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**The sectoral analysis of global value chains participation in
South Africa: A panel data approach**

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A dissertation submitted in fulfilment of the requirements for the degree

Master of Commerce (Economics)

in the

Faculty of Economics, Development and Business Sciences

University of Mpumalanga

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May 2025

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DEDICATION

This dissertation is dedicated to my lovely mother, Ophelia Langa, and sister, Alice Sharon.

ACKNOWLEDGEMENTS

To the Almighty God, who gave me the knowledge, strength and ability to write and complete this dissertation.

To my supervisor, Dr Rachel Nishimwe-Niyimbanira, my heartfelt gratitude, for her unwavering support, patience, guidance, and valuable feedback.

To my mom, Ophelia Langa, for not only financing my studies but, also encouraging me daily to reach for the stars. Words cannot express my gratitude for her love, sacrifice, and support.

To my amazing sister, Alice Sharon, for her love, encouragement, and continuous support. I am forever grateful to have her as my sister.

To my best friend, Lizar Stacie, for always being there with encouragement, laughter, lessons, and constant support, she is a true blessing.

May the Almighty God bless you all.

ABSTRACT

Economists have been attempting to address a fundamental question since the dawn of the discipline: why do countries trade with each other? The main reason why countries need to trade with each other lies in the differences in resource endowments and different factors of production. The inability of a country to manufacture all the goods it requires gives it an incentive to trade. International fragmentation involves breaking down a unified process into different phases across different regions, promoting trade in intermediate goods, and ultimately creating global value chains. Engaging in global value chains (GVCs) and the international fragmentation of production can result in higher levels of employment and economic expansion. Evidently, many countries have experienced a shift in their development paradigm due to their integration into global value chains, providing them with new development opportunities.

The present study endeavours to determine the factors attracting GVCs participation and examine whether global value chains participation leads to sectoral development in South Africa using secondary annual data from 1990 to 2022. Additionally, the study intends to provide some new findings for policymakers and scholars in South Africa. The study uses the panel autoregressive distributed lag model (P-ARDL) approach to investigate the short and long run relationships among the variables. The results reveal that in the long run all variables are statistically significant at 5% level, moreover, gross value added, and gross fixed capital formation positively contribute to global value chains participation. Whereas foreign direct investment and the exchange rate negatively contribute to participation in GVCs. These findings point out the following important policy implications: (1) investment policy, (2) firm development policy and (3) workforce development to boost South Africa's integration in GVCs.

Key Words: global value chains, forward global value chains participation, economic development, panel autoregressive distributed lag, South Africa.

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LIST OF ACRONYMS

Abbreviation	Meaning
AIDC	Automotive Industry Development Centre
AFCFTA	African Continental Free Trade Area
AGOA	Africa Growth and Opportunity Act
ANC	African National Congress
APDP	Automotive Production and Development Programme
ARDL	Autoregressive Distributed Lag Model
ASCCI	Automotive Supply Chain Competitiveness Initiative
ASGISA	Accelerated And Shared Growth Initiate Of South Africa
ATC	African Trade Center
BACS	Batyi Automotive Component Supply
BOP	Balance Of Payments
CIP	Competitive Industrial Performance
COMESA	Common Market for Eastern and Southern Africa
DTIC	Department Of Trade Industry and Competition
EAC	East African Community
EPA	Economic Partnership Agreement
EU	European Union
EXR	Exchange rate
FDI	Foreign Direct Investment
FTA	Free Trade Agreement
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GEAR	Growth, Employment and Redistribution
GEIS	General Export Incentive Scheme
GFCF	Gross fixed capital formation
GMM	Generalized Method of Moments
GVA	Gross value added
GVCP	Global Value Chains Participation
GVCS	Global Value Chains
ICIO	Inter-Country-Input-Output
ICT	Information And Communication

IO	Input-Output
IPAP	Industrial Policy Action Plan
ITAC	International Trade Administration Commission
HO MODEL	Heckscher-Ohlin Model
LDCS	Least Developed Countries
LCPS	Local Content Programmes
MERCOSUR	Southern Common Market
MIDP	Motor Industry Development Programme
MNCS	Multinational Corporations
MNES	Multinational Enterprises
NDP	National Development Plan
NGP	New Growth Path
OECD	Organization For Economic. Cooperation And Development
PMG	Pooled Mean Group
P-ARDL	Panel Autoregressive Distributed Lag Model
RCEP	Regional Comprehensive Economic Partnership
R & D	Research And Development
SA	South Africa
SACU	Southern African Customs Union
SADC	Southern African Development Community
SARB	South African Reserve Bank
SARS	South African Revenue Service
SMMES	Small, Medium, And Micro Enterprises
STATS SA	Statistics South Africa
SSA	Sub-Saharan Africa
TDCA	Trade, Development, And Cooperation Agreement
TIVA	Trade In Value Added
TRIM	Trade Related Investment Measure
UNCTAD	United Nations Conference on Trade and Development
WB	World Bank
WTO	World Trade Organisation
ZAR	South African Rand

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1. Background of the study

The rise of global value chains (GVCs) is seen as a key aspect of modern trade in the 21st century. Led mainly by large multinational enterprises (MNEs) seeking to improve efficiency, the GVCs revolution has led to more specialisation in tasks and business functions and, has also impacted smaller firms (Urata & Baek, 2022). Companies involved in GVCs rely more on international rather than national resources, knowledge and production factors. Consequently, economic activities have become more intertwined and complex (Carpa & Martínez-Zarzoso, 2022). A value chain describes a variety of activities that companies participate in to make a product from its conception until transformed into a finished product, these activities include product design, manufacturing, advertising, supplying, and finally the consumer (Zamora, 2016). The activities that make up a value chain can be performed either by an individual entity, or can be performed among various entities; either in a single location or across countries hence the name, global value chains (Brennan & Rakhmatullin, 2017).

GVCs demonstrate the performance of globalisation as it is about the exchange of raw materials, goods, knowledge, and funds. The process of making and remaking of products allows, for globalisation to take place (Auer, Borio, & Filardo, 2017). Additionally, GVCs give countries a new chance for growth by participating in a segment of the value chain, allowing the transfer of technologies to take place and giving firms the opportunity to modernise (Miao, 2023). Global value chains participation is broken down into two: backward GVCs participation and forward GVCs participation (Fernandes, Nievas, & Winkler, 2021). Backward GVCs participation occurs when a nation's exports contain value added previously imported from other nations (Fernandes, Kee, & Winkler, 2017). Forward GVCs participation, on the other hand, measures a portion of the domestic value added in exports utilised by a nation's trade partner, for the production of exports (Claudio, Jona-Lasinio, & Sopranzetti, 2020). Thus, forward GVCs participation occurs when a country exports its products to the importing country that uses them as intermediate goods. In simpler terms 'backward' GVCs is called backward when the intermediate inputs come from a previous

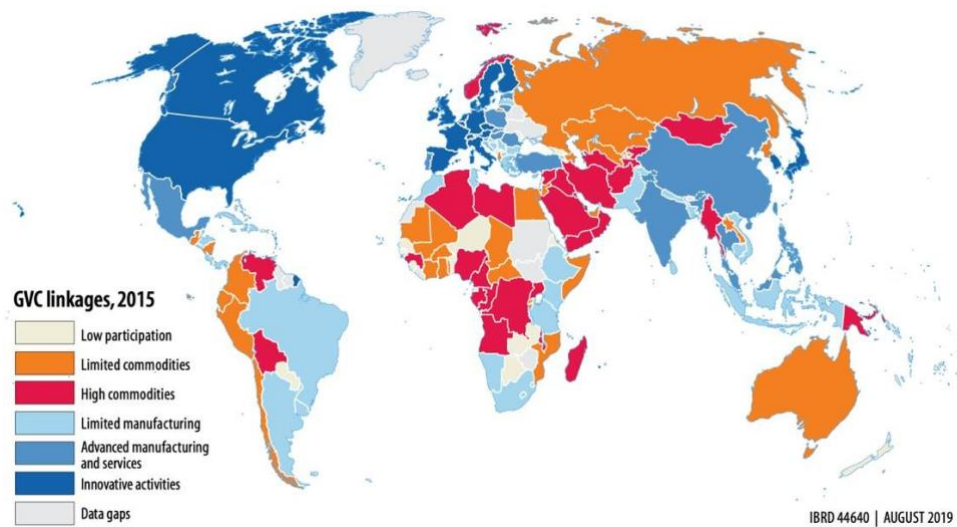
production stage, and ‘forward’ when the exporter is in the early production stages (Dutta, 2021).

The emergence of GVCs has been drastically changing the global economy since the 1980s, promoting increased trade integration among nations (Kaplinsky, 2015). Nonetheless, Africa still faces constrained involvement due to environmental and economic conditions. In addition to changing economic elements, the impact of Coronavirus in 2020 on African countries’ GVCs engagement cannot be overlooked (Edo & Kanwanye, 2023). The repercussions of the pandemic such as; the 2020 economic shutdown and ensuing supply chain disturbances in the same year resulted in a global increase in input costs (International Finance Corporation, 2021 and Wolhuter, 2022). African countries are in the 23rd position for competitive industrial employment worldwide. More so, the 2020 edition of the Competitive Industrial Performance (CIP) index evaluated the industrial competitiveness of 152 countries, and found South Africa to be the best-ranked African economy, ranking 52nd in the Competitive Industrial Performance index (UNIDO, 2020).

1.2.Statement of the research problem

Globally economies are built around global value chains that reckon for the increased proportion of global trade, GDP, and employment (Fernandez-Stark & Bamber, 2022). Multinational firms make the most of the differences in countries’ comparative advantages and place production in the most effective locations (Urata & Baek, 2022). Consequently, GVCs have shifted economic activity towards developing nations, creating new opportunities for development for both large and small firms (Baldwin & Lopez-Gonzalez, 2015). The rise in GVCs participation in various sectors namely electronics, textile, tourism, commodities, and the outsourcing of business services has an impact on global trade and production, and how the firms, manufacturers, and employees in developing countries participate in the world economy (Kummritz, Taglioni & Wrinkler, 2017). GVCs participation brings together firms, workers and consumers worldwide and enables workers and firms to advance. This advancement positively benefits low-income countries and enables them to develop (Pástor, 2022). Figure 1.1 shows the GVCs participation globally in 2015.

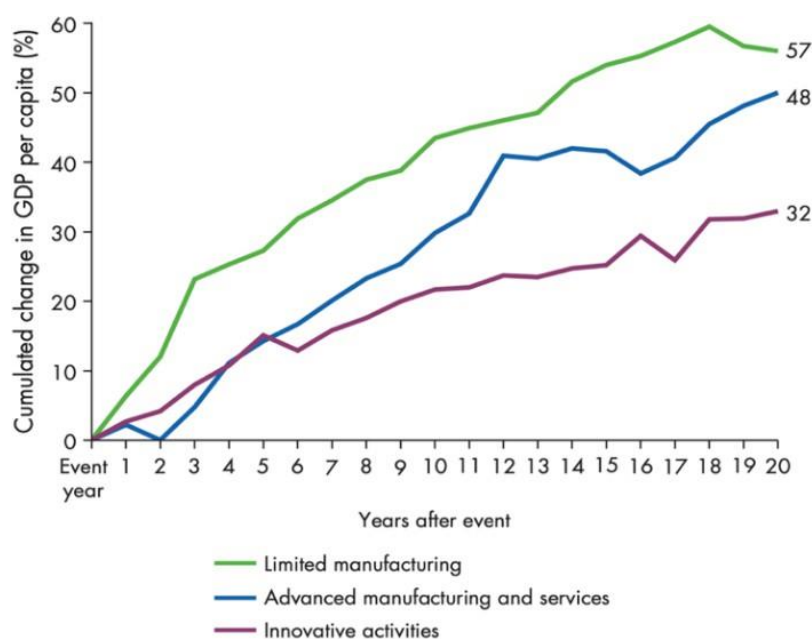
Figure 1.1: Global value chains participation



Source: World Development Report (2020)

As can be seen in the figure, South Africa has limited manufacturing (World Development Report, 2020). Although having limited manufacturing might seem like an impediment to the country's economy, Figure 1.2., show that countries specialising in limited manufacturing GVCs have, a higher GDP per capita growth than those specialising in advanced manufactured goods. Limited manufacturing means that the country can focus on specialisation that is, the industries in the country can concentrate their resources and labour on more efficient production and hence, benefit from comparative advantage (Laursen, 2015). This is done by exporting goods to other nations that are then sold domestically or re-exported (Jouanjean, Gourdon, Korinek, 2017). Specialisation encourages the distribution of technology and access to capital and inputs in chains (World Development Report, 2020). Thus, South African policymakers have to implement the right policies to increase global competitiveness, attract more investment, and increase employment for the economy to benefit from GVCs.

Figure 1.2: GDP per capita and GVC taxonomy from 1995-2020.



Source: World Development Report (2020)

A broad consensus on the relevance of sectoral development exists between policymakers. Sectoral development is essential in all economies as it acts as the basis for development and overall economic growth in a nation (Örgün, 2014). Policymakers argue that developed countries understood this concept hence these countries grew their economies through the development of their industries (TIPS, 2016). Research done on global value chains highlights their economic benefits, moreover, recent literature shows that countries benefit from participating in GVCs, to be exact, the upper middle and high-income countries benefit from such participation (Raei, Ignatenko, & Mircheva, 2014). Studies show that among others, factors such as, trade openness and investments, improved customs and logistics, adequate infrastructure, institutions and intellectual property protection, geography and market size, and border and transport efficiency enable firms to engage in GVCs (Takpara, Djiogap, & Sawadogo., 2023; Fernandes, Kee, & Winkler., 2020; Kowalski, Lopez-Gonzalez, Ragoussis, & Ugarte, 2015; Urata & Baek, 2020).

According to Stats SA (2024), there has been a favourable growth in eight South African industries in the first quarter of 2023 these include the manufacturing industry and the mining industry. Additionally, between April and June (quarter 2), six industries recorded a favourable growth, these include the manufacturing industry, the mining

industry, the agriculture industry, the personal services industry, general government services, and the personal services. There has been however, a decline in the growth of five industries in quarter 3 of the year, as the manufacturing, energy, mining and agriculture industries negatively contributed to the growth in GDP. This decline was, recovered in the last quarter of the year 2023 as six industries including the automotive, manufacturing, energy, and mining positively contributed to the growth in GDP in the country (StatsSA, 2024).

On one side, participating in GVCs is beneficial for developing countries, even in cases where they are unable to develop new industries, because these countries can focus on performing specific duties and supplying intermediate goods. Thus, GVCs have the potential to provide technological and knowledge spillover effects to firms, hence promoting development (Petre, Giovannetti, & Marvasi, 2017; Tajoli & Felice, 2018). The downside is that, having Least Developed Countries (LDCs) participating in GVCs can mean that LDCs fall under low value-added sections of the GVCs with little spillover effects (Morris, Barnes, & Kaplan, 2021). Thus, this study investigates factors that attract GVCs participation and determines whether GVCs participation leads to higher investment, higher value-added products, and hence, industrial development.

1.3. Research questions

In an attempt to answer whether global value chains participation leads to sectoral development and the factors that attract GVCs participation, the following research questions will be addressed:

- Which sectors participate more in GVCs in South Africa?
- Which factors attract sectoral GVCs participation in South Africa?
- What is the dynamic causal relationship between participation in GVCs and its determinants?

1.4. Objectives of the study

The primary objective of the study is to quantitatively perform a sectoral analysis of global value chains participation in South Africa by identifying factors that attract sectoral GVCs participation in the country.

1.4.1. Theoretical objectives

To achieve the main objective of understanding the relationship between GVCs and sectoral development, the following theoretical objectives are formulated for the study:

- Review the theoretical perspectives on the significance of GVCs on both GDP and development.
- Evaluate the significance of exporting in the leading South African sectors.
- Review literature on the relationship between GVCs and economic development.

1.4.2. Empirical objectives

To obtain viable outcomes, the following empirical objectives are formulated:

- Identify the sectors that participate more in GVCs in South Africa.
- Identify the factors that attract sectoral GVCs participation in South Africa.
- Investigate the dynamic causal relationship between participation in GVCs and its determinants.

1.4.3. Hypothesis of the study

This study aims to perform a sectoral analysis of global value chains participation in South Africa. To achieve this the study employs the variables listed below. GVCs participation measured based on forward linkages (domestic value added incorporated, in intermediate exports that are subsequently re-exported). Thus, the forward GVCs participation is the dependent variable. Independent variables include gross value added, gross fixed capital formation, foreign direct investment and the exchange rate.

H_0 : Coefficients to independent variables i to j $\beta_{i...j} = 0$, there is no relationship between forward global value chains participation and its regressor variables.

H_1 : $\beta_{i...j} \neq 0$, there is at least one or more explanatory variable(s) affecting forward global value chains participation.

Rejecting the null hypothesis means that a relationship between the regressand and the regressor variables exists. Depending on the sign of the coefficient, the study is able to explain whether a positive or a negative relationship exists between the explained and explanatory variables. Based on the significance level $p = 0.05$, it is possible to conclude whether the relationship between forward GVCs participation and its explanatory variables is statistically significant. A p value smaller than 0.05, indicates a statistically significant relationship.

1.5. Methodology

The study employs panel data analysis because of its insightfulness, it also exhibits less correlations between the independent variables in the model and permits greater variability within the dynamic system (Andre, 2017). The chosen research method is the Panel Autoregressive Distributed Lag model (P-ARDL), which is a combination of a dynamic panel model and an autoregressive distributed lag model (ARDL) (Sigmund & Ferstl, 2021). In the long run the ARDL model suggests an intermediate coefficient while allowing for differences in coefficients among groups in the short run. The benefit of the ARDL model is that it permits the short run dynamic coefficients to differ across sectors, but it restricts the long run coefficients to be uniform (Pesaran, Shin, & Smith, 2001; kannadhasan, Aramvalathan, & Balasubramanian, 2017). The panel ARDL model has been frequently and reliably used, demonstrating empirical success regarding the significance and robustness of its explanatory variables (Oluseye & Gabriel, 2017). Hermida, Santos, & Brittencourt (2022) used the panel ARDL, to examine whether the international fragmentation of production and GVCs participation impact economic growth in 40 emerging and advanced economies from 1995 to 2011. Additionally, Marandu (2018) used panel ARDL to ascertain whether FDI has an impact on the economic growth in eight Southern African countries.

The study spans from 1990 to 2022 this was chosen based on forward GVCs participation data availability. The study performs a sectoral analysis using five South African sectors, each, with 33 years of annual data, thus the study has a total of 165 observations. The data for the variables are obtained from, the United Nations Conference on Trade and Development (UNCTAD), Quantec, the South African Reserve Bank (SARB), and the World Bank (WB) databases. Lastly, all tests will be performed and analysed using EViews 14 commands. The EViews commands specifically used in the study facilitate the preliminary tests and model estimations, ensuring that the results are robust and accurate. The descriptive analysis will also be conducted. The descriptive analysis is crucial as it depicts the fundamental characteristics of the data in the study by offering overviews of the sample and the measures (Mishra, Pandey, & Singh, 2019). The study performs unit root tests to determine the stationarity level in the variables using, the Levin, Lin and Chu (2002), and the Im, Pesaran and Shin (2003) tests, followed by the lag length selection criteria. A cointegration test is also performed before running the pooled mean group (PMG) to

determine whether a long run relationship exists among the variables. The study also aims to determine potential causality between the variables, employing a granger causality test. Lastly, to ensure robust results, the diagnostic tests are performed, these include the cross-sectional dependence and the normality test.

