	(0.00537)	(0.00595)	(0.00490)
itu	0.0384*	0.0783***	0.0723***	0.0566***
	(0.0204)	(0.0208)	(0.0250)	(0.0169)

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Table 9 Continued

Variable	(1)	(2)	(3)	(4)
	Trade	Technology	Trade/Tech	Trade &Tech
rta	0.100***	0.0686***	0.110***	0.0807***
	(0.0189)	(0.0193)	(0.0220)	(0.0181)
reg	0.0633**	0.0623	0.0895**	Omitted
	(0.0316)	(0.0393)	(0.0380)	
lage	-0.000294	-0.00134	0.000129	-0.000476
	(0.0119)	(0.0114)	(0.0132)	(0.0109)
Loan access	0.0233	0.0316*	0.0457**	0.00386
	(0.0175)	(0.0179)	(0.0201)	(0.0171)
Sector				
Other activities	0.0344	0.00427	-0.0572	0.134*
	(0.0580)	(0.0689)	(0.0704)	(0.0763)
Transport and storage	0.152**	-0.0225	0.0177	0.0943
	(0.0690)	(0.0674)	(0.0780)	(0.0672)
Region	Added			
Prob>chi2	0.0000	0.0000	0.0000	0.0000
Pseudo R2	0.333	0.335	0.301	0.448
Observations	1,160	1,210	1,246	788

Notes: Standard errors are reported in parentheses below the coefficients. * p<0.1; ** p<0.05; *** p<0.001. The agriculture sector is the reference category, and we report sectors with significant coefficients only; other activities include electricity and water, arts and entertainment, information and communication and other services activities; reg was omitted because of predicting the dependent variable perfectly.
Source: Author analysis of TES 2022 data set.

The results are generally consistent in that there are no major divergences observed across the four specifications. They show that, significant drivers of firms participation in GVC include investment in R&D, firm size (the small firms are less likely to participate), firm engagement in innovation and technology upgrading (ITU), and awareness of regional trade agreements (RTA/FTA). Based on the indicators of formality status of firms in the data set (e.g., being registered and having audited accounts or a business plan), the results show that firms that are formal tend to be associated with high GVC participation. Interestingly, gender appears to be weakly correlated with GVC participation, except in the form of FDI relationship where female ownership is significant and negatively associated with GVC. That is, men-owned firms were more likely to participate in FDI related GVC but not women owned firms. The likelihood of firms participating in GVC is also significant for high productivity firms, consistent with the existing literature (Lu et al., 2018). In addition, owing to the significant size differences in GVC participation, firms with access to finance are more likely to participate in GVC than otherwise.

Finally, estimates show that sector variation also influences the possible relationship with GVC in terms of trade or FDI activities. However, only two sectors showed significant differences consistently between firms that participate vs. those that don't participate in GVC activities; these are transport sector (positively correlated) and financial services (negatively correlated). Indeed, as shown in the descriptive analysis (Table 4), transport and storage sector had higher presence of GVC firms, while finance and insurance sector had lower presence of GVC firms compared to agriculture sector. Nonetheless, we complemented the analysis of sectoral variation by distinguishing between the sectors that have high incidence of participation and those with low incidence (based on the estimates from descriptive analysis in Table 4). We define sectors with high GVC participation as those with higher participation incidence than average incidence of GVC participation. Using sector level incidence of GVC participation, reported in Table 4, the average incidence of firm participation in GVCs across all sectors is 18.2%. Therefore, the sectors with high incidence of GVC participation include mining and quarrying; transportation and storage; manufacturing, and construction sectors; while the estimates for the remaining sectors (mostly the agriculture and various services sectors) was below the average.

The regression results (Table 10) show that, the estimates for sectors with high GVC participation are higher compared to the sectors with low GVC participation; and that the drivers of GVC participation identified in the preceding general formulation remained valid. For example, being a formal firm is significantly and positively correlated with sectors that have high GVC participation incidence and insignificant in the low GVC participation incidence sectors. Sectors with low incidence of GVC participation appear to be significantly associated with FDI form of GVC participation but not trade related. And more generally, sectors with less or no firms characteristics that correlates with GVC participation (i.e., do not conduct R&D, Innovation and Technology Upgrading (ITU), and not aware of regional trade agreements) tend to be associated with the low GVC incidence group.