1.6. Significance of the study

Global value chains are considered important as drivers of industrialisation activities such as production, agriculture, energy, and minerals, on both a national and international scale. The importance of industrialisation in promoting growth and development is widely conceded as it encourages innovation, boosts production, and creates jobs. Yong (2015) emphasises that no developing country has ever achieved the necessary economic development to become a developed economy in modern times without industrialisation. Therefore, South Africa, along with other developing countries, will find it difficult to eliminate extreme poverty without undergoing industrialisation (Yong, 2015). GVCs involve breaking down production into various activities and tasks that are, spread across different countries playing a key role in promoting sectoral development (Raei *et al.*, 2019). Existing studies on GVCs integration have not given much focus to African countries, leading to a lack of understanding on how changing economic conditions affect them. This dissertation attempts to do an evidence-based study by identifying factors that attract GVCs participation in the different sectors in South Africa. This study underpins GVCs participation and the leading South African industries, offering further insights into the impact of global value chains on boosting the economy and creating employment in South Africa. What sets the study apart from previous studies is that, it compares global value chains participation in the top five South African sectors. Furthermore, the identified factors attracting sectoral GVCs participation will serve as a useful guide to policymakers, economic stakeholders and officials in developing strategies to encourage GVCs participation as a driver of industrialisation and economic development in South Africa. Additionally, the study can be utilised in future studies to highlight the significant role of global value chains participation in a nation.

1.7. Ethical consideration

To conduct the study, secondary data used were retrieved from the four different databases namely, the SARB, the World Bank, Quantec, and the UNCTAD databases available to the public. The study acknowledges the data sources used and all other

sources cited in the study. Moreover, the study follows the University of Mpumalanga ethical consideration.

1.8. Outline of the study

The study investigates the impact of GVCs on sectoral development in South Africa and it is made-up of six chapters. The study is structured as follows: Chapter 1 is the foundation of the study. This chapter highlighted the statement of the research problem, delineating the problems identified in the study, thirdly, the research questions and objectives were discussed, as well as, the hypothesis of the study, lastly the significance of the study was discussed. Chapter 2 discusses industrialisation and the various incentives developed by the South African government, to transform the South African economy into a globally competitive industrial economy that is now able to be part of the value chains process. It further discusses the process of global value chains and ends with an overview of the top five sectors participating in forward GVCs in South Africa.

Chapter 3 discusses various international trade theories relevant to the topic. Thereafter the empirical literature review is discussed. The empirical literature provides insights on the relationship between GVCs participation and development. Chapter 4 discusses the methodology used to identify the sectors participating more in GVCs, and to determine the factors that attract GVCs participation in South Africa, with the aim of providing a thorough explanation of the research design used. Chapter 4 also discusses the data sources, the unit root tests, the diagnostic tests performed, and the estimation technique, namely, P-ARDL. Chapter 5 presents, analyses, and interprets the econometric results obtained from the unit root tests, the Pedroni and kao-cointegration test, and lastly, the P-ARDL results. Chapter 6 concludes the investigation based on the results and interpretations from the previous chapters, the chapter also provides suitable policy recommendations, and the limitations encountered as well as the areas for further research, followed by the conclusion.

CHAPTER TWO: INDUSTRIALISATION AND GLOBAL VALUE CHAINS PARTICIPATION IN SOUTH AFRICA

2.1. Introduction

Engaging in global value chains can result in higher levels of employment and economic expansion. For countries to gain from GVCs participation they need to implement appropriate trade and investment policies. The ultimate goal of participating in global value chains is development hence this chapter begins by discussing the concept of economic development, followed by a discussion on the process of global value chains. Thereafter, the chapter discusses the top five performing industries participating in global value chains and it ends with a discussion of the historical context of trade policy interventions in South Africa. This chapter reviews the changes that took place in South African industries from 1990 to 2022, that is, the period that corresponds with the range of years of the study's methodology.

2.2. The concept of economic development

Before delving into global value chains, it is important to highlight the need for development in a nation. Many people have used the terms economic growth and economic development interchangeably, with this conceptualisation development was seen as a structural transformation in a nation and an increase in the nation's income (Mladen, 2015). However, with rising income levels and transformation came the negative side of economic growth, which is high inequality, environmental degradation and social disruption (Rubin & Segal, 2015). Hence, scholars realised that these two ideas of development were limiting and exclusive, and over time, the term economic development was not only known as the improvement in economic indicators, but also improvements in quality, innovation, risk alleviation, and entrepreneurship that destines the country in a high growth track (Dragoi, 2020).

In the long run, a prosperous modern sector is a key factor for a nation's sustainable development. From a very long time, the significance of sectoral development for a nation's growth has been acknowledged. South Africa can learn from developed economies that the way to achieve economic growth should be accompanied by a switch to a modern manufacturing sector (Gries & Grundmann, 2020). In addition, Ndiaya and Lv (2018) obtained a significant relationship between sectoral development and economic growth. Thus, this study attempts to find out whether global value chains

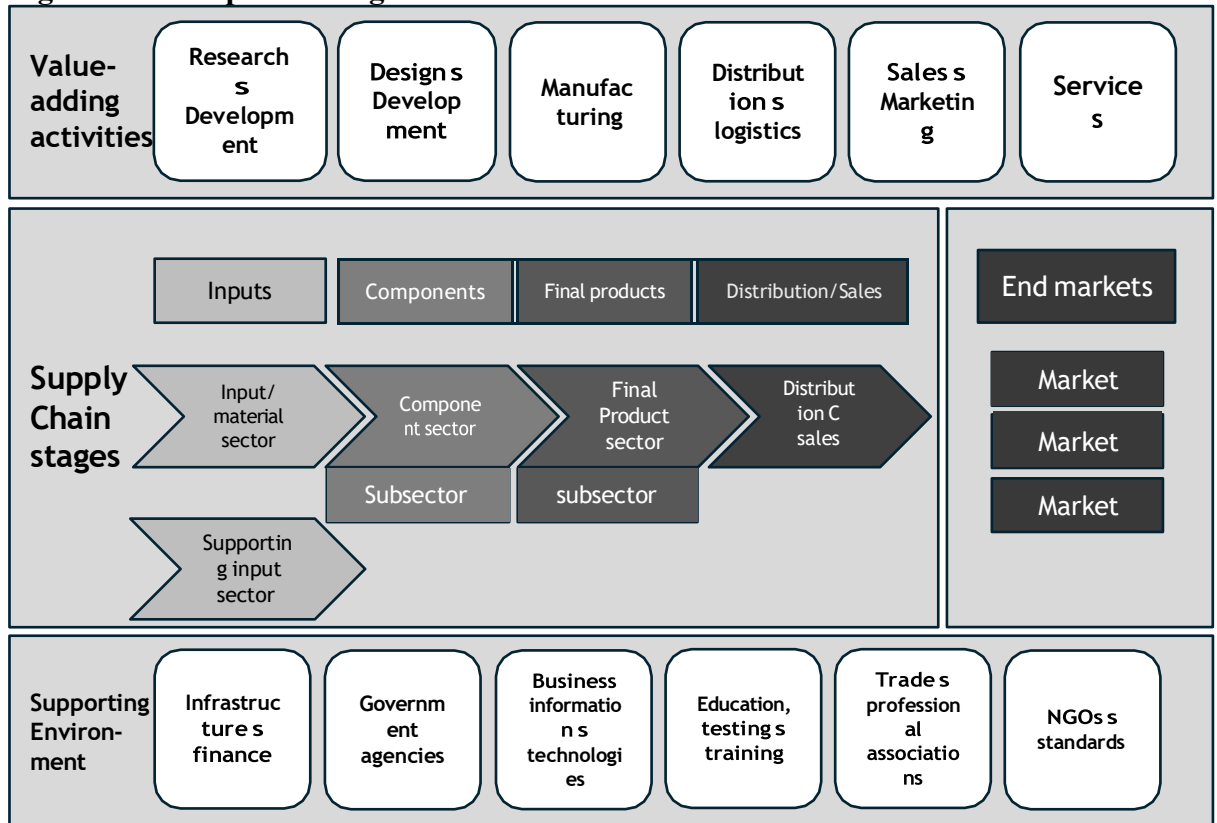
participation leads to sectoral development, and what factors affect GVCs participation, and lastly, whether these factors affecting integration in GVCs lead to an increase in the participation in GVCs.

2.3. Definition of the concept of “Global Value Chains”

The term “global value chains”, describes the widespread activities performed to develop a good or service, from its formation to its final use and the way in which these processes are distributed geographically and internationally. This definition explains how GVCs are organised and why they are organised in such a way. This means that GVCs is a sequence of activities undertaken by firms, each activity located in the region where it is mostly effective to perform it (Global Affairs Canada, 2011). The concept of GVCs originated from Porter (1985). Porter (1985) describes a value chain as a series of separate activities that a company carries out to design, manufacture, market, transport, and maintain its products (Masunda & Mupaso, 2019). This particular interpretation of GVCs provides a structural perspective on GVCs, portraying them as a series of activities carried out by multiple firms, with each activity conducted in the most efficient location. The definition describes how and why GVCs are organised. An alternative perspective on GVCs emphasises the transactions they create, such as the cross-border flow of intermediate goods and services used in a finished product sold worldwide (Pahl, Gouma & Woltjer, 2019).

Many countries have experienced a shift in their development paradigm due to their integration into global value chains, providing them with new development opportunities. This shift has been enabled by the removal of trade and foreign investment barriers (Ndubuisi & Owusu, 2021). Step one in plotting the value chain is linking the structural parts of the chain. Figure 2.1 below is made up of a visual template and a classification of the four fundamental parts to develop a product in different industries, namely value-adding activities, supply chain, end markets, and the supporting environment. These diverse activities take place in different sectors in the economies of various nations, which enables job creation for employees in all categories (Efogo, 2020; Takpara *et al.*, 2023).

Figure 2.1: The process of global value chains



Source: Author's compilation from Frederick (2019)

In Figure 2.1, the first part of the process of global value chains is value-adding activities including the six functions that companies participate in, to come up with a product from an idea to its formation, beginning with research and design to the production and distribution stage, and lastly advertising, sales, and services. Research and development is a crucial part of any firm's effort to boost its knowledge base and create, obtain and amalgamate innovation into its products (Safitri & Gamayuni, 2019). Research involves the design and implementation of systematic procedures to create technology-based assets with real value, that can be placed in the firm's business operations and be legally protected against others (Guttermann, 2023).

The design stage involves the creation and development of new products or upgrading existing products to reach certain user needs. The product design addresses several features namely aesthetics, functionality, cost effectiveness and sustainability (Ivanon *et al.*, 2023). Manufacturing involves the making of a product for the purpose of selling it to other firms participating in value chains or to end users (Esmaeilian, Behdad, & Wang, 2016). Logistics and distribution involve the transportation or storing of inputs

and products. Companies participating in logistics include wholesalers, intermediaries and warehouses (Coyle, Novack, & Gibson, 2021). Lastly, activities in advertisement and sales involve product branding, advertising and retail (Bala & Verma, 2018).

The second part of the process of global value chains is the supply chain. This part depicts the input-output structure of the product or the movement of business relations for the product or service portrayed (Hugos, 2024). Supply chain has four stages namely inputs, components, final products, and sales. This stage can also be used to point out the tools or materials required in the chain (MacCarthy, Blome, Olhager, 2016). The end markets of the final product or service make up the third part of the value chain. Categories in end markets are used to classify the products with the same location and buyer-specific features. For example in the textile industry, the production requirements of institutional buyers such as agencies of the governments or business differ from the consumer-retail market (Normaminovich *et al.*, 2021). The last part of a value chain is supporting environment. The supporting environment is made up of institutional actors including political parties, labour movements, and government actors at national and international levels enforcing the legal framework for being part of the chain. Some of these give support and rules to the industry whereas others focus on the economy (Eckhardt & Poletti, 2018).

2.4. Industries participating in GVCs in South Africa

Data retrieved from the UNCTAD indicate that the automotive, mining, agriculture, manufacturing and construction industries form part of the top ten sectors participating in forward GVCs in South Africa. Table 2.1 below shows the total amount of the forward GVCs participation in billions of US Dollars for five industries in South Africa from the years 1990 to 2022, with the construction sector being the top sector participating in forward GVCs in South Africa, generating a total of \$909 868 929 341 898 from 1990 to 2022. Followed by the manufacturing sector, being the second highest sector participating in forward GVCs in South Africa, as it generated \$404 285 036 740 091 in total from 1990 to 2022. The table also includes the agriculture, automotive and mining sectors with \$150 520 518 160 496, \$84 656 723 266 922, and \$39 434 555 791 593 respectively. The aim of the study is, to perform a sectoral analysis of global value chains participation in South Africa and, to determine the factors attracting forward

GVCs thus the study uses the sectors listed in the table to examine global value chains participation in South Africa for the aforementioned time.

Table 2.1: Top 5 sectors participating in forward GVCs in South Africa from 1990 to 2022

Sectors	Amount in billions of USD
Construction	909 868 929 341 898
Manufacturing	404 285 036 740 091
Agriculture	150 520 518 160 496
Automotive	84 656 723 266 922
Mining	39 434 555 791 593

Source: Author's compilation from UNCTAD (1990-2022).

In order to boost economic growth and address the increasing unemployment rate, the Department of Trade, Industry and Competition (DTIC), released its trade policy for industrialisation along with six sectoral master plans. These plans focus on enhancing skills development, creating job opportunities, and promoting a localisation strategy to strengthen the industrial capacity for both domestic and export markets (Zimo, 2023).

2.4.1. The automotive industry

The automotive industry is one of the biggest users of construction raw materials internationally (Modi, 2016). This industry involves various firms whose main goal is to design, develop, advertise, produce and sell motor vehicles, such as, automobiles, trucks, vans, motorbikes, and sport utility cars. The industry produces vehicle parts such as engines, and bodies of vehicles (Binder, 2024). In South Africa, this is the most important manufacturing sector. The South African automotive sector consists of, multinational firms, which are integrated into global value chains. The sector is a producer, an exporter and an importer of vehicles. Various vehicle assembly plants in South Africa, such as engine and automotive body components among others, are recognised internationally and praised for their product qualities (DTIC, 2018).

The automotive industry in the country is a continuous work in progress. It is supported by the South African government not only with a tariff reduction schedule to expose the sector to international markets, but also with the Motor Industry Development Programme (from 1995 to 2012), the Automotive Production and Development

Programme (to 2020), as well as rebate mechanisms to enhance competitiveness in the industry. On the supply side, the national government developed a national Automotive Supply Chain Competitiveness Initiative (ASCCI) for assistance in technological advancements, development of skills and enhancing manufacturing capabilities moreover, the provincial and local governments have supported the firms in their domain. For instance, the Gauteng provincial government established the Automotive Industry Development Centre (AIDC) to boost the automotive industry and enhance growth in the automotive small, medium, and micro enterprises (SMMEs) in the province (Gauteng Growth and Development Agency, 2014; DTIC, 2018; Automotive Supply Chain Competitiveness Initiative, 2021).

The automotive industry has a deep-rooted history in the country. Ford in 1924 assembled the first vehicles, with automotive component manufacturers setting up around 1930 (Barnes, 2013). As the demand for automobiles increased around the 1950s, the usage of imported equipment to assemble vehicles escalated, which lowered the development of a vehicles components industry. The increase in imports also increased the pressure on the country's balance of payments (BOP). In 1961, the government launched local content programmes (LCPs), these programmes expanded gradually, however, until 1989 they primarily aimed at replacing the imported cars with domestically assembled ones for a rapidly growing domestic market, recognised globally as a key emerging economy market (Morris *et al.*, 2021).

In 1995, the post-apartheid government ended the LCPs and established the Trade Related Investment Measure (TRIM) known as the Motor Industry Development Programme (MIDP) (1995 to 2012) (Black, Roy, & El-Haddad, Yilmaz, 2020). The goal of the MIDP was to incorporate the industry into worldwide value chains by enhancing competitiveness in the automotive industry (Aboulezz, 2016). It became one of the most important industrial policy interventions not only due to its effective incentive structure, but also due to its wide-reaching impact on the industry. The MIDP lowered tariffs and offered substantial support for exports (Morris *et al.*, 2021). The change in government policy led to vehicle assemblers gradually taking over their licensed operations in South Africa. This resulted in Ford, Toyota, Nissan and General Motors uniting with Mercedes Benz, BMW and Volkswagen to run their South African operations and strategically reorganising them to make the most of the MIDP (Barnes & Black, 2013).

The Automotive Production and Development Programme (APDP) (2013 to 2020) replaced the MIDP on the 1st of January with slight modifications made in 2016. The goal of the APDP is to increase production volumes and add value to the automotive component sector to generate jobs across the value chain. The second phase of the APDP became effective in 2021, this is another incentive programme for the automotive industry, managed by the International Trade Administration Commission of South Africa (ITAC) and South African Revenue Service (SARS), intended to support the goals of the South African automotive masterplan and advancing the automotive value chain (Laing, 2021). The programme offers rebates and refunds to vehicle manufacturers and importers to reduce their duty payments to the South African Revenue Services (SARS) on imported vehicles (25%) and original equipment components for assembly (20%) to support growth of the industry with GVCs (SARS, 2021; Zimo, 2023).

The automotive industry significantly contributes to the nation's economy, being the fifth largest export sector (Laing, 2021). In 2022, StatsSA (2022) reported that the automotive industry which includes both vehicle and component manufacturing had a total of 102 730 employed workers. This accounted for the largest portion of the total transport equipment labour force and nearly 1% of the country's labour force. Currently, the sector contributes to approximately 4.3% of the country's GDP (Treasury, 2023). Additionally, the sector accounts for 18.1% of exports and employs over 110 000 individuals (Augustine, 2024). Between 2016 and 2018, South Africa's vehicle production and its share of global production decreased from 2015. Although the number of automobiles produced somewhat increased in 2019 (632 000 versus 611 000 the year before) the COVID – 19 outbreak caused output to decline in 2020 (Lamprecht, 2021).

South Africa has paved its position in the automotive sector. In 2023, the Batyi Automotive Component Supply (BACS), a firm that produces vehicle parts for Ford Motor Company, opened a new facility in Pretoria. Additionally, various global automotive producers have increased their activities over the last years these include the BMW Group, which declared that in the second half of this year, 2024 it will produce the next generation BMW X3 at its Rosslyn factory in Pretoria (Taylor, 2024). South Africa has also engaged in the production of the first generation of hybrid electric cars

including, the Toyota Corolla Cross, which will be, exported to 40 African countries and will be enhanced by the promotion of the African Continental Free Trade Area (Augustine, 2024).

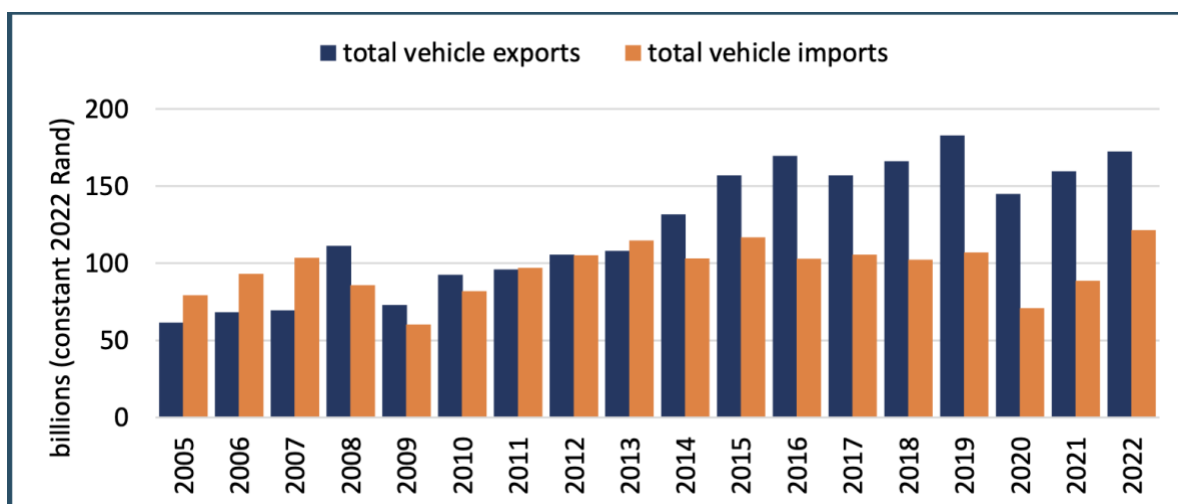
Toyota has been leading the country's market for 44 years (Branquinho, 2024). The South Africa's best-selling automakers from, the highest to the lowest in 2023 include Toyota; increasing by 8%, the Volkswagen Groups although having a 3.4% decrease is still at number 2, Suzuki increasing by 4.8%, Hyundai decreasing by 11.4%. Ford increased by 16.6%, while Nissan having decreased by 4.4%, Isuzu increasing by 9.4%, Renault having a 20.4% decrease, and Haval decreasing by 12.1%. Toyota's figures include Hino and Lexus, and Volkswagen Group includes Audi. However, BMW and Mercedes sales were not provided to the National Association of Automotive Manufacturers of South Africa, hence the percentage change could not be compiled (Bubear, 2024).