Given the significance of the firm size in driving GVC participation and the dominant share of small-sized firms in the Tanzania enterprise sector we also run separate regression to compare estimates of GVC correlates between small firms (MSMEs) and large firms. The results (Table 11) show that only awareness of regional trade agreements (RTAs) has significant association with participation in GVC for both small and large firms, while the other drivers apply differently. For example, conducting R&D regularly is observed to be significant in either trade or FDI related forms but not both. Conducting innovation and technology upgrading appears to be significant across all forms of GVC participation for small firms but is insignificant in large firm (reflecting low variability in large firms as ITU activities are common but not among small firms). Similar result is observed in the case of formality indicators that are identified with positive association with GVC participation for small firms but insignificant for large firms. Firm age (lage) is generally observed to have positive association with GVC participation for large firms and negative association for small firms.

Table 10: Correlates of participation in GVCs for firms in sectors with high intermediate trade

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Trade		Tech		Trade/Tech		Trade & Tech	
rd	0.179***	0.0467*	0.132**	0.106***	0.198***	0.113***	0.101**	0.0471**
	(0.0465)	(0.0240)	(0.0548)	(0.0239)	(0.0459)	(0.0272)	(0.0498)	(0.0192)
msme	-0.168***	-0.0718***	-0.201***	-0.0328	-0.201***	-0.0916***	-0.176***	-0.00765
	(0.0546)	(0.0269)	(0.0650)	(0.0278)	(0.0520)	(0.0301)	(0.0598)	(0.0215)
female	-0.114**	0.0121	-0.0918	-0.0354	-0.146**	0.00832	-0.0442	-0.0955***
	(0.0562)	(0.0232)	(0.0903)	(0.0287)	(0.0588)	(0.0266)	(0.0963)	(0.0366)
fdi	0.0583	0.112**	0.0449	0.0532	0.0337	0.159**	0.0725	0.0182
	(0.0818)	(0.0533)	(0.0825)	(0.0509)	(0.0843)	(0.0708)	(0.0634)	(0.0318)
doc	0.0966**	0.00841	0.153***	0.0429	0.197***	0.0205	-0.0517	0.0377*
	(0.0471)	(0.0262)	(0.0550)	(0.0266)	(0.0450)	(0.0300)	(0.0590)	(0.0217)
lvapw11	-0.00860	0.00139	0.0208	0.0173**	-0.00721	0.0102	0.0180	0.0117**
	(0.0117)	(0.00574)	(0.0162)	(0.00712)	(0.0119)	(0.00718)	(0.0154)	(0.00501)
itu	0.173***	0.0162	0.143***	0.0850***	0.155***	0.0699**	0.184***	0.0256
	(0.0383)	(0.0251)	(0.0528)	(0.0262)	(0.0413)	(0.0299)	(0.0479)	(0.0176)
rta	0.188***	0.0678***	0.0282	0.0927***	0.115***	0.112***	0.199***	0.0517***
	(0.0374)	(0.0240)	(0.0595)	(0.0222)	(0.0367)	(0.0254)	(0.0590)	(0.0183)
reg	0.0275	0.0947***	-	0.0656	0.112	0.105***	-	-
	(0.0860)	(0.0335)		(0.0452)	(0.0891)	(0.0403)		
lage	-0.0505*	0.0197	-0.0132	0.00109	-0.0582**	0.0204	0.00613	-0.000789
	(0.0273)	(0.0139)	(0.0350)	(0.0137)	(0.0263)	(0.0150)	(0.0310)	(0.0111)

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Table 10 Continued

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Trade		Tech		Trade/Tech		Trade & Tech	
Sector								
Financial	-	-	-	-	-	-0.113*	-	-
						(0.0649)		
Mining	0.0991	-	-	-	-	-	0.573***	-
	(0.0893)						(0.133)	
Transport	0.183**	-	-	-	-	-	0.195**	-
	(0.0783)						(0.0853)	
Region	Added							
Prob>chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R2	0.479	0.214	0.354	0.297	0.405	0.262	0.496	0.396
Observations	286	749	237	779	321	898	189	430

Notes: Standard errors are reported in parentheses below the coefficients. * p<0.1; ** p<0.05; *** p<0.001. Construction sector is the reference category for regression on sectors with high GVC incidence, and agriculture is the reference category for regression on sectors with low GVC incidence. Variables with no estimates (-) were omitted because of predicting the dependent variable perfectly or because they had no variation.
Source: Author analysis of TES 2022 data set.