Between 2005 and 2007, South Africa experienced a trade deficit with more imports than exports in the vehicle manufacturing sector. Nonetheless, the dynamics of the South African automotive industry have changed since then. Exports have seen a rapid increase, surpassing the imports growth rate. In 2023, the export value of vehicles in 2022 increased by R43.5 billion or 19.1%, to R270.8 billion, making up 14.7% of exports from SA (Naamsa, 2024). Notably, exports experienced significant growth between 2015 and 2019, reaching a peak of R182.8 billion. In contrast, imports showed stagnant growth during the same period (Loewald, 2024). Both imports and exports were significantly impacted by COVID-19 with imports experiencing a reduction from R106.9 billion to R70.9 billion in 2020, marking a decrease of 32.8%. On the other hand, exports had a moderate decline, decreasing by 20.7% from R182. billion to, R144.9 billion (Moshikaro-Amani, 2023).

Around 70% of vehicles made in South Africa are exported to European and American markets, with Germany, the US, the UK, and Australia being the main destinations in 2022. Additionally, about 77% of South Africa's total vehicles went to the US, Japan, and Germany, while only 14.7% of the country's vehicle exports were sold in SSA nations, namely Mozambique, Zimbabwe, Zambia, and eSwatini (Freight News, 2024).

Figure 2.2 below presents the total vehicle imports and exports in South Africa between the years 2005 to 2022.

Figure 2.2: Imports and exports of SA vehicles between 2005 and 2022 in constant (2022) Billion rand

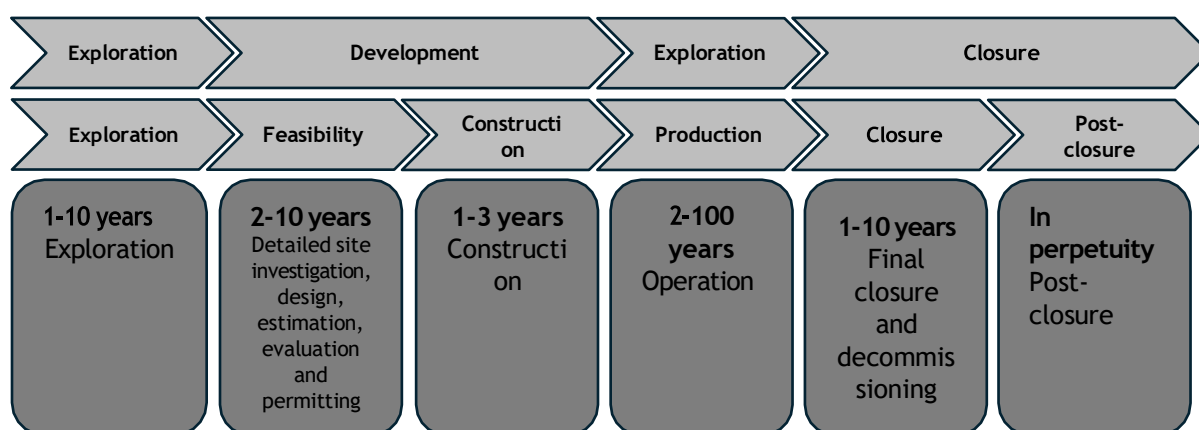


Source: TIPS (2023)

2.4.2. The Mining, Mineral products, Petroleum and Chemicals industries

Mining includes extracting non-renewable resources namely natural gases, and petroleum. The process of mining is necessary to acquire any minerals or materials that cannot be created in laboratories, factories, or grown using agriculture (Khayal & Elagab, 2022). The process of mining involves taking valuable minerals or other materials out of the Earth. Minerals and materials are, often extracted from an ore body, lode, vein, reef, or placer deposit. Ores include coal, oil shale, gemstones, metals, limestone, gravel, salt and clay (NRGI Reader, 2015).

Figure 2.3: The mine life cycle



Source: Author's compilation from NGRI Reader (2015)

South Africa is rich in natural resources, it has some of the most valuable minerals in the world, and its mining industry has a huge impact in the country's economy as it provides employment and foreign exchange revenue (Bekun, Emir, & Sarkodie, 2019). South Africa's abundance in minerals and mining export has put the country as a global mining powerhouse (Vigne & Cobbing, 2024). South Africa is a major producer of various mineral goods, especially platinum group metals. In fact, in 2023, the platinum sector had the highest number of workers in the mining industry (Statista, 2024). Statista (2024) reported the revenue of the South African mining industry to be R654 billion in 2023. However, this revenue represents a decrease compared to 2022, which had a total revenue of R726 billion.

The mining industry plays a crucial role in South Africa's financial well-being by providing different sources of revenue such as taxes, foreign exchange reserves from the sale of minerals, and employment opportunities (Carvalho, 2017). In 2022, South Africa was the world's largest exporter of chromium ore, manganese ore, platinum, precious metal ore, and titanium ore. In the same year, the country's export revenue of mined materials, amounted to R757 billion, which is made up of 58% of the total country's exports to its partners (Rossouw & Khutlang, 2023).

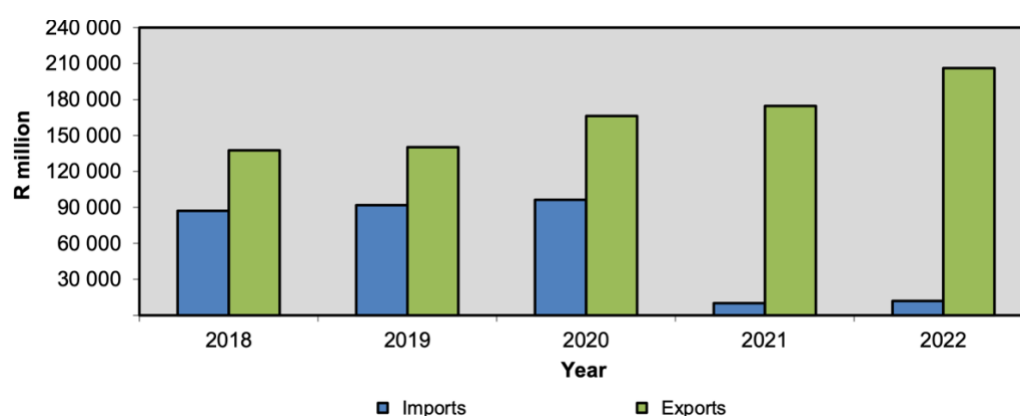
2.4.3. The agriculture industry

In developed countries, agriculture has been viewed as, a contributor to a nation's economic growth. Moreover, agriculture is an important provider of jobs, and earner of foreign exchange revenue (Loizou, Karelakis, & Galanopoulos, 2019). In SSA, the

agriculture industry is essential for overall economic growth, reducing poverty and food security (Devaux, Torero, & Donovan, 2018). Researchers have documented that growth created by agriculture in SSA is more successful in lowering poverty compared to GDP growth in other sectors (Schaffnit-Chatterjee, 2014). The agriculture sector involves producing and processing crops, raising livestock and harvesting fish and other animals in a farm or in their natural habitats. The sector is made up of various sub sectors including food crops, tree crops, vegetables and herbs, livestock and poultry, fisheries and aquaculture, and non-traditional activities (Harris & Fuller, 2014).

The agriculture value chains is divided into four subsections namely, inputs, production, processing and marketing (Devaux *et al.*, 2018). Input, is made up of plant nutrition, animal nutrition, agro-chemicals, veterinary, manufacturers and infrastructure. Production consists of farmers and aggregators. Processing consists of storage, warehousing, manufacturing, packaging, and presentation. Lastly, manufacturing consists of branding, promotion, export, and logistics (Frederick, 2019). The agriculture sector consists of backward and forward linkages to other sectors. Backward linkages in the agriculture sector include importing inputs for production such as chemicals and fertilizer (Montalbano & Nenci, 2022), and forward linkages in the sector includes the provision of raw materials to the manufacturing industry (Asamoah, 2020).

Figure 2.4: Value of SA imports and exports of agricultural products from January 2018 to December 2022



Source: Department of Agriculture, Land Reform, and Rural Development (2022)

The agriculture sector is a significant sector of South Africa's socio-economic development. The impact of this sector on empowerment and poverty relief is high as this is one of the most employment-intensive sectors in the economy. The Department

of Agriculture, Land Reform, and Rural Development (2022) reported that in 2021, the total gross income from agricultural products increased (from R362 575 to R417 783 million in 2022) by 13.4% due to an increase in animal products, a 5.8% increase in horticultural products, and a 27.8% due to increases in the revenue for field crops. Additionally, in 2022 the imports value was almost R119 003 million compared to R101 511 million in 2021, while exports amounted to approximately R206 293 million in 2022 compared to 174 521 million in 2021 (Department of Agriculture, Land Reform and Rural Development, 2023). In 2023, the total of agricultural products amounted to approximately R426 440 million, an increase of 5.5% compared to 2022, mainly due rising prices of animal products and horticulture (Department of Agriculture, Land Reform & Rural Development, 2023).

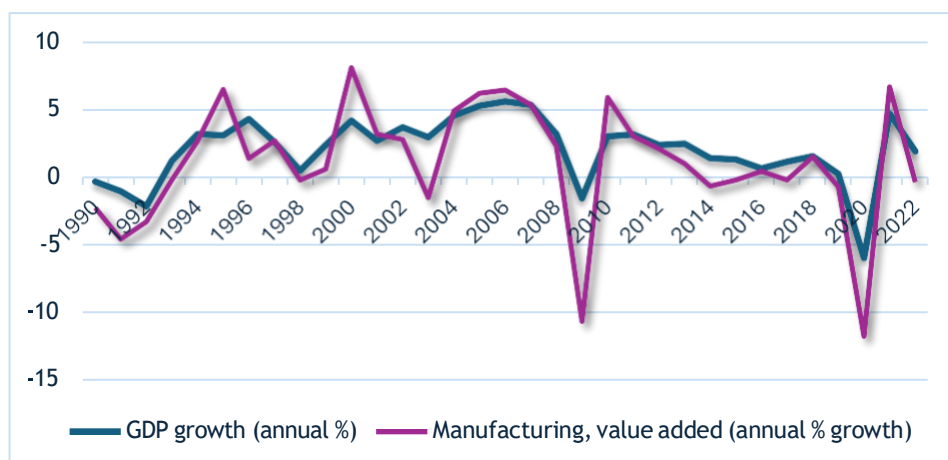
2.4.4. The manufacturing industry

Since the industrial revolution, manufacturing has become growingly significant with most goods produced in masses (Mnguni & Simbanegavi, 2020). The manufacturing industry includes industries engaged in the process of turning raw materials into finished goods that are ready for sale. The final product can either serve as intermediate goods which are used in the production process (producer good) or a finished good that is sold to consumers (consumer good) (Black & Kohser, 2017). Manufacturing industries are those industries that participate in the transformation of materials into products. This transformation can be physical, mechanical, or chemical. This process starts with product design and material specification, these materials are then altered to become the desired product (Huang, Wang, & Liang, 2020). Various industries depend heavily on manufacturing to run, these include food and beverage, textiles, electronics, automotive and many more. The manufacturing industry is crucial in economies as it includes a large scale of the labour force and produces materials needed by various sectors (Roos, 2016).

Over the years, the annual growth of the manufacturing industry mirrored the overall annual GDP growth. Figure 2.5 illustrates that before 1994, annual real growth rate in manufacturing averaged 4.3%, declining to 3.6% post 1994 before the recession, and further dropping to 1.9% between the years 2010 to 2015. The industry was negatively affected by the great recession in 2008/2009. Subsequently the COVID – 19 pandemic in 2020 negatively impacted the demand and revenue for firms as a result of

disturbances in supply chains of global productions and trade due to the lockdown (Makoni & Chikobvu, 2023).

Figure 2.5: annual percentage growth in GDP and value added



Source: Author's compilation from World Bank Data from 1990 to 2022

South Africa's top export products consist of gold, platinum, coal briquettes, cars, and diamonds, exported mainly to China, Germany, India, Japan, and the United States, while its import products consist of refined petroleum, vehicles, crude petroleum, parts and accessories of vehicles, and broadcasting equipment, imported mainly from China, India, Germany, Saudi Arabia, and the US. In May 2024, South Africa had a trade surplus of R12.1 billion, exporting R170 billion and, importing R158 billion, with the main exports products being platinum (R19.4B), gold (R10.4B), coal briquettes (R9.98B), and delivery trucks (R 9.04B). While the main imports were refined petroleum (R21B), commodities not elsewhere specified (ZAR15.8B), crude petroleum (R 6.81B), cars (R4.69B) and telephones (R4.22B) (OEC, 2024).

In 2023 South Africa had a trade balance surplus exceeding R60 billion. Conversely, manufacturing had a trade balance deficit of over 172 billion in the same year. Capital goods made up 10% of total African imports in 2023, while exports accounted for 5%. The portion of capital goods in manufacturing imports has been decreasing from the peak of 14% in 2012. Meanwhile, the portion of manufacturing exports increased from 6% in 2021 to 9% in 2022, primarily because of increased exports to the European Union and the US (Mthembu, 2024).

2.4.5. The construction industry

This is one of the key industries globally, contributing significantly to the GDP of many countries (Khaertdinova, Maliashova, & Gadelshina, 2021). Growth in this sector is,

largely driven by government spending through the provision of capital for infrastructure development. Infrastructure development is important in all economies (Luu, Nguyen, Ho, & Tien, 2019). For LDCs, infrastructure such as the installation of electricity, and road construction plays an important role in the prosperity, social wellbeing, and quality of life of the nation's citizens and their business opportunities (Thwala, 2022). Inadequate infrastructure may result in lower economic growth, an underdeveloped nation, and inferior living standards (Alaloul, Musarat, & Rabbani, 2021).

Due to political uncertainties, the South African construction industry underwent changes between the 1980s and 1990s. The industry shifted its focus from a first-world approach to a developing-world construction environment, prioritising the population's basic needs and economic conditions. This transition involved the creation of new policies to promote stability, economic growth and competitiveness, sustainable job creation, and address past inequalities while building industrial capacity for development (Mathonsi & Thwala, 2012). The South African economy is equally impacted by the construction industry, which is also an important contributor to the nation's employment and economic growth (Standard Bank, 2022). Investing in infrastructure promotes economic growth in any country and enables the development of enterprises, promotes job creation and poverty alleviation (CIDB, 2012). In 2023, the construction industry in the country contributed R109.5 billion to the nation's GDP, which increased compared to the previous year which had a value of R108.9 billion rand (Cowling, 2024).

South African construction companies operating in Mozambique include Concor, WBHO Construction (Pty) Ltd, Group Five, Raubex Group Limited, Stefanutti Stocks (Pty) Ltd, some of these also operate in countries such as Lesotho, Botswana, Namibia, Lesotho, eSwatini, Madagascar, Mauritius, Zambia, Zimbabwe and even outside Africa, in the United Kingdom (Patrick, 2024). Concor is a service construction and an infrastructure company, focused on the building, mining and property development sectors. Concor is also operative in Lesotho, Botswana, and Namibia. Wilson Bailey Holmes-Ovcon (WBHO) construction (Pty) Ltd, also focused on building construction is operative in other African and European countries such as Botswana, eSwatini,

Madagascar, Zambia and, the United Kingdom (Concor, 2024; Patrick, 2024; Stefanutti Stocks, 2024).

Similarly, Raubex Group Limited is focused on road and civil engineering contraction, this firm is not only based in Mozambique, but also in Zambia, Zimbabwe, Namibia, and Botswana. Additionally, Group Five is, another South African company focused on the sub-Saharan Africa region, working in the energy, infrastructure, real estate, and resources sectors. Apart from Mozambique, this company is, also based in Mauritius, Zimbabwe and Ghana. Another South African country includes CVS Construction (Pty) Ltd specialising in bulk earthworks, concrete structured schools, shopping malls, wind farms, and many more. Lastly, Stefanutti, is one of the largest construction firms in the country, involved in building, roads, civils, oil and gas, and many others, is also located eSwatini, Zambia, and eSwatini (Patrick, 2024; Raubex Group, 2024; Group Five, 2024). This highlights the sector's participation in GVCs.

2.5. Industrialisation

Industrialisation is the process whereby the secondary sector's share of value added grows compared to that of the primary sector. It is a crucial stage of development in a nation, as it signifies a shift from agriculture and mining dominance to manufacturing, playing a vital role and largely contributing to total output (Chang & Zach, 2019). The foundation of industrialisation lies in enhancing production processes and creating superior quality products through the advancement of technological capabilities (Effiom & Uche, 2022). Since the start of the Industrial Revolution two centuries ago, advancements in production technologies, ranging from steam engines to information and communication (ICT) hardware, have raised productivity in the manufacturing industry (Li & Lin, 2015) as well as in mining, energy production, agriculture, communications, and many services. Enhancements in consumer products and capital production is crucial for the success of nations and regions (Lewis, 2016). Industrialization and specialization go hand in hand. Countries, industries, and firms specialise in what they manufacture best (Mohr, 2015). They improve their technological capabilities in particular areas of production to maintain a competitive advantage. No country can manufacture all the goods and services it requires, thus all countries undergo international trade. Exporting generates foreign exchange revenue that is used to import goods from other countries (Ruffini, 2016). For example, South

Africa exports platinum and coal, mostly to China, the United States, and Germany, then uses the foreign exchange revenue to import advanced machinery and equipment (OEC, 2024).

2.6. Historical context to industrial policy in South Africa

Historically, South Africa's development is attributable to the minerals, mining and energy sectors. South Africa achieved industrial triumph in the 19th century a result of the discovery of valuable metals and diamonds. Hence, mining accounted for 60% of the nation's exports. This led to the growth of the manufacturing sector through the diversification of mining operations such as the extension of downstream mineral processing, engineering, the chemical industry, banking and other manufacturing industries (Schwank, 2008). Before the country became democratic in 1994, it was ruled by the Apartheid government. The Apartheid government was mainly concerned with South Africa being a self-sufficient country, thus the government implemented high tariff barriers, allowed the exchange rate to appreciate, hence discouraging exports, and, provided industrial support by implementing demand-side interventions, aimed at increasing the output demand in an industry (Aboobaker & Michell, 2022).

2.7. Industrial policy in the Apartheid era

From 1925 to 1973, the government adopted an 'import substitution' strategy to strengthen state investment and manufacturing in major sectors (Malefane & Odhiambo, 2017). This led to the formation of an association among state-owned entities, the mining industry, and the state. This formation brought about various state-owned enterprises, local markets for recently developed industries in that period additionally it resulted in the exploitation of workers, and protectionism for local industries. Nonetheless, economic growth was exceptional in the 1960s (Schneider, 2000). However, the apartheid growth path failed in the period of the 1970s to 1980s after experiencing sustained growth in the 1960s. Due to income inequality, mass production was greater than mass consumption. Secondly, capital productivity dropped due to the lack of productivity in the labour force, and lastly, overall inequality such as in the provision of jobs, and hierarchy relations, resulted in political opposition, and low production as employees decided to take an industrial action. Additionally, crime and insecurity hindered technological development and the drive to invest, hence, export growth was limited (Newman, Baloyi, & Ncube, 2010).

In the 1980s, the country's economy worsened as the manufacturing sector could not meet consumer's needs both nationally and internationally and could not generate employment for the population. These economic conditions occurred as, a result of poorly designed protection systems, the influence of apartheid in the workforce, a work organisation built around suppression, and failed labour relations systems (Joffe, Kaplan, & Kaplinsky, 1995). During the early 1990s, the South African economy faced significant challenges due to international sanctions that isolated the country from global markets, particularly international capital markets. This era marked one of the longest recessions in the country's history, spanning from March 1989 to May 1993. Nonetheless, since 1993, the economy experienced a period of economic growth (Bekun *et al.*, 2019).

2.8. South Africa's trade integration since 1990s

During the 1990s, after the country re-integrated into the world economy, the government made a shift in the trade policies to advance its multilateral, preferential, bilateral, non-reciprocal, and regional trade policies as an attempt to support industrial development, promote exports and GVCs participation, and sustainable economic growth (Stern & Ramkolowan, 2021). A summary of the key trade policy developments over the last 30 years is, shown in Table 2.1 below

Table 1.2: Trade policy interventions in South Africa

Year	Trade policy intervention
1990	The introduction of the General Export Incentive Scheme (GEIS).
	Import tariffs; are gradually terminated.
1994	SA's re-integration into the world economy.
	Import duties on, intermediate products and capital goods are eliminated.
	The transition from quantitative restrictions to tariffs is finalised.
1995	South Africa implemented the Uruguay Round mandate of the General Agreement on Tariffs and Trade.
1996	Formation of the process of rationalising new tariffs.
	New bilateral trade agreement signed between Zimbabwe and SA.
	The Southern African Development Community (SADC) Free Trade Protocol signed.

1997	Export aid given by GEIS discontinued.
2000	The SA-European Union (EU) Trade, Development, and Cooperation Agreement (TDCA) executed.
2000	South African goods given preferential access into the US through the US Africa Growth and Opportunity Act (AGOA).
	The SADC Protocol on Free Trade put into action.
2002	The recently introduced agreement of the Southern African Customs Union (SACU) put into effect.
	Negotiations between SACU-MERCOSUR initiated.
2003	Negotiations for a free trade agreement (FTA) between SACU and the United States initiated.
2006	The European Free Trade Association and the Southern African Customs Union Trade Agreement signed.
	A memorandum of agreement signed to encourage bilateral trade and economic collaboration between South Africa and China.
	Southern African Customs Union and United States FTA negotiations adjourned.
2008	A joint agreement for Trade, Investment and Development between SACU and the US signed.
	A three-party negotiation for a free trade agreement (FTA) between SADC, East African Community (EAC), and Common market for Eastern and Southern Africa (COMESA) began.
	Agreement between SACU and MERCOSUR officially signed.
2010	A framework for trade policy and strategy introduced in South Africa.
2011	A partnership formed among the BRICS countries, these are, Brazil, Russia, India, China, and South Africa.
2015	The three-party FTA between SADC, EAC, and COMESA begins.
	Import duties on capital and intermediate goods eliminated.
2016	The economic partnership agreement between the EU and the SADC signed.
	SACU and MERCOSUR's preferential trade agreement is in effect.
2019	African Continental Free Trade Area (AfCFTA) starts to operate.

	SACU and Mozambique Economic Partnership Agreement signed.
2021	SACU and Mozambique Economic Partnership Agreement begins to operate Implementation of the AfCFTA is on track.

Source: Malefane (2018)

2.9. Multilateral and non-reciprocal trade agreements signed by South Africa

In the realm of multilateral trade, the World Trade Organisation (WTO) holds the most influence over South Africa's trade policy, establishing a framework for increased bilateral trade among its member nations. Since 1947, South Africa has been a part of the General Agreement on Tariffs and Trade (GATT) within the WTO. The WTO's Uruguay Round of GATT has directly impacted South Africa's trade policy tools. The tight provisions regarding subsidies led to the discontinuation of the GEIS that was implemented in the country in 1990 hence, South Africa had to gradually phase out this scheme by 1998 in compliance with the recommendation of the Uruguay Round of GATT (Malefane, 2018).

South Africa made significant efforts to adhere to the commitments of the WTO Uruguay Round protocol, reducing tariff and non-tariff measures affecting trade in goods. These efforts included simplifying the tariff structure, eliminating import restrictions, and phasing out export subsidies. The reduction in tariffs mainly targeted the manufacturing and agriculture sectors, with the average tariff on manufacturing goods decreasing from 21% in 1992 to around 11.5% in 2002. Similarly, tariff protection in the agriculture sector dropped from 5.5% in 2002 to 3.7% in 2009 (Hviding, 2006).

2.10. Regional trade agreements signed by South Africa

Over the years, African countries have implemented trade policies to reduce tariff/non-tariff barriers that encourage trade openness, as an attempt to promote intra-African trade and provide a platform that stimulates trade (Gbatsoron *et al.*, 2019). The AfCFTA is one of the agreements developed to promote export diversification, socio-economic growth and development, and to boost Africa's trade position in the global market and enter into transformative regional and global value chains (World Development Report, 2020; Siba, 2022). More so, the African Trade Center (ATC) is an agency designed to

promote trade and investment with an objective of promoting, local and foreign direct investment in African countries (Africa Trade Center, 2020).

South Africa also became part of the SADC in 1996, a trade bloc consisting of 15 countries in the region (Tanyanyiwa & Hakuna, 2014). The SADC trade protocol, which became effective from 1 September 2000, played a significant role in shaping South Africa's trade policy. One of the key objectives of the SADC trade protocol is to promote liberalised trade flows among member nations by removing trade barriers such as import duties on products from SADC member countries, thus promoting trade. Hence, over the last decade, South Africa significantly lowered the tariff rates in line with the SADC trade protocol. The goal for the South African economy was to eliminate tariffs on most intra-SADC imports within 5 years while, other members were given 8 years to do the same. The advantages of SADC membership have been mutual for South Africa and the SADC members. SADC has not only boosted South Africa's access to regional markets but also contributed to decreasing the trade deficit that other countries have with South Africa (Mapuva & Muyengwa-Mapuva, 2014).

The Southern African Customs Union (SACU) that, include South Africa, Botswana, Lesotho, Namibia, and Swaziland was created in 1910 to promote economic development, diversification, employment, and global value chains by coordinating trade at the regional level (Molepo & Jordaan, 2024). Furthermore, on 1 April 2016, the SACU-MERCOSUR preferential trade agreement took effect, linking SACU nations with Argentina, Paraguay, Brazil, and Uruguay. The agreement includes tariff cuts on specific items such as plastic, steel, chemical, textile, electronic, capital, automotive and agricultural products. Lastly, the COMESA-EAC-SADC FTA above other things aims to boost economic integration in Africa (Malefane, 2018).

2.11. Bilateral trade agreements

South Africa entered into bilateral trade agreements with other nations to improve market access and trade terms for its goods. In June 2016, the EU-SADC EPA replaced the TDCA, with the aim to provide easier access to the European Union intermediate goods for SADC EPA member nations to support the countries' economic diversification and promote regional integration in SADC. Before implementing the EU-SADC EPA, South Africa and the European community, had a TDCA, implemented

in 2000, which aimed to establish a free trade area, allowing free movement of products in all sectors, easing the overall global value chains process. The TDCA also aimed at promoting mutual trade liberalisation in goods, services, and capital (European Commission, 2016).

South Africa signed the African Growth and Opportunity Act (AGOA), another bilateral agreement. AGOA was put into effect on 18 May 2000 by the United States to provide market access to the goods of eligible Sub-Saharan nations. By offering improved trade preferences to these countries, AGOA aims at promoting higher trade and foreign investment in Sub-Saharan Africa (Williams, 2015). Since October 2000, South Africa and other eligible African countries have positively benefited from the AGOA initiative. Despite being planned to end in September 2008, the US government prolonged AGOA until 2015 (Mbatha, 2019). AGOA has granted South Africa duty-free access for exports from various industries including chemicals, forest products, agricultural products, energy-related products, textile and apparel industry, footwear, electronic products, transport equipment, minerals and metals, and machinery thus promoting integration in GVCs (Naumann, 2015).

2.12. Conclusion

Industrialisation leads to economic development by boosting productivity, generating jobs and increasing wages, and creating foreign exchange revenue. The notion of value chains involves the sequential linkages where inputs and resources are, transformed into outputs for a market. Although its significance has diminished due to the 2008 financial crisis, worsened by the Coronavirus pandemic and the Ukraine-Russia war, half of global trade still involves global value chains, with all nations participating in it and specialising in the production stages differently. GVCs allows firms to access international markets and focus on core activities.

South Africa is in the lead in terms of industrial development in Southern Africa. Although its development resulted in an imbalance among the other nations in Southern Africa, it helped to drive development in the region through trade and manufacturing in regional value chains. As a result, the nation is one of the region's main trading partner. In the 1990s, South Africa implemented new economic reforms aimed at boosting economic growth. These reforms included shifting from import substitution

industrialisation to an export promotion strategy converting quantitative restrictions, and introducing general export incentives. South Africa also signed several trade agreements both regionally and globally post-1990, leading to increased multilateral trade.

This chapter began by discussing and explaining the concept of economic development, followed by a discussion on the process of GVCs, thereafter, the chapter discusses the five performing industries participating in global value chains, namely, automotive, agriculture, mining, manufacturing and construction. The chapter ends by discussing the historical context to industrial policy in SA and South Africa's trade integration since 1990.

CHAPTER 3: LITERATURE REVIEW

3.1. Introduction

The resolution of the GVCs has revolutionised trade, resulting in changes in the connections between development, growth, trade, trade competitiveness, and trade governance options (Taglioni & Winkler, 2016). Exporting by means of global value chains has been, recently seen as a potential solution for declining industrialisation trends (Dollar, 2017). Due to advancements in information and communication technologies, developing countries can now participate in international markets by joining GVCs, by performing specific stages in the manufacturing process, to enhance competitiveness and industrialise by increasing their participation (Boffa, Jansen, Sollender, 2021). Export-led industrialisation is, now considered easier than before, relying on firm capabilities and a nation's macro-economic stability, as well as effortless growth through various channels. These include advantages from specialisation in specific functions, accessing imported raw materials, obtaining knowledge spillovers from, multinational corporations and competitive advantages from global competition (Criscuolo & Timmis, 2017).

This chapter aims at reviewing relevant theories that help to, thoroughly discuss the impact of GVCs on sectoral development within the framework of the study and the empirical literature review on GVCs and sectoral development. This chapter is, divided into two sections. The first section introduces the international trade theories that drive the study analysis, these international trade theories suggest that there is a link between trade and development. The second section discusses the empirical literature (studies) that have examined global value chains and development in South Africa and other nations. Based on the literature it is evident that global value chains and economic development are, linked with one another, hence, to fully understand the impact of trade on economic development it is essential to understand the theories supporting this relationship. Lastly, the last section concludes the chapter.

3.2. Theoretical framework

This study focuses solely on the international trade theories arguing that a positive relationship exists between international trade and economic development. The theoretical framework section starts by discussing the classical country-based theories, namely the theories of absolute and comparative advantage, as well as the Heckscher-

Ohlin model, followed by a modern firm-based theory, namely, Porter's national competitive advantage, the gravity trade model, the Prebisch-Singer hypothesis, ending with the fragmentation theory.

3.2.1. Classical country-based theories

There are various theories explaining the benefits of trade that can be linked with GVCs. The oldest trade theory by Mercantilists emphasises the importance of international trade in providing a surplus in the trade balance for wealth creation. Subsequent trade theories have emerged since these include the classical theories by Adam Smith and David Ricardo (Görgün, 2019).

The theory of Absolute advantage

Adam Smith, also known as the father of modern economics is the pioneer of the theory of absolute advantage supporting free trade (Yoshii, Fujimoto, & Shiozawa, 2019). His theory is, formulated around critics of the mercantilist theory, which argues that a country benefits from international trade when its exports are higher than its imports, in order to keep a favourable balance. Adam Smith's theory of absolute advantage revolves around specialisation (Mohr, 2015). For Adam Smith, it is the division of labour that boosts productivity, hence when labour, is correctly divided more output can be manufactured without additional labour (Görgün, 2019). Assuming that there are two nations and two products, labour is the only factor of production and production techniques differ among the countries, and each country can manufacture each good using less human labour expenditure than the other country, and hence more cheaply. Therefore, each country has an absolute advantage in producing one good (Dean, Elardo, & Green, 2020). If both countries start to trade with one another, each country will specialise in producing the good for which it has an absolute advantage and acquire the other good through international trade. Overall, more of both goods can be manufactured because, the nation's resources are used efficiently, by trading, both countries can consume more units of at least one good (Schumacher, 2012).

The importance of division of labour in enhancing growth stems from its ability to increase both the quality and quantity of production (Bennett, 2015). The production process in global value chains involves dividing tasks into different segments these tasks are then, distributed worldwide by multinational corporations (MNCs) therefore, if a country embraces a more advanced division of labour, it could improve the quality and

quantity of production, consequently leading to an increase in the total output. Hence, Smith's observation indicates that international trade facilitated by division of labour, can indirectly, impact economic growth (Smith, 2023). Smith's evaluation of international trade demonstrates how trade can boost economic growth under certain conditioning assumptions. One of the key assumptions is that, when factor prices vary between countries it can, impact productivity returns through trade. This assumption highlights the significance of the differences in factor endowments and prices across nations in Smith's trade analysis, ultimately this analysis shows how factor prices can drive economic growth over time (Hansen, 2021).

Smith emphasised the significance of international trade in the economy, and advocated strongly for free trade, stating that government intervention is essential, to a certain extent. Smith believed that free trade leads to optimal allocation of capital across the different economic sectors. However, to implement free trade, policies supporting international trade and improvement in growth are essential (i.e. The AfCFTA, the SADC trade protocol, and the COMESA-EAC-SADC FTA) (Irwin, 2016; Malefane, 2018; Siba, 2022). Smith's theory has not been expanded as it is not viewed as a pertinent theory to explain foreign trade due to, the dominance caused by Ricardo's theory of comparative advantage, which was used to expand on the neoclassical trade models including the factor price equalisation theorem, and the Heckscher-Ohlin model. However, Adam Smith's theory is, still used as an introductory explanation and guide to modern international theories that leads directly to neoclassical trade theories (Schumacher, 2012).

The theory of Comparative advantage

This theory is, considered 'the most beautiful and deepest result in all economics' (Warren, 1990). The theory formulated by David Ricardo, turned out to be a principle in modern economics. Although Ricardo was not the first one to come up with it, he was the first person to write a finished formulation of the theory in his work on the *Principles of Political Economy and Taxation* (1987). This theory attempts to explain the trade flow direction among nations and to determine the gains each nation obtains from participating in international trade. The theory also strongly argues in favour of free trade among countries (Faccarello, 2015).

According to this theory, all that is needed for two nations to benefit from international trade is for the opportunity cost to differ in both countries (Kok & Selvaratnam, 2018). Table 3.1 below illustrates the maximum output per worker per day for two countries that trade with one another. Suppose there are only two nations, Italy and Australia, one Italian worker can be able to produce two desks or eight barrels of wine daily, whereas, an Australian worker might only make, one desk or six barrels of wine daily. Hence compared to Australia, Italy uses fewer resources to produce both goods (Mohr, 2015).

Table 3.1: Maximum output per worker per day in Italy and Australia

	x units of desks	y units of wine
Italy	2	8
Australia	1	6

Source: Author's compilation from Mohr (2015)

Although Italy has, an absolute advantage in producing the two goods, the opportunity cost of producing a barrel of wine in Australia is $\frac{1}{6}$ of a desk whereas in Italy, the opportunity cost of producing 1 barrel of wine is $\frac{1}{4}$ of a desk thus Italy has a comparative advantage in making desks. While Australia has a comparative advantage in making wine (Mohr, 2015). The reached conclusion is that the presence of gains from trade is determined by comparative costs rather than absolute costs (Bellino & Fratini, 2019). As GVCs become more prominent in trade the concept of comparative advantage is seen in different production stages rather than bundled goods and services. By integrating this theory to global value chains it can be seen how firms can reduce production costs, and increase their roles globally by specializing in certain tasks of the production process (Deqiang, Zhijun, & Hajduk-Stelmachowicz, 2021).

The Heckscher-Ohlin model

According to the Ricardian model, labour is, viewed as the sole factor of production. The Ricardian model states that comparative advantage occurs due to international differences in the labour productivity of countries which, results in changes in opportunity costs and prices. However, it does not explain what brings about these international differences in labour productivity (Taylor, 2017). Hence, the Heckscher-Ohlin model was developed as a substitute for David Ricardo's theory to remove the labour theory of value and, integrate price mechanism into trade theory by explaining

the root origin of the differences among the comparative costs of different economies (Ikechukwu, Fyनेface & Anochie, 2022).

The HO model was, formulated by Eli Heckscher (1919) and, Bertil Ohlin (1933). The model explains that trade happens due to the difference in factor endowments among nations. The HO model is a mathematical theory that is used in international trade to evaluate the export structure of a country relative to its natural resources. Heckscher (1919) and Ohlin (1933), argue that trade not only depends on labour productivity, but also the differences in a nation's factor and resource endowment (Bajona & Kehoe, 2010). Thus, a nation will export goods for which it can manufacture in surplus, and efficiently that is, the nation will export goods, which it can manufacture abundantly given its natural, land, and capital endowment (Baskaran, Blöchl, Brück & Theis, 2011). The HO model offers a theoretical basis for exploring how countries participate in different stages of production, and gain advantages from GVCs. By analysing factor endowments and comparative advantages, the model clarifies the specialisation and trade patterns seen in today's global economy. Countries with abundant capital specialise in high-value production of the value chain, while countries abundant in labour participate more in labour-intensive production in the value chain (Kunroo & Ahmad, 2023).

The model indicates that a country will export the resources or goods it has in excess. Thus, it explains why a country with excessive resources has a comparative advantage in exporting than a country that lacks the same resources. In detail, given two countries, country A and B, if country A has excess capital, but lacks labour, then country A has a comparative advantage in manufacturing capital-intensive goods which need plenty of capital but a bit of labour, so if the country has excess capital, the price of capital will be low (Brodino, 2023). On the contrary, it will be expensive for country A to produce labour-intensive goods, since labour is scarce, and the price of labour is relatively high. Hence given country A and country B, a specific product will be cheaper in country A if it has abundant resources while producing the same good will be expensive in country B because of the scarcity of the exact resources (Ikechukwu *et al.*, 2022).

3.2.2. Prebisch-Singer Hypothesis

Classical economists believed that the long-run trend of primary commodity prices would increase; however, the supply of primary commodities is, limited by the availability of cultivable land (Bahmani-Oskooee, Elmi, & Ranjbar, 2017). The modern reality is that labour-intensive manufactured goods produced in economies of scale have become cheaper in real value compared to primary commodities such as copper, as the supply of these manufactured goods is influenced by resource endowment and technological advancement (Jahan, Murad, & Hossain, 2021). According to the classical view, such a positive movement can be seen in the nineteenth century, with a positive trend in primary commodity prices, while the 20th century witnessed a decline in the price of commodities. This hypothesis disagreed with the classical view, stating that the prices of primary commodities decline in the long run (Galassi, 2019).

It is in every nation's interest to improve their terms of trade as this not only increases their current account balance but also enables the nation to acquire more imports. The Prebisch-Singer theory (1950) states it is less profitable for nations to export primary goods compared to manufactured goods. The theory argues that there is a long run decline in real commodity prices because the income elasticity of demand is lower for commodities than for manufactured goods. This means that countries dependent on the exports of primary goods in a long run, experience a reduction in the terms of trade (Keho & Read, 2021). Prebisch and Singer (1950) explain that this long run decline is due to the widened gap in the long-term price development of primary goods, and produced goods. Countries with an export structure containing less individualized goods and a small percentage of value added do not benefit much from trade (Witkowska, 2016).