Table 11: Correlates of firm participation in GVCs (MSMEs vs large firms)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Trade		Tech		Trade/Tech		Trade & Tech	
rd	0.0544**	0.179**	0.0819***	0.0834	0.102***	0.199***	0.0261	0.0796
	(0.0269)	(0.0717)	(0.0219)	(0.0712)	(0.0258)	(0.0766)	(0.0191)	(0.0696)
female	-0.0122	0.413***	-0.0376*	-0.203	-0.0346	0.220***	-0.103***	-0.0639
	(0.0244)	(0.0996)	(0.0219)	(0.124)	(0.0245)	(0.0826)	(0.0311)	(0.0997)
fdi	0.0678	0.207**	0.135**	0.0219	0.179*	0.128	0.0476	0.0392
	(0.0740)	(0.0870)	(0.0685)	(0.0825)	(0.100)	(0.0906)	(0.0370)	(0.0600)
doc	0.0648**	0.0964	0.0506**	0.0937	0.0727***	0.104	0.0537***	-0.00227
	(0.0273)	(0.0782)	(0.0233)	(0.0683)	(0.0282)	(0.0638)	(0.0195)	(0.0849)
lvapw11	0.0199***	-0.0160	0.0119**	0.0208	0.00762	-0.0275	0.0122**	0.0140
	(0.00668)	(0.0199)	(0.00590)	(0.0179)	(0.00650)	(0.0198)	(0.00543)	(0.0165)
itu	0.0565**	-0.00321	0.0789***	0.101	0.0773***	0.0110	0.0682***	-0.00573
	(0.0250)	(0.0809)	(0.0220)	(0.0677)	(0.0256)	(0.0775)	(0.0197)	(0.0689)
rta	0.0916***	0.157**	0.0423*	0.200***	0.0952***	0.233***	0.0587***	0.220***
	(0.0247)	(0.0733)	(0.0221)	(0.0593)	(0.0242)	(0.0574)	(0.0215)	(0.0786)
reg	0.0399	-	0.0620*	-	0.0786**	-	-	-
	(0.0335)		(0.0357)		(0.0351)			
lage	-0.0199	0.0924**	-0.0130	0.0943**	-0.0234*	0.157***	-0.0261*	0.0435
	(0.0151)	(0.0444)	(0.0121)	(0.0449)	(0.0141)	(0.0444)	(0.0140)	(0.0398)
loan	0.0196	0.120*	0.0153	0.0941	0.0327	0.162**	-0.0356	0.0869
	(0.0222)	(0.0687)	(0.0191)	(0.0707)	(0.0214)	(0.0695)	(0.0225)	(0.0604)

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Table 11 Continued

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Trade		Tech		Trade/Tech		Trade & Tech	
Sector								
Construction	0.0398			0.467**	-0.145	0.355**	-	0.115
	(0.0978)			(0.211)	(0.0893)	(0.179)		(0.178)
Manufacturing	-0.00675			0.351***	-0.0693	0.388***	0.0273	0.220
	(0.0486)			(0.121)	(0.0626)	(0.109)	(0.0415)	(0.148)
Mining	-				-	0.616***	-	0.786***
						(0.156)		(0.129)
Transport	0.164*	0.0819***		0.280**	-0.0142	-0.000560	0.109	0.347**
	(0.0889)	(0.0219)		(0.140)	(0.0855)	(0.173)	(0.0763)	(0.169)
Region	Added							
Prob>chi2	0.0000	0.0000	0.0000	0.0000	0.			
Pseudo R2	0.479	0.354	0.298	0.361	0.206	0.434	0.406	0.441
Observations	874	166	908	192	1001	192	463	150

Notes: Standard errors are reported in parentheses below the coefficients. *** p<0.01, ** p<0.05, * p<0.1. Agriculture is the reference category in sector variable. Variables with no estimates (-) were omitted because of predicting the dependent variable perfectly or because they had no variation. As noted previously, we have adopted firm size definition provided in Tanzania National MSME Policy (2003) which groups firms based on the number of employees, such that MSME is any firm that employs 1-99 employees while large firm is one that employs 100+ employees.
Source: Author analysis of TES 2022 data set.