The Prebisch-Singer hypothesis assumes that the terms of trade of nations whose export basket consists of solely primary goods will decline, in a long run. The terms of trade of a nation is the ratio of the average index of export prices in relation to the average index of import prices (Zahonogo, 2016). The Prebisch-Singer hypothesis emphasizes the weaknesses of nations depending on primary goods and stresses the importance of value addition. Its link to GVCs highlights the significance of advancing the value chain participation to attain sustainable growth. By tackling the challenges presented by the

hypothesis, developing nations can boost their participation in GVCs, their terms of trade, and promote economic resilience (Terra, 2015)

3.2.3. Modern firm-based theories

Firm-based theories came about with the rise of multinational companies (MNCs) because, country-based theories failed to appropriately explain the expansion of MNCs and intra-industry trade. Contrary to country-based theories, firm-based theories include product and service factors such as technology, quality, and brand and customer loyalty in explaining trade flows. For the purpose of the study, the only firm-based theory discussed is Porter's national competitive advantage theory because it assists in explaining how some countries gain competitive advantage and boost their role in GVCs. By considering demand and factor conditions, firm strategy, and supporting industries, policymakers and firms can improve their competitive position in the economy. This highlights the significance of national conditions in developing the dynamics of GVCs, which in turn impact the nation's growth, and development.

Porter's national competitive advantage theory

Porter's national competitive advantage theory is a theory of competitive advantage of industries, focusing on explaining why specific industries in a country are competitive globally and, why certain firms in a country are able, to consistently innovate. Porter (1990) stated that, a country's competitiveness in, an industry is determined by, the industry's innovative capacity as well as, its capacity to upgrade (Gupta, 2015). Porter (1990) used four determinants to explain his theory namely, (1) local market resources and capabilities, (2) local market demand conditions, (3) local suppliers and complementary industries, lastly (4) local firm characteristics. If these listed determinants are favourable, domestic firms are able to continuously upgrade and innovate (Mahmood, 1990).

Firstly, Porter (1990) understood that natural resources such as minerals and oils may either be available or unavailable in a nation. Porter (1990) further explains that despite the fact that a nation is competitive due to the natural resources it possesses, it cannot transform these into value creation without having advanced factors such as skilled labour, investment in education, technology and infrastructure, which are important in deciding what a country imports and what it exports (Öz, 2002). Secondly, he believed that for innovation to take place, demand conditions are required. Demand conditions

include the size of the local market, the suitability of product standards, and a sophisticated home market is crucial (Fang, Yunheng, & Wang, 2018). This means that countries acquire a competitive advantage in industries where the home demand gives the firms a clear image of emerging buyer needs (Keter, 2012).

Thirdly, global enterprises gain from having robust, effective, supporting and related industries to obtain the inputs needed. According to Porter (1990), industrial production does not occur in isolation but rather depends on a network of suppliers, manufacturers, and distributors, hence having related and supporting industries layers the foundation on which the main industry can thrive. Lastly, the characteristics of local entities include firm strategy, industry structure and rivalry. Domestic rivalry is essential for a firm's international competitiveness as it forces the firm to develop unique and sustainable strengths, capabilities, and innovation, and encourages firms to upgrade (Mekić & Mekić, 2014). Moreover, Porter stated that the government has a significant impact on the national competitiveness of industries as governments can implement policies that boost the competitiveness of companies and from time to time, the whole industry (Smit, 2010; Zhang, 2014).

In his book 'The Competitive Advantage: Creating and Sustaining Superior Performance' (2008), Porter (2008) explains how value chains are crucial to maintain a competitive advantage. Essentially, Porter (2008) explains that competitive advantage arises due to the differences in competitor value chains. As such, an industry gains competitiveness from the value chain, specifically, the value chain that arises from a firm's activities in that industry. One of the factors that determine a firm's profitability is an adequate value chain that allows the firm to outdo its competitors in the same industry (Pantea, Csobra, & Irina, 2008).

A Global value chains theory

3.2.4. The fragmentation theory

Throughout its evolution, trade theory has primarily focused on elucidating and evaluating trade concerning finished goods. The international division of labour and, the significance of specialisation have been, mainly examined in terms of finished goods (Mohr, 2015). While there is a notable body of literature on the trade of intermediate products, its discoveries and perspectives are, often seen as an additional aspect rather

than a fundamental part of the main paradigm. Even discussions on intra-industry trade, which could have focused on the exchange of parts and components, have often focused on the exchange of finished products (Ali *et al.*, 2022; Handique, 2020). It was only in the 1980s that the rise of international production networks (GVCs) became a significant aspect of the global economy. This trend is especially prominent in East Asia, where parts and components transit borders several times before assembled into finished goods (Saslavsky & Shepherd, 2014). Additionally, improved transport and logistics performance, the decrease in transport and communication costs, as well as the removal of trade restrictions further contributed to international fragmentation (Gani, 2017).

Consider the production of electronics, the electronics GVCs involve research and development (R & D) and design, raw materials and inputs, electronic components, subassemblies, assembling the final good and lastly, buyers of the finished good (DeBacker & Miroudot, 2014). The division of the integrated process into separate production stages creates opportunities for developing countries unable to manufacture an entire product (Abreha, Kassa & Lartey, 2021). The concept of fragmentation involves dividing a formerly unified production process into multiple components or fragments (Murray, 2024). While this fragmentation usually starts at a local or national level, reduced costs of international coordination can enable manufacturers to take advantage of variations in technologies and factor prices across countries in developing more expansive production networks (Hermida *et al.*, 2022). Essentially, fragmentation makes sense when there are cost savings in producing parts and components in separate locations, based on lower labour and production costs compared to the original location, and when connecting these locations involves lower service link costs (Los, Timmer & Vries, 2014).

3.3. Empirical literature review

This section provides empirical literature on global value chains. The section is divided into four parts, the first part discusses the impact of GVCs participation on selected variables, followed by a discussion on the determinants of global value chain participation, thereafter the impact of GVCs in Sub-Saharan Africa, and the trade facilitation and GVCs are discussed. The section concludes with a table that summarises the empirical findings of the studies reviewed.

Researchers have used two approaches have been used in studies on GVCs participation, one that makes of transaction trade data, and the other that uses firm-level data. There are two types of firm-level data methods: one using a firm's import and export data, and another that focuses on a firm's involvement in GVCs. The former typically depends on survey responses on a firm's participation in GVCs while the latter assumes that a firm partakes in GVCs when it imports inputs and exports outputs (Urata & Baek, 2020). Studies conducted by Obashi and Kimura (2018) and Athukorala (2011) carry out their research at sectoral levels. Studies by the OECD, World Input-Output Data, and the EORA database including studies conducted by Baldwin and Lopez-Gonzalez (2015), and Timmer *et al.* (2014) examine both backward and forward inter-industry, international linkages to assess the level of GVCs participation in different sectors (Obashi and Kimura 2018; Athukorala 2011; Baldwin and Lopez-Gonzalez 2015; Timmer, Abdul & Bart, 2014). There are two distinct approaches to the transaction trade data, one that uses international data and, another that uses international, inter-industry, and input-output (IO) data. Studies using international trade data analyses the volume of trade in parts and components to evaluate the importance of GVCs while acknowledging that the formation of GVCs results in increased trade in parts and components (Bontadini, 2019).

3.3.1. Impact of GVCs participation on selected variables

A study by Yanikkaya and Altun (2020) looked into how sectoral value-added and total factor productivity (TFP) were affected by their involvement in GVCs for 26 EU countries, and the United States of America, with 21 sectors for the period of 1995-2011 and 28 sectors for the period of 2005-2015. They used the Generalised Method of Moments (GMM) estimation technique to investigate both the manufacturing and services sectors, and the results obtained show that in the period of 1995-2011 sectors with more GVCs participation underwent a greater output and total factor productivity growth compared to the period of 2005-2015. The study then proceeded to investigate each sector separately and found that for the period of 2005-2015 only the manufacturing sector underwent higher growth and productivity (Yanikkaya & Altun, 2020).

Dollar (2019) states that GVCs participation plays a major role in enhancing value-added manufactured goods and services. As such, a study by Kummritz (2016)

investigated the connection between industrial development and global value chains using a set of Inter-Country Input-Output tables, the sample covers 54 countries, from the period of 1995 to 2011. The findings show that regardless of income levels, increased GVCs participation increased domestic value added and productivity in all nations. The author found that when the backward GVC participation increases by 1%, domestic value added increases by 0.11% in the average industry. Moreover, he found that for forward linkages, an increase in GVC participation by 1% increases the domestic value added by 0.6% and labour productivity by 0.3% (Kummritz, 2016).

Carneiro *et al.* (2024) used a meta-analysis to determine the impact of global value chains on employment they found that the impact varies according to the nation's development level, employee's qualifications, the sectors in consideration, and the GVCs and employment indicators. The study used a sample of 51 empirical studies estimates were made from which 2596. The authors found that employment has a positive impact on GVCs and high-skilled workers, and the opposite applies to the services sector more than it does to the manufacturing sector (Carneiro *et al.*, 2024).

3.3.2. Determinants of global value chain participation

Kowalski *et al.* (2015) assessed the factors that determine global value chain participation, as well as the economic effects and policy implications of GVC participation in Africa, Asia, and the Middle East using the OECD TiVA database from 1995 to 2009, with data from 57 countries from the EORA database. The results from the analysis indicate that many LDCs participating in GVCs benefit economically by experiencing higher productivity, export diversification and urbanity. Moreover, the study found that the key factors of GVC participation include trade openness, and investments, market size improved customs and logistics, adequate infrastructure, institutions, and intellectual property protection, structural factors namely geographic, and the level of development (Kowalski *et al.*, 2015). Johnson (2023) found that African countries have a relatively high proportion of exports of intermediate goods compared to imports due to its abundance in natural resources.

Fagerberg *et al.* (2018) examined the hypothesis and found that more GVCs participation results in greater economic growth from the period 1997 to 2013 using 125 countries. The obtained results indicate that countries that increase GVC participation

experience economic growth faster than other countries, whereas countries with struggling economies are left disadvantaged. Furthermore, the results indicate that there is a positive link amongst technological development and economic development, and that building an innovative system is essential for both development and participation in GVCs. The result is consistent with Jangan and Rath (2021) who assessed the relationship between international trade and economic growth, focusing on the advancements in GVCs using a sample of 58 countries from 2005 to 2015, the results obtained revealed that trade through GVCs promotes economic growth.

Urata and Baek (2020) attempted to find the factors determining participation in global value chains by doing a firm and country-related analysis from the period 2009 to 2018 in 111 countries and 38 966 firms, the study used the Probit and Tobit models and focused on small and medium-sized firms (SMEs). The results obtained revealed that at firm level, high labour productivity, foreign ownership, high technological capability, and large firm size are essential for a firm additionally these factors allow firms to engage in GVCs. For country-related factors, foreign direct investment inflows, openness to trade, developed infrastructure, effective logistics, and good governance enable firms to engage in GVCs and raise their level of participation. Similarly, Rahman *et al.* (2024) investigated the determinants of GVCs participation in Regional Comprehensive Economic Partnership (RCEP) countries by employing fixed effects regression method over a period of 1995 to 2018. The findings showed that openness to trade and economic freedom, positively impact backward GVCs participation whereas FDI inflows negatively influence forward GVCs participation in RCEP countries (Rahman *et al.*, 2024).

Another study by Fernandes *et al.* (2022) used panel data cross-country analysis using 100 countries from 1990 to 2015 to find the factors determining GVCs participation. The study shows that trade policy and FDI connectivity, geography, domestic industrial capacity, factor endowments, and the quality of institutions are important factors that determine GVC participation. The results further indicate that factor endowments, geography, a stable political system, trade liberalisation, FDI inflows, and domestic industrial capacity are crucial in determining participation in GVCs as these have a greater effect compared to traditional exports (Fernandes *et al.*, 2022). This coincides with Pavón-Cuéllar and Barreto-Pavón (2024), who analysed the determinants of

insertion in world production, in terms of forward and backward GVCs participation using static panels, and the results obtained revealed that FDI inflows, education, and economic activity affect both forward and backward linkages. More so, distance to the hub and the exchange rate are relevant in backward GVCs participation, whereas market size and logistics determine the forward GVCs participation (Pavón-Cuéllar & Barreto-Pavón, 2024)

3.3.3. Impact of global value chains in Sub-Saharan Africa

Global value chains are beneficial to developing countries as they offer them a chance to participate in global trade and diversify their export products. As such, in the absence of GVCs, developing countries would need to have the capability of manufacturing a complete product to enter into a new industry (Dollar, 2017). On that note, the concept of GVCs has allowed China to export high-tech goods, although, the nation's main focus is the assembly of goods (Dollar, 2019). Obeng *et al.* (2022) investigated the impact of global value chains participation and inclusive growth in Sub-Saharan Africa (SSA) for 19 SSA countries from the years 1991 to 2017. The study used the GMM pooled estimator, and the findings obtained indicate that GVCs integration promotes inclusive growth by creating jobs. Moreover, the study found that foreign value added in SSA has a greater influence on inclusive growth despite its foreign value added being less than its domestic value added. The study recommends that policymakers from these countries should support downstream industries to obtain technologies while attracting upstream industries into their economies.

Another study by Bolaji *et al.* (2018) used the Autoregressive distributed lag (ARDL) model to investigate how boosting the agricultural value chain can enhance rapid economic diversification in Nigeria from 1981 - 2015. The findings obtained indicate that expenditure on agriculture positively impact agricultural sector productivity in Nigeria. The results also show that agricultural land, agricultural raw materials, and agricultural machinery, directly impact agricultural productivity in the country. The empirical findings show that capital and labour directly influence economic growth. Lastly, the study advises the governments to make efforts to create institutions that will develop policy programmes on agricultural development not only to increase growth in the sector but to also boost the overall economic growth in the country (Bolaji *et al.*,

2018). This finding confirms that agriculture is the main driver of growth in developing countries (Espoir *et al.*, 2024).

Similarly, Edo and Kanwanye (2023) examined the impact of initial economic factors, which are trade openness, exchange rate, institutional quality and digital transformation and the Covid-19 pandemic on the participation of selected African countries namely Morocco, South Africa, and Tunisia, in global value chains from the first quarter of 2010 to the second quarter of 2022. The study used the unrestricted error-correction and dynamic OLS models, and the results obtained show that the listed economic factors positively influence GVCs, whereas the pandemic negatively influenced GVCs in all three countries (Edo & Kanwanye, 2023). Certainly, most countries were, negatively affected by the pandemic. Hayakawa and Mukunoki (2021) conducted a study to determine the impact of Coronavirus on GVCs, the results obtained reveal that supply chain and output levels were largely affected by the pandemic.

3.3.4. Trade facilitation and global value chains

Scholars have been examining the impact of trade openness on economic growth, Idris *et al.* (2016) argues that trade openness plays a key role in driving economic growth. Takpara *et al.* (2023) looked into how trade facilitation affected the involvement of SSA countries in global value chains. Using the pooled OLS regression and instrumental variable-two-stage least squares (IV-2SLS) estimators and, new value data on a panel of 25 countries for the years 2004 to 2017. The results showed that ICT, physical infrastructure, and border and transport efficiency support SSA countries participation in global value chains. The results are robust at the sectoral level specifically in the textile and apparel, agriculture, and manufacturing sectors for information and communication technology and physical infrastructure. The results encourage well-structured sectoral policies to benefit from GVCs (Takpara *et al.*, 2023).

3.3.5. Global value chains and productivity

A crucial concept in economics is that productivity leads to economic growth. The fathers of modern economics, Adam Smith and David Ricardo in the 18th century, emphasised the significance of productivity in relation to the advantages of specialisation and international trade (Kim & Pyo, 2016). Constantinescu *et al.* (2019) used data on trade in value added from the World Input-Output database, covering 40 countries and 13 sectors for a period of 15 years to examine the impact of global value

chains participation on productivity. The results obtained suggested that GVCs participation is a driver of labour productivity. Specifically, backward GVCs participation that is, using imported goods to manufacture export products is very crucial for countries. Lastly, they found that a 10% increase in the level of GVCs participation increases average production by almost 1.6% (Constantinescu *et al.*, 2019). Similarly, a study by Gonzalez (2017) found that ASEAN countries positively benefit from the import of intermediate goods, by boosting export performance, which creates employment, especially in services.

Pahl and Timmer (2020), examined whether GVCs participation has led to the development of lower-income countries from 1970 to 2008 using data from 58 countries, of which 38 are developing countries, and 13 industries, using national input-output tables, and data derived from UNIDO's Indstat2 database. The results obtained indicate a positive and significant relationship between GVCs participation and labour productivity growth, and that a percent increase in GVCs participation index results in a 0.01 increase in the growth rate. A study by Kummritz *et al.* (2017) performs a similar research by investigating the policies that increase value-added gains using the OECD ICIO database covering 61 countries and 34 industries for the years, 1995, 2000, 2005, and 2008 to 2011. They found that GVCs participation positively influences the domestic value-added, more on the buying than the selling side, thus the results emphasise the importance of economic policies that promote GVCs integration. Table 3.2 below provides a summary of the empirical studies on GVCs.

Table 3.2: Summary of empirical studies reviewed on GVCs

Author (year of publication)	Value chain, country or region	Method	Main contribution to knowledge
Impact of GVCs participation on selected variables			
Yanikkaya and Altun (2020)	21 sectors from 1995-2011 and 28 sectors from 2005-2015	Generalised Method of Moments (GMM)	For the 1995-2011 period, sectors with more GVCs participation underwent a greater Output and TFP growth compared to the period of 2005-2015.

Kummritz (2016)	54 countries, from 1995 to 2011	Novel value-added trade resistance index	For all nations, increases in GVCs participation result in productivity and domestic value added.
Carneiro <i>et al.</i> (2024)	51 empirical studies	Meta-analysis	Employment has a positive impact on GVCs.
Determinants of global value chain participation			
Kowalski <i>et al.</i> (2015)	57 countries including some emerging developing economies and 187 countries (EORA database), from 1995 to 2009	OECD TiVA database	GVCs participation improves productivity and export diversification. Additionally, the key factors of GVCs participation are trade openness, and investments, improved customs and logistics, adequate infrastructure, institutions, and intellectual property protection structural factors namely geographic as well as market size and development levels.
Urata and Baek (2020)	From 2009 to 2018 using 111 countries and 38 966 firms	Probit and Tobit models	Country-related factors, availability of educated people, FDI inflows, openness to trade, well-developed infrastructure, good governance, and adequate logistics, enable firms to engage in GVCs.
Fernandes <i>et al.</i> (2020)	100 countries from 1990 to 2015	Least square regression method	Geography, a stable political system, FDI inflows, trade liberalisation, factor endowments, and national industrial capacity are crucial in driving participation in GVCs.

Pavón-Cuéllar and Barreto-Pavón (2022),	53 countries for backward participation, and 52 countries for forward participation	OECD TiVA database	FDI inflows, education, and economic activity affect both forward and backward linkages. Distance to the hub and the exchange rate are relevant in backward GVCs participation, whereas market size and logistics determine the forward GVCs participation.
Rahman <i>et al.</i> (2024)	RCEP region for the years 1995 – 2018	OECD TiVA	Economic freedom and openness to trade positively impact backward GVCs participation whereas FDI inflows negatively influence forward GVCs integration in RCEP countries.
Impact of global value chains in Sub-Saharan Africa			
Obeng <i>et al.</i> (2022)	25 countries for the years 2004 – 2017	GMM pooled estimator	Foreign value added in SSA has a greater impact on inclusive growth.
Bolayi <i>et al.</i> (2018)	Nigeria	ARDL	Agricultural expenditure positively influences agricultural sector productivity in Nigeria.
Edo & Kanwanye (2021)	Morocco, South Africa, and Tunisia	Unrestricted error-correction and dynamic OLS models	Trade openness, exchange rate, institutional quality and digital transformation positively influence GVCs participation, whereas the pandemic negatively influenced GVCs.
Trade facilitation and global value chains			
Takpara <i>et al.</i> (2023)	General, 25 countries	Pooled OLS and IV-2SLS)	Trade facilitation indicators such as ICT, infrastructure, transport efficiency, and border efficiency,

			support SSA countries' participation in global value chains.
Global value chains and economic growth/ productivity			
Constantinescu <i>et al.</i> (2019)	40 countries and 13 sectors for 15 years	World Input-Output database	GVCs participation is a crucial determinant of labour productivity.
Gonzalez (2016)	ASEAN countries	GMM	ASEAN countries positively benefit from the import of intermediate goods, by boosting export performance.
Pahl and Timmer (2020)	58 countries, of which 38 are developing countries, and 13 industries	National input-output tables. UNIDO's Indstat2 database	A positive and significant relationship between GVCs participation and labour productivity growth, and that a 1% increase in GVCs participation index results in a 0.01% increase in the growth rate.
Kummritz <i>et al.</i> (2017)	61 countries and 34 industries for 1995, 2000, 2005, and 2008 to 2011	Standard fixed effects model	GVCs participation positively influences the domestic value added.

Source: Author's summary of reviewed studies

3.4. Conclusion

This chapter focused on the determinants of global value chains based on theoretical frameworks and empirical literature. As such, the first section presents the theoretical background of the study, this involves explaining the different international trade theories related to global value chains and development. Two schools of thought were discussed, the classical school of thought and the modern-firm school of thought. The chapter begins by explaining the classical country based theories (i.e. the theories of absolute advantage, comparative advantage and the HO model), followed by Porter's

national competitive advantage theory, the Prebisch-Singer hypothesis, and lastly the global value chains theory of fragmentation. According to the classical school of thought, economic growth is primarily fuelled by the division of labour, thus increasing returns, leading to higher productivity and income per person as both GDP and employment rise, whereas growth from the modern-firm school of thought explains the importance of maintaining a competitive advantage in the value chain.

The chapter further discusses the empirical background of the study, stating the empirical findings encountered in the reviewed studies show that, GVCs participation is an engine of growth and development among nations. As such the empirical findings on the impact of GVCs participation on selected variables show that an increase in GVCs participation led to higher domestic value added and productivity for all nations, additionally, employment has a positive impact on GVCs. More so, empirical findings on determinants of global value chains participation found that trade openness, and investments, improved customs and logistics, adequate infrastructure, institutions, and intellectual property protection, availability of educated people, and FDI inflows, are the key factors leading to GVC participation.

Empirical findings on the impact of global value chains in Sub-Saharan Africa show trade openness, exchange rate, institutional quality and digital transformation positively influence GVCs integration. Similarly, empirical findings on trade facilitation and global value chains found that trade facilitation indicators support SSA countries' participation in global value chains. Lastly, empirical findings on global value chains and productivity found a positive and significant relationship between GVCs participation and labour productivity growth. The following chapter outlines the methodology used to address the objectives of the study.

CHAPTER 4: RESEARCH METHODOLOGY

4.1. Introduction

Forward GVCs participation is, a situation where a country is involved in the export of intermediate goods that are used, in the production processes of the buying country to, produce final goods that are either, re-exported or consumed (Claudio *et al.*, 2020). In South Africa, forward GVCs participation is important because of the country's position as an emerging economy in SSA (Schoeman, 2015). South Africa is an exporter of various raw materials including minerals, and manufactured goods, such as automotive parts and components (DTIC, 2018). Forward GVCs participation can result in industrial and technological upgrading, as well as job creation (Wiryan, Aginta, & Fazaalloh, 2022). Understanding the country's relevance in forward GVCs is important for firms, and policymakers trying to develop the economy, and improve its position in the global market.

This chapter discusses the estimation procedures and techniques used to perform a sectoral analysis of global value chains participation in South Africa. The chapter covers the five sectors participating in forward GVCs in South Africa from 1990 to 2022 and discusses the research design, data sources, and the empirical model specification. It also discusses the unit root tests, the estimation technique, and the co-integration technique. Lastly, to identify both the strengths and weaknesses of the model used, the diagnostic tests to be performed are also discussed.

4.2. Research design

The study uses a quantitative approach and a correlational research design. Correlational research design is a type of quantitative research method that involves the collection of quantitative (numerical) data that is mathematically analysed with the aim of strengthening the validity and reliability of the observations, thus the study uses this approach to evaluate factors attracting sectoral forward GVCs participation in South Africa for the period of 1990 to 2022 (Govinda, 2014). A correlational study design is a study design that investigates the hypothesis that the variables in the model are associated (Asamoah, 2014). This means that two or more quantitative variables are, computed together to find out whether there is an existing relationship between the

variables, thus, the research method assesses the covariance among variables (Mishi & Maredza, 2024).

4.3. Data sources

To determine the dynamic relationship between sectoral GVCs participation and its determinants, the study employs annual secondary data spanning from the years 1990 to 2022. The aforementioned time period was chosen as available data for GVCs participation ranges from 1990 to 2022. Moreover, in the last 30 years, South Africa has not only become more open to trade, thus increasing the country's exposure to the world economy but the government also made various efforts to ameliorate the country's trade administration processes by developing more than 30 main trade policy interventions. These among others include the introduction of the GEIS in 1990, The SADC Free Trade Protocol agreement in 1996 and its implementation in 2000, the AfCFTA coming into force in 2019 and its implementation in 2021 (Stern & Ramkolowan, 2021).

The study performs a sectoral analysis on GVCs participation using the five South African sectors, each with 33 years of annual data thus the study has a total of 165 observations. The data for the variables is obtained from, the UNCTAD, Quantec, the South African Reserve Bank (SARB), and the World Bank (WB) databases. Lastly, all tests are, performed and analysed using EViews 14. The EViews 14 commands specifically used in the study facilitate the preliminary tests and model estimations, ensuring that the results are robust and accurate.

4.4. Model specification

The purpose of this study is to perform a sectoral analysis of global value chains participation in South Africa, thus the study adopts a panel autoregressive distributed lag model. This analysis is, chosen as this study performs a multivariate analysis between the variables to determine whether global value chains participation leads to the factors that attract it, and to determine whether the factors attracting GVCs participation positively contribute to GVCs participation. What sets ARDL apart is its ability to allow the short run dynamic coefficients to vary across sectors, but it restricts the long run coefficients to be uniform.

The study adapts the following model by Balcilar, Lee & Olasehinde-Williams (2020):

$$IP_{it} = \gamma_i + \sum_{j=1}^p \lambda_{ij} IP_{it-j} + \sum_{j=0}^q \delta'_{ij} X_{it-j} + \varepsilon_{it} \dots \dots \dots (1.1)$$

Where IP_{it} - log of insurance premiums (total life and non-life),

I - number of groups (1, 2, 3..., N),

t -number of periods (1, 2, 3..., T),

X_{it} -vector of the independent variables, and

δ_{it} -the vector of coefficients and γ_i is the group specific effect.

The study specifies the model as follows:

$$GVCP_{it} = \sum_{j=1}^p \lambda_{ij} GVCP_{it-j} + \sum_{j=0}^q \delta'_{ij} X_{it-j} + \varepsilon_{it} \dots \dots \dots (1.2)$$

Error correction form of the ARDL model:

$$\Delta IP_{it} = \phi (IP_{it-1} - \theta'_i X_{it}) + \sum_{j=1}^{p-1} \lambda^*_{ij} \Delta IP_{it-j} + \sum_{j=0}^{q-1} \delta'^*_{ij} \Delta X_{it-j} + \varepsilon_{it} \dots \dots \dots (1.3)$$



$$\Delta GVCP_{it} = \phi (GVCP_{it-1} - \theta'_i X_{it}) + \sum_{j=1}^{p-1} \lambda^*_{ij} \Delta GVCP_{it-j} + \sum_{j=0}^{q-1} \delta'^*_{ij} \Delta X_{it-j} + \varepsilon_{it} \dots (1.4)$$

Where:

$\phi_i = -(1 - \sum_{j=1}^p \lambda_{ij})$ = speed of adjustment, if $\phi_i = 0$, there is no long-run relationship

$\phi(GVCP_{it-1} - \theta'_i X_{it})$ measures; the speed of adjustment of global value chains participation to the deviation from its long run relationship with the explanatory variables and the terms, $\sum_{j=1}^{p-1} \lambda^*_{ij} \Delta GVCP_{it-j}$ and $\sum_{j=0}^{q-1} \delta'^*_{ij} \Delta X_{it-j}$ are short run dynamics

Functional form:

Global value chain participation = f (gross value added, gross fixed capital formation, foreign direct investment, exchange rate)

$$GVCP_t = (GVA_t, GFCF_t, FDI_t, EXR_t) \dots \dots \dots (1.5)$$

Regression model:

$$GVCP_t = \beta_0 + \beta_1 GVA_t + \beta_2 GFCF_t + \beta_3 FDI_t + \beta_4 EXR_t + \varepsilon_t \dots \dots \dots (1.6)$$

Where *GVCP* represents forward global value chains participation and the dependent variable of the model. *GVA* is, the gross value added, *GFCF* represents gross fixed capital formation, *FDI* denotes foreign direct investment, *EXR* represents the exchange rate, β_{0-4} are the coefficients estimated, ε is the error term and represents panel data.

Table 4.1: Variable definitions, measures, and data sources

Variable	Definition and measure	Expected sign	Source
Dependent variable			
Forward GVC participation (GVCP)	GVC participation index is an estimate of how much an economy is connected to GVCs for its manufacturing, and international trade. This index shows how each sector is involved in GVCs through both forward and backward linkages (Fernandes <i>et al.</i> , 2020). The two main ways of measuring a country's participation in GVCs include backward linkages and forward linkages. The current study employs only the forward GVCs participation, which, is mostly, found to increase GDP in Africa (Conde <i>et al.</i> , 2015). Forward GVCs participation measures the amount of domestic value added used in another country's export production.		UNCTAD
Independent variables			
Gross value added (GVA)	Measures the contribution to the economy of each individual producer, industry or sector, manufacturer and region in an economy (Cai & Leung, 2020). GVA is equals to cost of production minus cost of inputs directly attributable to production.	+	Quantec
Gross fixed capital	Is a term utilised in national accounts to quantify the value of acquisitions of new or current fixed assets by	+	World Bank

formation (GFCF)	households, the government or business, minus disposals of fixed assets. GFCF is a part of the GDP expenditure and indicates the proportion of the newly value added being invested in the economy (Kanu & Ozurumba, 2014; Ali, 2015).		(WDI)
Foreign direct investment (FDI)	FDI occurs when an individual or entity who invests in a business in another country, having the ownership and control of foreign productive assets (Seiko, 2016). FDI permits financial inflows into the economy. This study uses FDI inflows.	+	World Bank (WDI)
Exchange rate	The exchange rate plays a crucial role in a nation's export levels. It can also be viewed as, a component of a nation's monetary policy, reflecting the value of its currency relative to other currencies (Da-Wariboko <i>et al.</i> , 2022). This value helps establish how currencies compare with one another and plays a vital role in the dynamics of trade and capital movements.	-	SARB

Source: Author's compilation

4.5. Estimation Procedures and Techniques

4.5.1. Panel Unit root

The study performs unit root tests to determine whether the variables in the model are either stationary or non-stationary. Variables need to be stationary for estimation of their long-run relationship. To test for unit root this study employs the Levin, Lin and Chu (2002), and the Im, Pesaran and Shin (2003) tests, to ensure accurate results and to maintain consistency. The null hypothesis is that all the variables have unit root meaning that they are non-stationary. The null hypothesis is, rejected when the critical value is greater than the p-values equals to 0.05 for all the variables, ensuring that all variables are stable over time (Im, Pesaran, & Shin, 2023) It is important to test for stationarity as a non-stationary series can lead to spurious and misleading results in the regression model (Gungor & Simon, 2017).

4.5.1.1. The Levin, Lin and Chu test

Levin, Lin and Chu (2002) developed a method using pooled t-statistic of the estimator to assess the hypothesis that each independent time series has a unit root against the alternative hypothesis that each time series is stationary. They extended Quad's model

by considering varying individual deterministic effects and heterogeneous serial correlation structures of the error terms given homogenous first order autoregressive parameters. Levin, Lin and Chu (2002) created a method that uses the pooled t-statistic of the estimator to test the hypothesis that each individual time series has a unit root against the alternative hypothesis that each time series does not have a unit root (i.e. it is stationary) (Barbieri, 2006). The Levin, Lin and Chu model assumes that autoregressive coefficients are homogenous between individual i.e. $p_i = p$ for all values of i and test the null hypothesis $H_0: p_i = p = 0$ against the alternative $H_a: p_i = p < 0$ for all i (Afjal, 2023). The LLC can be, specified as follows:

$$\Delta y_{it} = \rho y_{it-1} + \alpha_{0i} + \alpha_{1i}t + u_{it} \dots \dots \dots (1.7)$$

$$i = 1, 2, \dots, N, t = 1, 2, \dots, T$$

Where individual effects and a time trend are included, α_{1i} is the deterministic element and u_{it} is a stationary process.

4.5.1.2. The Im, Pesaran and Shin test

This test is built on heterogeneity of the autoregressive parameter. The test differs from the Levin, Lin and Chu in the sense that it allows a broad alternative that the p_i can differ and, that some variables can have a unit root, whereas the LLC test assumes that the unit root is common for all cross-sections. Naturally, the power of the test sharply decreases if a considerable fraction has a unit root (Pesaran, 2011). Both tests allow for varying lag lengths across cross-sections. The Im, Pesaran and Shin (IPS) test permits both stationary and non-stationary series to exist simultaneously (Iskenderoglu & Ozturk, 2016). In addition, the test allows for residual serial correlation, dynamics heterogeneity, and variances between groups. Although the IPS test has the same null hypothesis as the Levin, Lin and Chu test, the alternative hypothesis differs as the IPS test is, based on heterogeneity of the autoregressive parameter (Wu, 1999).

A separate ADF regression for each cross-section:

$$\Delta y_{it} = \rho y_{it-1} + \sum_{j=1}^{p_1} \phi_{ij} \Delta y_{it-j} + \dot{z}_{it}\gamma + \varepsilon_{it} \dots \dots \dots (1.8)$$

$$i = 1, 2, \dots, N, t = 1, 2, \dots, T$$

To test the hypothesis of no unit root, the Im, Pesaran and Shin (2003) employs a group mean t-bar statistics, based on the mean of the individual ADF test statistics. The t-statistics of t-bar is, given as follows:

$$\Gamma_t = \frac{\sqrt{N}t_{NT} - E(t_T|\beta_i = 0)}{\sqrt{Var(t_T|\beta_i = 0)}} \rightarrow N(0, 1), \text{ where } t_{NT} = \frac{1}{N} \sum_{i=1}^N t_{iT} \quad (1.9)$$

Where t_{NT} is the average ADF t-statistics, $E(t_T|\beta_i = 0)$ is the finite common mean and $Var(t_T|\beta_i = 0)$ is the variance of the individual ADF statistics t_{iT} .

4.5.2. Panel autoregressive distributive lag model

A panel data is a combination of time series and cross section observations. The study uses panel data because it exploits all the information that can help describe the global relationship among the variables allowing for more accurate estimations, in addition, it provides a larger sample and therefore, increased degrees of freedom (Hsiao, 2007). The study uses the panel-data autoregressive distributed lag (panel ARDL) method to identify factors that attract GVCs participation in the different sectors in South Africa. The panel ARDL model has been frequently and, reliably used, demonstrating empirical success regarding the significance and robustness of its explanatory variables (Oluseye & Gabriel, 2017)

The choice of the panel autoregressive distributed lag (P-ARDL) is, grounded in several benefits, including its adaptability with studies consisting of small samples. The P-ARDL model can accommodate variables with varying orders of integration, meaning it can manage both level and first variables. Additionally, the P-ARDL approach is easy to set up, analyse and interpret since it consists of one equation, while also being robust enough to include more than two lags in the same regression analysis (Oluseye & Gabriel, 2017). In addition, the Chudik and Pesaran (2013) P-ARDL model proves to be ideal for panel analysis, as it can address cross sectional dependence (CSD) and allows for one or two structural breaks during unit root testing. Ultimately, the P-ARDL is effective for estimating both long and short run variables within the model.

4.5.3. Panel co-integration technique

Panel cointegration tests aim to analyse the long-run relationships among the panel series. The study uses both the Pedroni (1999) and the Kao (1999) co-integration tests

to explain the long-run relationship among the variables under the null hypothesis of no cointegration among the variables (Mamvura, 2018). The Kao (1999) cointegration test suggests estimating the homogenous cointegrating relationship using pooled regression allowing for individual fixed effects. The Kao (1999) test does not account for a time trends, whereas the Pedroni (1999) test allows for certain heterogeneity in the cointegration relationship by suggesting estimating a separate first stage regression for each panel member to estimate the values of β from the following cointegrating equation (Pedroni, 1999; Gengenbach, Palm, & Urbain, 2005).

To compute residuals using panel co-integration regression:

$$GVC_t = \alpha_i + \beta_1 GVA_t + \beta_2 GFCF_t + \beta_3 FDI_t + \beta_4 EXR_t + \varepsilon_t \dots \dots \dots (1.10)$$

Where α_1 represents panel specific means (fixed effects). The null hypothesis is that, there is no cointegration in the series and this is tested against the following alternative hypothesis of cointegration in the series. The decision to reject the null hypothesis of no cointegration depends on whether the computed f-statistic lies within the critical value range (Malefane, 2018).

The null hypothesis of no cointegration is, given as follows:

$$H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0 \text{ (No cointegration)}$$

The alternative hypothesis is, given by:

$$H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq 0 \text{ (Cointegration)}$$

The null hypothesis is rejected when there is a long-run relationship between forward GVCs participation and its explanatory variables.

4.5.4. Lag length selection

In time series models, determining the proper lag order to capture response time and feedback is a challenging econometric problem. In dynamic panel models, the issue is more intricate due to, the existence of fixed effects meaning that the dimension of the parameter space rises with the sample size (Han & Lee, 2013). The study performs a lag length selection to determine the optimal lag length by choosing the correct order

selection criteria. It is important to choose the correct lag order as omitting lags can lead to estimation bias, whereas too many lags can increase the standard errors of the estimated coefficients, thus increasing the forecast error (Nkoro & Uko, 2016). The different methods used to select the number of lags in the model are Akaike Information criteria (AIC), Bayesian information criteria (BIC), Schwarz Information criteria (SIC) and Hannan Quinn criteria (HQC). The number of lags chosen is based on the criterion that gives the lowest value (Traoré, 2018).

4.5.5. Breusch-Pagan test

The Breusch-pagan multiplier test assesses the importance of random effects in panel data models, while the Hausman test helps decide between fixed and random effects models (Rehal, 2022). The Breusch-Pagan Lagrange multiplier (LM) test statistic utilising a chi-square distribution with 1 degree of freedom is, employed to assess the variance of the random effects component. The null hypothesis asserts the absence of random effects in the panel data this, means that the differences across sectors have no impact on forward global value chains participation, while the alternative hypothesis states the significance of random effects in the model and the appropriateness of a random effects model. The null hypothesis is rejected when the LM statistic is greater than the critical value (Halunga, Orme, & Yamagata, 2017; Musora & Matarise-, 2023).

4.5.6. Fixed effects model (FEM)

FEM is based on the assumption that different intercepts can accommodate individuals' differences. The difference between the random effects models and the fixed effects models lies in whether the unobserved individual effect, is correlated with the explanatory variables in the model, rather than the nature of these effects being stochastic or not (Marandu, 2018). In random effects models, the omitted time-variant variables are presumed to have no correlation with the included time-varying explanatory variables (Antonakis *et al.*, 2021), whereas in fixed effects models, the omitted time-variant variables can correlate. At times, the FEM includes variables that are unobservable, causing bias in parameter estimates. The fixed effects models account for any time-invariant differences among the individuals, ensuring that the estimated coefficients of the models are not biased by omitting time-invariant characteristics thus it is important to control the variables in the estimation process (Ceesay & Moussa, 2022).

4.5.7. Random effects model (REM)

One of the benefits of using random effects is that it is able to incorporate time-invariant variables, which are, impossible in FEM, where the intercept accounts for all time-invariant variables (Befratello, 2024). Hence, the individual's error term is uncorrelated with the predictors, allowing for time-invariant variables to act as regressor variables (Ceesay & Moussa, 2022). The REM assumes, that the variation among entities is considered to be, a random variable that does not correlate with the independent variables. The REM is more efficient than the FEM resulting in lower standard errors and increased statistical power to spot effects (Nwakuya & Ijomah, 2017).