The effect of participation in GVCs on the performance of firms

Following an exploratory investigation of firm-level drivers of GVC participation, another interesting question in the empirical analysis is whether the firms that are significantly associated with GVC participation are also identified with higher firm performance compared to those that are not. This means that we will estimate Equation 2 using predicted probability of firm participation in GVC obtained using estimated Equation 1 as explanatory variable, and formulated as a semi-logarithmic model as follows:

$$Ln\,Y_i = \gamma + \delta\widehat{GVC_\iota} + \beta_1 lnage_i + \beta_2 form\ of\ ownership_i + \beta_3 sez_i + \beta_4 outage_i + \beta_5 loan_i + \beta_6 train_i + \beta_7 itu_i + \beta_8 sector_i + \beta_9 region_i + \varepsilon_i \quad (2)$$

Where: LnY_i is the indicator for firm performance; $\widehat{GVC_i}$ is predicted probability of GVC participation (tradehat, techhat, tradehat/techhat, or bothhat, i.e., tradehat and techhat) obtained using Equation 1; β and δ are coefficients of explanatory variables; and ε_i is the random error term. Table 12 presents all variables used to estimate Equation 2 and how they are measured. We use log of number of employees (*lemp*) and log of sales per worker (*lsalpw*) as an indicator of firm performance. That is, the high firm performance is shown by ability to respectively increase number of employees, or ability to increase sales per worker.

We estimate Equation 2 using a simple Ordinary Least Squares (OLS) technique—an approach commonly used in previous firm performance empirical studies with cross-sectional data. However, as in the case with previous studies on firm performance, the specification entails addressing the endogeneity challenge which is difficult since our data is cross sectional for which we cannot control for confounding factors through the use of fixed effects. Again, the implication is that the regression results should be interpreted as indicating correlation rather causal relationships. Nonetheless, since the predicted probability of GVC participation showed significant correlation (see Table A1 in the appendix), we run regression for each of the predicted GVC variable separately.

Table 12: Variables used in regression analysis (Equation 2)

Regression	Variable Name	Label	Variable Form	Expected Sign
Correlates of participation in GVC and firm performance	Log of sales per worker of a firm	*lsalepw*	Continuous	N/A
	Log of firm employment	*lemp*	Continuous	N/A
	Predicted probability of participation in GVC through trade	*Tradehat*	Dummy	+
	Predicted probability of participation in technology related GVC activities	*Techhat*	Dummy	+
	Predicted probability of participation in trade or technology related GVC activities	*Trade/Techhat*	Dummy	+
	Predicted probability of participation in both trade and technology related GVC activities	*Trade&Techhat*	Dummy	+
	Log of firm age	*Lnage*	Continuous	+
	Form of ownership	*Form of ownership*	Discrete	
	Operating in Special Economic Zone	*sez*	Dummy	+
	Regularly conducting R&D	*rd*	Dummy	+
	Foreign ownership	*fdi*	Dummy	+
	Number power outages experienced by a firm in a month	*outage*	Continuous	-
	Access to finance	*loan*	Dummy	+
	Firm conducted ITU activities in the past 5 years	*itu*	Dummy	+
	Firms conducts regular training to employees	*train*	Dummy	+
	Foreign owned firm	*fdi*	Dummy	+
	Sector	*sector*	Discrete	+/- depending on sector
	Region	*region*	Discrete	+/- depending on region

Source: Author's compilation.