4.5.8. Hausman test

The choice of model in panel data analysis must be informed on, the individual-specific components and the exogeneity of the explanatory variables. The study employs the Hausman test to test whether a significant difference exists between the parameter estimates of the variables' coefficients between the fixed and random effects models (Epaphra, 2018). The null hypothesis is that random effects is the appropriate test, and there is no correlation between the error term and the explanatory variables in the panel data model. The alternative hypothesis is that the fixed effects is the appropriate model, that is, there is a correlation between the error term and the explanatory variables in the panel data model (Sheytanova, 2015). The null hypothesis is rejected when the p value is less than 0.05 (Pokharel, 2018).

4.5.9. Granger causality

This is a test used to establish the direction of causality of the relationship in the presence of a delayed relationship amongst two variables (Akkaya, 2021; Shojaie & Fox, 2022). A granger causality test is done by performing a joint test of the coefficients of all the lagged terms of the explanatory variable under the null hypothesis that the explanatory variables do not granger cause the explained variable (Stokes & Purdon, 2017). Thus, the study performs the Dumitrescu and Hurlin (2012) panel causality test to determine whether the variables in the model predict one another. This test is, chosen over the Granger (2004) causality test due, to its robustness when dealing with heterogeneities in the panel (Jangam & Akram, 2019). When the p-value is less than 0.05 for all explanatory variables, the null hypothesis can be rejected, meaning that the explanatory variables (gross value added, gross fixed capital formation, foreign direct investment, and the exchange rate) do granger cause forward GVCs participation

(Rosol, Młyńczak, & Cybulski, 2022). Thereafter, a reverse causality test is performed using each explanatory variable as, the dependent variable and, using forward GVCs participation as an independent variable. The null hypothesis is that the explained variable does not granger cause the selected explanatory variable, which is the forward GVCs participation. The null hypothesis is, rejected when the p-values are less than 0.05 (Bose *et al.*, 2017).

If causality flows from Y to X, the Granger causality regression equation is as follows:

$$X_t = \alpha_0 + \sum_{i=1}^p \alpha_i X_{t-i} + \sum_{j=1}^p \beta_j Y_{t-j} + e_{1t} \dots \dots \dots (1.11)$$

If causality flows from X to Y, the Granger causality regression equation is as follows:

$$Y_t = \alpha_0 + \sum_{i=1}^p \alpha_i Y_{t-i} + \sum_{j=1}^p \beta_j X_{t-j} + e_{2t} \dots \dots \dots (1.12)$$

From the first equation, a conclusion can be made that X granger causes Y if the past values of Y can be used to predict X. Additionally, the coefficient of Y_{t-1} , denoted as β_{11} , is statistically different from zero as shown by the F-test. Similarly, in the second equation, X granger-causes Y if the coefficient of X_{t-1} , denoted as β_{12} , is statistically different from zero (Rosol *et al.*, 2022). This means that the former values of X can predict the latter values of Y with increased precision (Afjal, 2023).

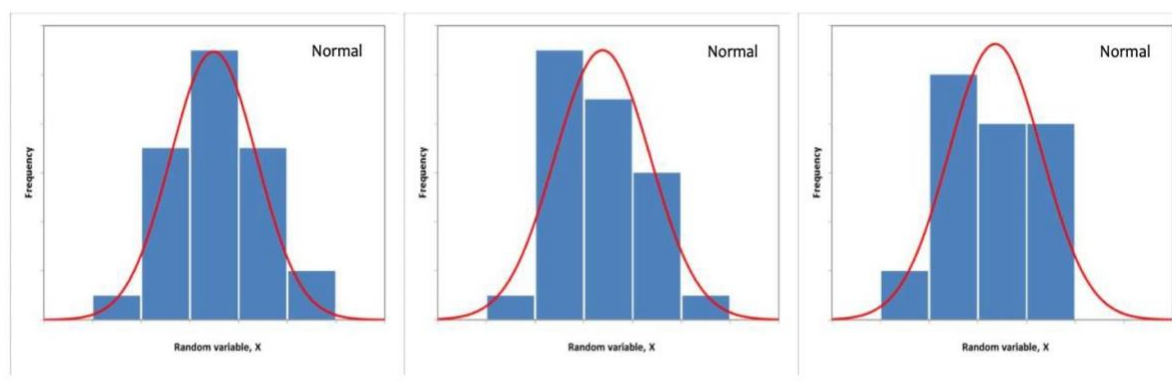
4.5.10. Cross-sectional dependence

The study test for cross-sectional dependence. Cross sectional dependence occurs when there is an interaction among cross-sectional units, causing efficiency loss for least squares and rendering conventional t-tests and f-tests using standard variance-covariance estimators unreliable. In some instances, cross sectional dependence may lead to inconsistent estimators (Pesaran, 2020). The study uses the Pesaran Cross-sectional Dependence test to detect whether a cross-sectional dependence exists between the regressors. The null hypothesis is that there is no cross-sectional dependence in the data (Yameogo & Omojolaibi, 2021; Tugcu, 2018).

4.5.11. Normality testing

Normal distribution is most likely the frequently observed distribution in nature. A normality test is essential to estimate the correct standard errors of the parameter estimates. If the residuals are not normally distributed, main variables may be missing, or either the explained variable or one of the explanatory variables may have the wrong functional form (Khatun, 2021). The first step to pinpoint normality is the histogram, which is a frequency bar plot of data. For data that is normally distributed, the histogram bars must mirror a symmetric bell (Hernandez, 2021). Figure 4.1 shows data that is normally distributed. To test for normality, this study uses the Jarque-Bera test. This test was formulated by joining squares of normalised skewness and kurtosis in a single statistic. A Jarque-Bera statistic value higher than 0.05 means that the null hypothesis is rejected meaning that the sample data is normally distributed (Das & Imon, 2016).

Figure 4.1: Histogram of frequencies of normally distributed data



Source: ForsChem Research Reports (2021)

For the normality test the hypotheses is given as follows:

H_0 : Normal distribution

H_1 : No – normal distribution

4.6. Conclusion

This chapter specified the data set used in the study and methodised the econometric estimation approach adopted to investigate the impact of GVCs participation on sectoral development in South Africa from 1990 to 2022. The study uses secondary annual data from five South African sectors including the manufacturing, automotive, agriculture,

construction, and mining, and, has a total of 165 observations. The time period was chosen due to availability of GVCs participation data, and because South Africa has become more open to trade, and increased its exposure to the world economy in the last 30 years, as the government took various measures, and developed several trade policy interventions to improve the country's trade administration between 1990 to 2022.

The methodology of the study is based on quantitative methods moreover the study uses the panel ARDL model due to its ability to allow the short run dynamic coefficients to vary across sectors, while restricting the long run coefficients to be uniform. However, before estimating the panel ARDL model, the LLC, and the IPS tests are performed to test whether all variables in the study are, integrated at mixed orders. Thereafter, two cointegration tests, namely the Pedroni and Kao cointegration tests are performed to determine whether a long-run relationship exists between GVCs participation and its explanatory variables.

The chapter then discusses the lag length selection criteria, followed by the Breusch-Pagan Lagrange multiplier, employed to assess the significance of random effects in panel data. Moreover, both the FEM and REM are discussed followed by the Hausman test to determine the appropriate model among the two. Lastly, an estimation of the residual diagnostic tests is performed to determine whether the results yielded in the model are reliable. The following chapter interprets and discusses the empirical results obtained in the study.

CHAPTER 5: RESULTS ANALYSIS AND DISCUSSION

5.1. Introduction

The significance of international trade through value chains in LICs cannot be ignored. Furthermore, as noted by kummritz *et al.*, (2017), global value chains participation offers new opportunities for economic upgrading and knowledge spillovers. This chapter presents and discusses the empirical findings from the panel regression used to perform a sectoral analysis of forward GVCs participation in South Africa. In the study, the panel ARDL by Chudik and Pesaran (2013) is used to perform a sectoral analysis of GVCs participation in South Africa from 1990 to 2022, using the top five main South African sectors namely, the agriculture, automotive, construction, manufacturing and mining. The decision to select these sectors was, informed by data compiled from the UNCTAD, which revealed that these listed sectors fall under the top ten sectors participating in forward global value chains in South Africa from 1990 to 2022.

After the introduction, the second section includes the descriptive analysis, followed by correlation analysis and stationarity tests. To test for stationarity; the study uses two types of panel data unit root tests namely; Levin, Lin and Chu (2002) and the Im, Pesaran and Shin (2003) tests, thereafter the results of the P-ARDL analysis are interpreted and discussed. Lastly, are discussions, on the Granger causality results and diagnostic tests. The study uses the Panel ARDL model, because it analyses five sectors namely, the agriculture, automotive, construction, manufacturing and mining.

5.2. Descriptive statistics

Descriptive statistics are a statistical technique to accurately and meaningfully summarise data. The study examines the attributes of each variable for every unit using descriptive statistics (Keller, 2017). Table 5.1 below displays the descriptive statistics for forward global value chains participation, gross fixed capital formation, gross value added, foreign direct investment, and the exchange rate for the five South African sectors in natural logs.

Table 5.1: Descriptive statistics

	lnGVCP	lnGVA	lnGFCF	lnFDI	lnEXR
Mean	14.36439	11.33744	12.69138	13.01928	4.679195
Median	14.61982	11.50523	13.00891	12.83736	4.683427
Maximum	16.89498	13.62575	13.74952	15.11995	5.492279
Minimum	11.22035	8.933975	11.06717	10.55745	3.718196
Std. Dev	1.538088	1.218550	0.880026	1.429807	0.537484
Skewness	-0.415453	-0.248243	-0.383519	0.168354	-0.054533
Kurtosis	2.363771	1.980939	1.654488	1.657493	1.849185

Source: Author's compilation from EViews 14

The results show that the average forward participation in GVCs is 14.37% suggesting a relatively low performance. The minimum and maximum GVCs participation values are 11.22% and 16.89% respectively. The standard deviation of 1.538088 indicates that there are variations in sectoral global value chains participation. Similarly, the average gross value added is 11.34%, and the standard deviation is 1.218550, meaning that on average, gross value added estimates deviate from the mean by about 1.22 units. The average gross fixed capital formation level is 12.69%, while the minimum and maximum levels are 11.07% and 13.75% respectively. With respect to foreign direct investment, the average investment is 13.02%, whilst the minimum and maximum are 10.56% and 15.12% respectively. Additionally, the average exchange rate is 4.7%, with a maximum of 5.492279% and a minimum of 3.718196% respectively. The standard deviations for all variables are less than their means, meaning that there is a small coefficient of variation. More so, the skewness lies outside the -2 to +2, implying that the dataset is not normally distributed. Lastly, the study found the values of kurtosis to be less than 3, meaning that the curves in the model are platykurtic in nature. This means that the dataset distribution is low, and has a few extreme outliers (Wiśniewski, 2017).

Figure 5.1: Difference between a normal distributed and a platykurtic curve

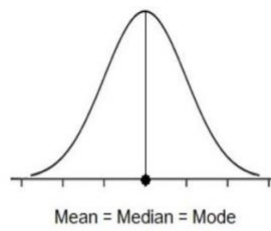


Figure 1. The normal distribution



Figure 2A. Platykurtic

Source: Barri (2019)

Figure 5.1 shows the difference between a normally distributed curve (a bell-shaped curve) and a platykurtic distribution, (lower, broader, and flatter than the normally distributed) (Barri, 2019). Since the results obtained from the descriptive analysis reveal that the kurtosis is less than three, the figure that best demonstrates the results obtained is the bottom, flatter curve.

5.3. Correlation matrix

Before estimating the model, a correlation analysis was, conducted on the explanatory variables to check for the strength and direction among the variables. The correlation coefficient can be, interpreted using the spectrum for deriving correlation in figure 5.2. A higher n value results in a lower acceptable correlation coefficient. Correlations of 0.6 are not significantly different from correlations of 0.1 in terms of predicting individual values of one variable from another (Keller, 2017).

Figure 5.2: the spectrum for deriving the size of a correlation (-1 to +1)



Source: Gogtay and Thatte (2017)

Table 5.2: correlation analysis

	lnGVCP	lnGVA	lnGFCF	lnFDI	lnEXP
lnGVCP	1.000000				
lnGVA	0.295852	1.000000			
lnGFCF	0.440846	0.342412	1.000000		
lnFDI	0.399542	0.333680	0.951140	1.000000	
lnEXR	0.359920	0.318905	0.916602	0.956285	1.000000

Source: Author's compilation from EViews 14

The sign of the correlation coefficients indicates the relationship between forward GVCs participation, gross fixed capital formation, gross value added, foreign direct investment, and the exchange rate. As can be observed in table 5.2 all variables are, positively correlated with forward global value chains participation, that is, increases in the explanatory variables results in an increase in forward GVCs participation. This is in line with the expectations highlighted in Table 4.2 in Chapter 4, as a positive relationship is, expected between forward global value chains participation, gross fixed capital formation, gross value added, and foreign direct investment. However, Table 5.2 also shows that the exchange rate is, positively correlated with GVCs participation, which is not the relationship expected in the study, as an increase in the exchange is not likely to increase GVCs participation. Forward participation in GVCs is the domestic value-added portion of foreign exports. In other words, forward GVCs participation is when South Africa sells products to another country (e.g. Singapore), that is then used to make the final product in Singapore. Thus an appreciation of the rand would result in the decrease in the quantity of goods demanded from South Africa, because Singapore would rather buy from a country whose exchange rate is favourable i.e. cheaper than South Africa hence decreasing South Africa's exports, and participation in forward GVCs.

Since the explanatory variables are closer to zero than one, a conclusion is reached, that the linear relationship between the explanatory variables and GVCs participation is weak. Moreover, the correlation between the independent variables and gross value added is weak. However, there is high positive correlation between FDI and gross fixed capital formation, the exchange rate and gross fixed capital formation, as well as the

exchange rate and foreign direct investment, as their correlation coefficients are greater than 0.9, meaning that, there is a strong positive relationship among those variables.

The high correlation of 0.951140 between FDI and gross fixed capital formation suggests a strong positive relationship between the two variables. FDI is investment made by foreign firms in South Africa, while gross fixed capital formation is the value of investments on physical assets (Seiko, 2016; Mahdi, 2023). The high correlation means that as FDI increases, so does gross fixed capital formation. In simpler terms, when foreign firms invest in South Africa, they contribute to infrastructure, machinery, equipment and facilities for production, hence increasing gross fixed capital formation. Similarly, the high correlation of 0.916602 between, the exchange rate and, gross fixed capital formation suggests, a strong positive relationship between the two variables. This means, that changes in the rand are, closely related to changes in investment. Lastly, the high correlation of 0.956285 between the exchange rate and FDI suggests a strong positive relationship between the two variables. This means that changes in the exchange rate result in changes in FDI. In other words, depreciation of the rand makes investment cheaper, attracting foreign investors.

5.4. Panel unit root test results

Unit root tests are one of the initial tests conducted before employing the ARDL model and determining cointegration. This test is important because it checks whether the variables are stationary and helps determining their integration order. Two tests are used to check for unit root. More so, as mentioned in Chapter 4, in order to ensure consistency, the two methods are used to validate and confirm the results of one another. The results for the unit root test are summarised in Table 5.3 below.

Table 5.3: Panel unit root test results

Variables	Level and difference	LLC TEST	IPS TEST	ORDER
lnGVCP	Level	0.0175	0.3185	I(1)
	1 st Difference	0.0000	0.0000	
lnGVA	Level	0.0061	0.7364	I(1)
	1 st Difference	0.0002	0.0000	
lnFDI	Level	0.2466	0.9887	I(1)
	1 st Difference	0.0375	0.0000	
lnEXR	Level	0.0000	0.0000	I(0)

Source: Author's compilation from EViews 14

The findings show that at 1% significant level, both unit root LLC and IPS tests show that the exchange rate is the only stationary variable at level hence the remainder variables are stationary at first difference. Thus, the null hypothesis that a unit root exists is rejected since the probability values are less than the 1% and 5% levels of significance. According to the test results, a conclusion can be drawn that there is no stationary variable at second difference I(2), as the dataset consists of variables integrated of mixed orders I(0) and I(1). This meets with Pesaran *et al.* (2001) criteria for running an ARDL model.

5.5. Panel ARDL lag determination

The study requires assessing both the long and short run relationships along with the effectiveness of the Akaike information criteria (AIC) model selection summary on alternative models in the regression analysis. A criteria graph has been utilised to identify the top twenty distinct series-ARDL models. The analysis for the benchmark model indicates that a lower AIC value performs better in the model. The figure and table below show that the initial ARDL (1,0,0,1,1) model, that is model 507 appears to be the most favoured, as it yields the lowest achievable AIC value (-1.84). The ARDL (1,0,0,0,1) model is next with a value of (-1.83). The study uses 1 lag for the dependent variable, that is forward GVCs participation, 0 lags for gross value added, 0 lags for gross fixed capital formation, 1 lag for FDI and 1 lag for the exchange rate. The study proceeds to test for cointegration to determine the existence of a long-run relationship between the variables.

Figure 5.3: Akaike information criteria

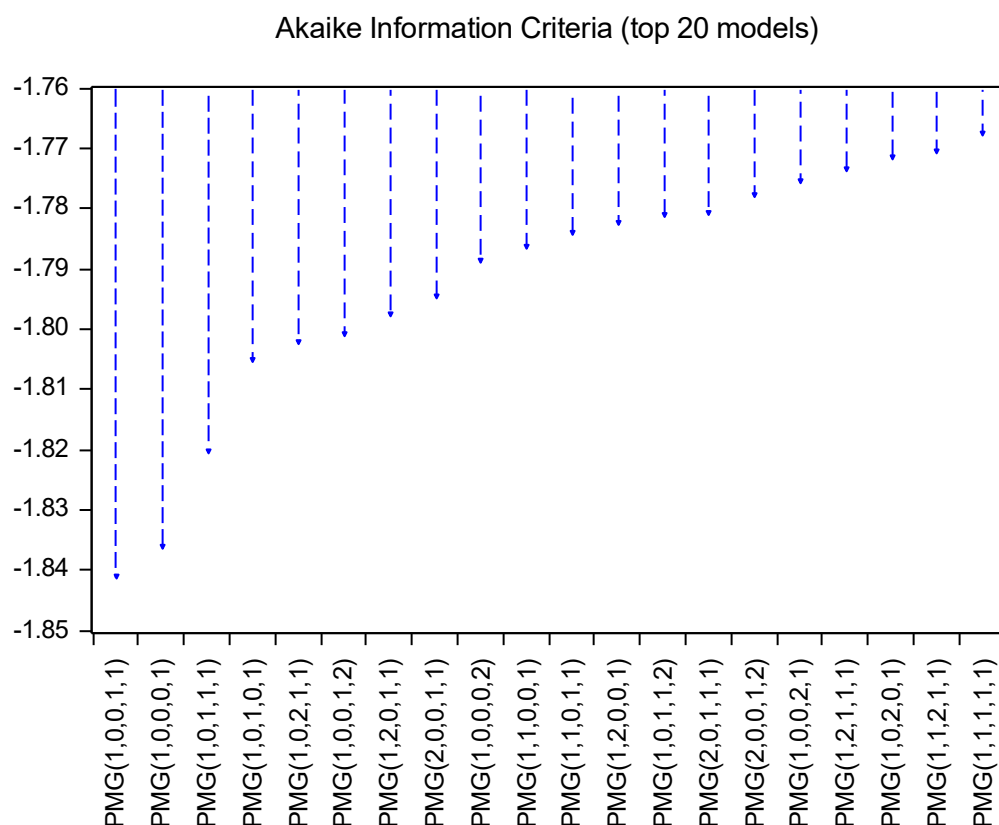


Table 5.4: Lag length selection results

4	LogL	AIC*	BIC	HQ	Specification
507	153.788100	-1.840966	-1.339049	-1.637004	PMG (1,0,0,1,1)
511	148.441045	-1.836043	-1.438693	-1.674574	PMG (1,0,0,0,1)

Source: Author's compilation from EViews 14

5.6. Cointegration test results

Following the unit root outcomes, the dataset consists of a combination of level and first difference hence a cointegration test is conducted. As indicated in the methodology of the study, the Kao (1999) and Pedroni (1999) cointegration tests are used, to determine whether there is a long-run relationship among the variables. The results are presented in Table 5.5.