Table 13: Correlates between participation in GVCs and firm performance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	**lsalpw**	**lemp**	**lsalpw**	**lemp**	**lsalpw**	**lemp**	**lsalpw**	**lemp**
tradehat	3.306***	2.564***						
	(0.403)	(0.281)						
FDI Linkagehat			5.419***	2.630***				
			(0.405)	(0.266)				
Trade/FDI Linkagehat					4.072***	2.298***		
					(0.331)	(0.208)		
bothhat							3.382***	2.472***
							(0.492)	(0.353)
lage	0.159**	0.223***	0.165***	0.232***	0.157***	0.219***	0.143*	0.239***
	(0.0624)	(0.0379)	(0.0562)	(0.0373)	(0.0577)	(0.0370)	(0.0779)	(0.0464)
Form of Ownership								
Partnership	0.144	0.378***	0.0968	0.368***	0.0959	0.345***	0.115	0.354***
	(0.163)	(0.0906)	(0.145)	(0.0854)	(0.148)	(0.0842)	(0.185)	(0.109)
Limited Liab	0.386***	0.625***	0.209	0.579***	0.205	0.531***	0.327**	0.664***
	(0.144)	(0.0942)	(0.132)	(0.0930)	(0.133)	(0.0904)	(0.157)	(0.108)
Association	-0.350	-0.166	-0.291	-0.143	-0.362	-0.180	-1.665***	0.647*
	(0.572)	(0.684)	(0.534)	(0.621)	(0.573)	(0.618)	(0.286)	(0.362)
sez	0.145	-0.192*	0.0533	-0.181*	0.0536	-0.194**	0.117	-0.280**
	(0.181)	(0.102)	(0.164)	(0.0939)	(0.169)	(0.0962)	(0.198)	(0.115)
loan	0.286***	-0.0378	0.165*	-0.0639	0.136	-0.0767	0.261**	-0.0101
	(0.0977)	(0.0633)	(0.0899)	(0.0611)	(0.0898)	(0.0600)	(0.114)	(0.0775)

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Table 13 Continued

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	**lsalpw**	**lemp**	**lsalpw**	**lemp**	**lsalpw**	**lemp**	**lsalpw**	**lemp**
lemp	-0.155***	-	-0.246***	-	-0.241***	-	-0.0803	-
	(0.0521)		(0.0457)		(0.0473)		(0.0601)	
r&d	0.082***	0.036***	-0.0429	0.08***	0.06**	-0.0301	0.0384*	0.0796**
	(0.0209)	(0.003)	(0.0775)	(0.0218)	(0.0093)	(0.0401)	(0.0195)	(0.0253)
itu	-0.276**	0.0597	-0.763***	-0.0726	-0.596***	-0.0419	-0.342**	0.133
	(0.136)	(0.0928)	(0.131)	(0.0902)	(0.133)	(0.0899)	(0.145)	(0.101)
rta	0.247**	0.105***	0.0589*	-0.310	0.0560**	0.0196	0.0690*	0.0352**
	(0.0901)	(0.0281)	(0.031)	(0.185)	(0.0189)	(0.0201)	(0.0324)	(0.0112)
fdi	0.258	0.226	-0.255	0.186	-0.192	0.0975	0.471	0.338
	(0.321)	(0.269)	(0.279)	(0.258)	(0.302)	(0.256)	(0.323)	(0.243)
train2	-0.0945	0.499***	-0.229**	0.500***	-0.171	0.470***	-0.153	0.572***
	(0.116)	(0.0821)	(0.106)	(0.0802)	(0.108)	(0.0775)	(0.132)	(0.0928)
Sector	Added							
Region	Added							
Constant	14.49***	0.685***	14.30***	0.563***	14.27***	0.533***	15.70***	0.597*
	(0.269)	(0.169)	(0.243)	(0.165)	(0.248)	(0.164)	(0.479)	(0.357)
Observations	1,160	1,160	1,210	1,210	1,246	1,246	788	788
R-squared	0.337	0.537	0.408	0.554	0.392	0.557	0.260	0.559

Notes: Standard errors are reported in parentheses below the coefficients. * p<0.1; ** p<0.05; *** p<0.001
Source: Author analysis based on TES 2022 data set.

The results on correlates of GVC participation with firm performance (Table 13) show that all GVC participation variables are significant in all regressions with minor variations. For example, compared to FDI relations, GVC participation through trade appears to be more strongly associated with higher employment and the vice versa. That GVC participation through FDI relations is more strongly associated with higher sales per worker. Firms engaging in any form of GVC participation exhibit higher firm performance using both employment and sales per worker compared to those that do not. Generally, these results show that participation in GVCs is an important driver for enhancing firms' performance, consistent with the findings in previous studies (Urata, 2021).

6. Conclusion

Using firm-level data from the recently available Tanzania Enterprise Survey (TES) 2022, this paper analysed the drivers of firm participation in global value chains (GVCs), and implication of such participation on firm performance. The results are reported both on the descriptive as well as empirical analyses.

The descriptive analysis showed that the level of firm participation in GVC is low in comparison to the average for sub-Saharan Africa, mainly due to the small size and informal nature of firms that limit their capacity to integrate in the external trade or relations with FDI firms. The empirical analysis identified the factors and firm characteristics that are significantly correlated with GVC participation. The results indicated that firm size (being SME), awareness of existing regional trade agreements, engaging in innovation and technology upgrading, and conducting regular R&D are important correlates of firm engagement in GVC participation. Notably, these factors were even more significant (i.e., their coefficients were larger than those in the preceding regression) in the sectors with high proportion of GVC firms (manufacturing, transport and storage, mining and construction). Finally, we analysed the association of firm participation in GVCs and firm performance, and results showed that GVC participation is positive and significantly associated with higher firms' performance.

The above results are generally consistent with findings in the comparable existing studies where a few conclusions stand out. Firstly, firm characteristics are important yardsticks of measuring whether, and to what extent, a firm is able to participate in GVC. Secondly, the form of GVC participation for a firm matters. Although our regression results do not demonstrate remarkable differences, the sizes of the estimates differ for trade vs. FDI related GVC participation. Nonetheless, extending the scope of firm participation, from the strict sense of trade related to include FDI relationship, improved the threshold of firm participation. Finally, the findings of the study conform to standard conclusion in the literature that GVC participation plays important role in enhancing firm performance.

The policy implications of these findings are three-fold. First, it is critical for the government to create conditions for firms to acquire capacity to participate in GVC, including abhorring the pervasive informality or any other incentive that limit growth and productivity of firms. Secondly, the government should continue to promote regional integration as it appears it can play significant role in initiating firms to GVC participation. Finally, the findings underscore the critical importance of investing in R&D and innovation and technology upgrading.

Notes

1. This was calculated as (exports/total sales)×(procurements from foreign countries/total procurements).

2. The three criteria used in the identification include (1) whether a firm is an intensive importer—it imports at least one-third of its total intermediate inputs; (2) whether a firm is an intensive exporter—it exports at least two-thirds of total output; and (3) whether a firm has access to international networks.

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Appendix

Table A1: Correlation estimates of variables used in each regression

Variables	lsale	lemp	lsalpw	lvapw	lage	gvc	tech_ gvc	trade_ gvc	rd	msme	female	doc	sez	itu	rta	reg	loan	sector	region
lsale	**1.0**																		
lemp	0.6	1.0																	
lsalpw	0.8	0.0	1.0																
lvapw	0.8	0.1	0.9	1.0															
lage	0.2	0.3	0.1	0.1	1.0														
gvc	0.4	0.4	0.2	0.2	0.1	1.0													
fdi_gvc	0.3	0.4	0.2	0.2	0.1	0.8	1.0												
trade_gvc	0.4	0.4	0.2	0.2	0.1	0.7	0.3	1.0											
rd	0.2	0.2	0.1	0.1	0.0	0.3	0.3	0.2	1.0										
msme	-0.5	-0.5	-0.3	-0.3	-0.2	-0.3	-0.3	-0.3	-0.1	1.0									
female	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	0.0	0.2	1.0								
doc	0.4	0.5	0.2	0.2	0.1	0.3	0.3	0.2	0.2	-0.4	-0.1	1.0							
itu	0.2	0.3	0.1	0.1	0.1	0.2	0.2	0.2	0.2	-0.2	-0.1	0.2	0.1	1.0					
rta	0.3	0.4	0.1	0.1	0.1	0.3	0.3	0.3	0.2	-0.3	-0.1	0.3	0.0	0.2	1.0				
reg	0.4	0.2	0.3	0.3	0.1	0.2	0.1	0.1	0.1	-0.1	-0.1	0.3	0.1	0.1	0.1	1.0			
loan	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.1	1.0		
sector	0.0	-0.2	0.2	0.2	-0.1	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	0.3	0.1	1.0	
region	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	-0.1	0.1	-0.1	1.0

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