Table 5.5: Pedroni cointegration test

Pedroni				
	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	1.056167	0.1454	0.802862	0.2110
Panel rho-Statistic	-0.453129	0.3252	-0.365654	0.3573
Panel PP-Statistic	-2.405841	0.0081	-2.441938	0.0073
Panel ADF-Statistic	-1.130311	0.1292	-0.487027	0.3131
Alternative hypothesis: AR coefs. (between-dimension)				
	Statistic	Prob.		
Group rho-Statistic	0.166761	0.5662		
Group PP-Statistic	-2.8489333	0.0022		
Group ADF-Statistic	-1.006058	0.1572		
Kao				
			Statistic	Prob.
ADF			-2.802015	0.00025

Source: Author's compilation from EViews 14

The outcomes of the Pedroni (1999) cointegration test show that apart from panel pp-statistics, and panel group-statistics, all other statistics are insignificant, hence the study fails to reject the null hypothesis of no cointegration at a 5% significance level. The table further presents results for the Kao cointegration test, showing that the p-value is less than 0.05, meaning that variables in the model are cointegrated at a 1% level, thus confirming the existence of a long run relationship between forward GVCs participation, foreign direct investment, gross fixed capital formation, gross value added, and the exchange rate. The results from the two tests show conflicting evidence of cointegration as Pedroni (1999) shows that there is no cointegration and Kao (1999) shows that there is cointegration in the model. However since the aim of the study is to perform a sectoral analysis of GVCs participation using the five South Africa's sectors

namely the automotive, agriculture, construction, manufacturing and mining, the study expects a long relationship to exist between all sectors and GVCs participation. Unlike the Pedroni (1999) test, which assumes heterogeneity, the Kao (1999) test assumes homogeneity among the cross-sections, meaning that it tests whether the different sectors in the study have a homogenous long run relationship with GVCs participation. Thus, the results obtained from the Kao (1999) test are more appropriate for this study.

5.7. Breusch-Pagan Lagrange Multiplier test

As mentioned in chapter four, the Breusch-pagan LM test assesses the importance of random effects in panel data models, under the null hypothesis that random effects are not significant. Table 5.6 below presents the results for the Breusch-Pagan LM test.

Table 5.6: Breusch-Pagan Lagrange multiplier

Cross section	Time	Both
2281.136	15.47606	2296.612
(0.0000)	(0.0001)	(0.0000)

Source: Author's compilation from EViews 14

As the p-values of cross-section (0.0000), time (0.0001), and both (0.0000) are lower than 0.05, the null hypothesis is rejected, this indicates that the random effects are significant in the model, and their use is appropriate. Thus, the fixed and random effects are employed in the study with the Hausman test conducted to determine which model between, the fixed and random effects is more appropriate (Rehal, 2022).

5.8. Fixed effects model

Table 5.7: Fixed effects model results

Variable	Coefficient	t-Statistic	Prob.
lnGVA	0.139712	2.779438	0.0062
lnGFCF	0.907197	13.38496	0.0000
lnFDI	0.015119	0.278487	0.7810
lnEXP	-0.611545	-5.494635	0.0000
C	3.931537	8.780032	0.0000
Effects Specification			
Cross-section fixed (dummy variables)			
Weighted Statistics			
R-squared		0.981201	
Adjusted R-squared		0.980178	
Durbin-Watson stat		0.434449	

*** Statistically Significant at 1%, ** Statistically Significant at 5%, * Statistically Significant at 10%

Source: Author's compilation from EViews 14

The fixed effects model findings are shown in Table 5.7. The R-squared and adjusted R-squared value is 0.98, indicating that the explanatory variables in the model are highly effective at explaining 98% of changes in the explained variable. The intercept C has a coefficient of 3.93% and is statistically significant at 1%. This is interpreted as a 3.93% increase in forward participation in GVCs in South Africa holding gross value added, gross fixed capital formation, foreign direct investment and the exchange rate constant.

All variables exhibit their expected signs. Gross value added has a coefficient of 0.139712 and is statistically significant at a 1% level. This means that a percentage increase in gross value added results in a 0.1397% increase in forward GVCs participation. Additionally, gross fixed capital formation is statistically significant at 1% level and has a coefficient of 0.907197, meaning that, other variables held constant a percentage increase in gross fixed capital formation increases forward GVCs participation by 0.9071%.

Although foreign direct investment exhibits the expected (positive) sign with forward GVCs participation, the relationship between the two variables has been, found to be insignificant. Lastly, a statistically significant negative relationship is observed between the exchange rate and participation in GVCs. This means that a percentage increase in the exchange rate, holding other variables constant, will cause forward GVCs participation to fall by 0.3932 percent.

5.9. Random effects model

Table 5.8: Random effects model results

Variable	Coefficient	t-Statistic	Prob.
lnGVA	0.147711	3.705211	0.0023
lnGFCF	0.906060	7.079697	0.0000
lnFDI	0.014840	-3.629590	0.7849
lnEXR	-0.613635	7.079697	0.0000
C	3.924430	5.021671	0.0000
Weighted Statistics			
R-squared		0.845018	
Adjusted R-squared		0.840913	
Durbin-Watson stat		0.297575	

Source: Author's compilation from EViews 14

Table 5.8 above presents the results for the Random effects model. The R-squared and adjusted R-squared values are 84.50% and 84.01% respectively. This means that the explanatory variables are effective at explaining forward GVCs participation in the model. The intercept C is statistically significant at 1% and has a value of 3.924430. This is interpreted as a 3.92% increase in forward participation in GVCs in South Africa holding gross value added, gross fixed capital formation, foreign direct investment and the exchange rate constant.

Gross value added has a positive significant relationship with participation in forward GVCs at a 1% significance level. The coefficient of 0.147711 means that a percentage increase in gross value-added increases forward GVCs participation by 0.1477%. Similarly gross fixed capital formation has a positive significant relationship with forward GVCs participation at a 1% significance level. The coefficient 0.906060 implies that a percentage increase in gross fixed capital formation leads to a 0.906% increase in forward GVCs participation. Since gross fixed capital formation is an investment in physical assets, the expectation is that investment improves the country's production level, thus improving its integration in GVCs.

A positive relationship exists between foreign direct investment and forward GVCs participation. Although the relationship obtained is insignificant, FDI has the expected sign stated in the study's hypothesis. Lastly, a negative relationship has, been found between the exchange rate and participation in GVCs. An explanation for this is, that as the demand for the rand increases relative to other currencies, importing from South Africa becomes more expensive compared to other countries. Resulting to selling relatively cheaper products, thus foreign buyers divert from importing from South Africa to those selling the product cheaper, thus as the demand for South African products falls, it results in a reduction in the country's participation in forward GVCs.

5.10. Hausman test

There is a need to conduct the Hausman test to ascertain whether the study employs a fixed effects model or random effects model (Epaphra, 2018). Table 5.9 below presents the Hausman test results obtained from the analysis.

Table 5.9: Hausman test results

Test summary		Chi-Sq Statistic	Chi-Sq. d.f.	Prob
Cross-section random		0.000000	4	1.0000
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var (Diff.)	Prob.
lnGVA	0.139712	0.147711	0.000264	0.6228
lnGFCF	0.907197	0.906060	0.000050	0.8721
lnFDI	0.015119	0.014840	0.000003	0.8717
lnEXR	-0.611545	-0.613635	0.000006	0.3986

Source: Author's compilation from EViews 14

The null hypothesis for this test is that the random effect is appropriate, and the alternative hypothesis is that the fixed effect is appropriate in the model. If the p-value is less than 0.05, the null hypothesis is rejected. The cross-section random probability value is 1, as the p-value is more than 0.05 the study fails to reject the null hypothesis and recommends the random effects model results over the fixed effects model.

5.11. The long run P-ARDL Results

Table 5.10: Long run Panel Autoregressive Distributed Lag Results

Variable	Coefficient	t-Statistic	Prob.*
LnGVA	0.355554	3664510	0.0003***
LnGFCF	1.045764	9.127793	0.0000***
LnFDI	-0.298147	-3.217012	0.0016***
LnEXR	-0.371291	-1.972216	0.0504**

*** Statistically Significant at 1%, ** Statistically Significant at 5%, * Statistically Significant at 10%

Source: Author's compilation from EViews 14

The findings indicate that in the long run, gross value added, and gross fixed capital formation tend to improve forward GVCs participation in South Africa. This is, attributed to the fact that they both exhibit a statistically significant relationship with forward global value chains participation. The exchange rate negatively impacts global value chains participation.

Gross value added has a significant positive long run impact on forward GVCP. This means that an increase in the quantity of goods produced in the different South African

sectors will result in an increase in the quantity of the domestic value added in exports utilised by South Africa's trade partner for the production of exports (forward GVCs participation). Thus, a percentage increase in gross value added will lead to 0.1046% increase in forward participation in global value chains. This corroborates Zhuquing (2019) results, which found that for a nation to successfully increase its participation in GVCs it must be able to increase its domestic value added.

Both the comparative advantage theory and Porter's diamond theory support the positive relationship between GVA and forward GVCs participation. The theory of comparative advantage argues that gains from trade are obtained through comparative advantage, all that is required for nations to trade is that their opportunity costs differ, this means that the cost of producing, for example, a tyre, must be cheaper in South Africa than that the cost of producing it in Namibia (Huggins & zushi, 2015). By specializing in the production of goods for which they have a comparative advantage, the agriculture, manufacturing, automotive, construction, and mining sectors can undergo higher-value added, thus increasing output and their exports level to other countries, resulting in an increase in the sectors' integration in GVCs.

Furthermore, Porter's national competitive theory states that a nation's competitive advantage is determined by four factors, for the purpose of this discussion, only one out of the four factors highlighted in the literature review chapter is discussed, that is factor conditions. Factor conditions refer to the country's factors of production, namely, land, capital, entrepreneurship, and labour (Silver, 2018). Factor conditions are particularly relevant to South Africa, which is abundant in natural resources such as minerals, giving the country a comparative advantage in the mining sector, thus improving the value added in the sector. Additionally, South Africa is a producer of vehicle parts such as engines, and bodies of vehicles (Binder, 2024). Lastly, South African agriculture is an important provider of jobs, and earner of foreign exchange revenue in the country (Loizou *et al.*, 2019). Thus, by increasing the gross value added in these sectors South Africa, improves, its integration in forward GVCs.

A positive relationship has, also been found between gross fixed capital formation and forward GVCs participation. Gross fixed capital formation is essentially an investment in infrastructure and assets (Boamah *et al.*, 2018). The coefficient of 1.045764 indicates

that a 1% increase in gross fixed capital formation results in a 1.0457% increase in forward GVCs participation. This highlights the significance of gross fixed capital formation in explaining participation in GVCs. This is in line with Adarov and Stehrer (2021) who found that capital accumulation generally increases GVCs integration in the 26 sectors under study including the agriculture, construction and manufacturing sectors in European countries. This finding is, also evidenced in a study by Amat and Robert (2020), who highlighted the importance of capital for productivity and GVCs participation.

The positive sign obtained between gross fixed capital formation and forward global value chains participation is, supported by the Endogenous (new) growth theory. This theory explains how investment in technology, as well as, both human and physical capital result in the improvement of productivity and growth in the long run (Todaro & Smith, 2012). In GVCs, the theory highlights the importance of capital development and innovation, as well as technological spillovers to improve a nation's competitiveness and integration in the value chain (Onyimadu, 2015). In other words, the endogenous growth theory explains that when South Africa increases investments in physical capital in the manufacturing sector, it results in higher productivity, thus increasing the quantity of output produced, quantity of goods available for exports, and South Africa's integration in forward GVCs participation.

The signs of the coefficients of the variables are of high importance as they provide further insights into how these variables affect the explained variable. As such it was found that foreign direct investment does not bear the theoretically expected sign as a negative relationship was obtained between FDI and forward global value chains participation. This is consistent with a study by Rahman *et al.* (2024) who investigated the determinants of GVCs participation in RCEP bloc and obtained a negative relationship between FDI inflows and forward GVCs participation in RCEP countries.

The inverse relationship between FDI and South Africa's involvement in GVCs suggests that FDI is not focused on high-value sectors or activities that integrate the country's industries into forward global value chains participation. In the long run the negative relationship between FDI and forward GVCs participation is supported by, the Dependency Theory. This theory states that the world economic system is built in a way

that favours the rich, industrialised economies, while maintaining the least developed countries poor (Romaniuk, 2017). Hence through the explanation of the theory, the negative relationship between the FDI and forward GVCs participation could stem from multinational corporations (MNCs) who invest in extractive industries or production in low-value goods (Dagume *et al.*, 2024). Thus, instead of promoting the integration of local industries into higher stages of GVCs, foreign direct investment only strengthens South Africa's role as a supplier of raw materials and primary goods. The dependent theory also argues that foreign direct investment in developing countries has an expected negative relationship on the growth of the host economy (Moss *et al.*, 2004)

The coefficient of the exchange rate is statistically significant and equal to -0.371291. This means that a 1% increase in the exchange rate will lead to a 0.3713% reduction in forward GVCs participation. This relationship is consistent with economic theory and empirical evidence as Kutu (2017), and Omolade and Ngawala (2014) found that an appreciation in the currency is adversely impacted by, industrial production due to a reduction in exports. One of the main ways in which, the exchange rate impacts a country's global value chains is through its effect on export competitiveness. An appreciation of the rand increases the local cost of value-added as the rand strengthens relative to the currencies of South Africa's trading partners especially in the automotive, construction, and manufacturing sectors that rely on imported intermediate products (Choi *et al.*, 2019). This results in higher production costs for South African firms and lowers their integration into forward GVCs by decreasing their ability to compete globally. This inverse relationship between the exchange rate and GVCs participation can be explained using, the Dutch disease phenomenon.

Economists use the term "Dutch Disease" to describe a situation where a country's export performance declines due to an appreciation of the exchange rate as a result of the discovery of a natural resource. When for instance, South Africa experiences a sudden increase in exports from the mining sector, hence resulting in an appreciation of the rand, reducing the competitiveness of other sectors such as manufacturing (Nülle & Davis, 2018). As the exchange rate rises, South Africa's manufacturing sector becomes less competitive in relation to other nations, and the country focuses on extracting natural resources for exports instead of upgrading its other sectors' integration in forward GVCs. In the long run this restricts South Africa into low value added segments

of the value chain and lowers the country ability to diversify and increase its involvement in forward GVCs participation (Brinčiková, 2016).

5.12. The Short run P-ARDL

Table 5.11: Short run Panel Autoregressive Distributed Lag Results

Variable	Coefficient	t-Statistic	Prob.
CointEq(-1)	-0.304206	-5.214526	0.0000***
D(LNGVA)	0.094069	0.843946	0.4004
D(LNGFCF)	-0.127499	-0.523133	0.6018
D(LNFDI)	0.226759	3.542479	0.0005***
D(LNEXR)	-0.295719	-7.836239	0.0000***
C	0.857808	3.296538	0.0012***

*** Statistically Significant at 1%, ** Statistically Significant at 5%, * Statistically Significant at 10%

Source: Author's compilation from EViews 14

The negative coefficient of the error correction term indicates a disequilibrium in the system in the short run while the significant probability value reveals that the system will converge in, the long run. According to Engle and Granger (1987), an error correction mechanism is present for a cointegrated relationship. The results suggest that there is a long run relationship between forward global value chains participation, and its explanatory variables, this also means that there is a long run causality running from FDI, exchange rate, gross value added, GFCF to forward GVCP in South Africa. This means that the errors in global value chains participation in the previous years will be corrected in the current year by FDI, exchange rate, gross, value added, GFCF at an adjustment speed of 9.32% annually. The significant ECT value at 5% implies that long-run equilibrium is achievable and that the system will converge. The findings align with Mamvura (2018) and Doorasamay (2019) who stated that a strong significant error correction term provides evidence of a stable long-run relationship.

In the short run, both the exchange rate and foreign direct investment have a significant impact on global value chains participation. Additionally, it is observed that both foreign direct investment and the exchange rate, bear the expected signs as a positive relationship is found between foreign direct investment and with global value chains participation, and an inverse relationship has been found between the exchange rate and

GVCs participation. However, an insignificant relationship between gross value added, and gross fixed capital formation with GVCs participation, has been found.

In contrast to the long run, a positive relationship has been obtained between, FDI and forward GVCs participation. This means that an increase in FDI will raise forward participation in GVCs. The positive and significant relationship obtained from foreign direct investment is consistent with the literature and empirical evidence as an increase in the FDI will lead to an increase in the participation of developing countries in global value chains (Kersan-Škabić, 2019; Efogo *et al.*, 2022). This is evidenced by Efogo *et al.* (2022) examined the impact of FDI on GVCs participation in 43 developing countries including South Africa, found that FDI has a significant positive relationship effect on GVCs participation in developing countries. Additionally, Gochero and Boopen (2020) looked at the relationship between foreign direct investment and growth in the mining sector, and found a positive relationship between domestic investment, non-mining, and mining. Lastly, Kersan-Škabić (2019) found that FDI is one of the most important determinants of participation in GVCs.

The divergence in the FDI impact on GVCs in the short and long run can be seen as follows, in the short run, an increase in investment may be driven by technology and knowledge spillovers, market access, and investment in capital, this results in increases in production (Fernandes *et al.*, 2022). An increase in South Africa's production from the manufacturing, automotive, agriculture, mining, and construction sectors results in an increase in exports, which can boost forward participation in GVCs (Constantinescu *et al.*, 2019). However, in the long run, foreign companies might take a large share of value-added activities, leaving local companies at the lower levels of the value chain (such as raw materials, and assembly), leading to a crowding out effect, where local firms fail to compete with MNCs (Giovannetti and Sanfilippo, 2016; Gander, 2017). Thus, having MNCs (FDI) involved in higher value-added production lowers South Africa's integration in forward GVCs participation.

Lastly, a negative relationship has, been found between the exchange rate and forward participation in GVCs. This means that a 1% increase in the exchange rate results in a - 0.2957 decrease in forward GVCs participation. These findings are in line with the literature reviewed, as an appreciation in the rand improves the competitiveness of

South Africa's value of exports (i.e. causes South African products to be expensive relative to other foreign products), in turn lowering the demand for South African products from the agriculture, construction, mining, manufacturing and, automotive sectors. Thus, lowering competitiveness of these industries and their integration in forward GVCs participation (Soyres *et al.*, 2020; Tan *et al.*, 2019).

5.13. Cross-section short run

Table 5.12: Cross-section short run results

Sector	Error correction term (ECT)	Prob*
Agriculture	-0.403713	0.0058
Automotive	-0.413855	0.0000
Mine	-0.114278	0.0056
Construction	-0.224290	0.0000
Manufacturing	-0.364893	0.0000

Source: Author's compilation from EViews 14

Table 5.12 above presents the results from a cross-section short run. In all sectors, forward GVCP is negative statistically significant, hence a short run disequilibrium will be fixed in the long run. Additionally, each sector's error correction term is statistically significant, showing that equilibrium in the long run is achievable. These results corroborate existing literature by Kutu (2017) and Mamvura (2018) who argued that a significant error correction term is evidence of a long run stable relationship.

5.14. Cross-sectional dependency

Table 5.13: Cross-sectional dependence test results

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	62.72031	10	0.0000
Pesaran scaled LM	11.78862		0.0000
Pesaran CD	6.000708		0.0000

Source: Author's compilation from EViews 14

Table 5.13 indicates the results for the Pesaran (2004) CD test cross sectional dependence test. The results obtained do not show the presence of cross sectional

dependence. The t-statistic value of 6.000708 is greater than the Pesaran table value the p-value of 0.000 is statistically insignificant at 5%. The study fails to reject the null hypothesis of no interdependence between the residuals. This means that the analysis model is suitable for identifying the main factors influencing sectoral forward global value chains participation in South Africa.

5.15. Normality test

The underlying premise of various statistical techniques such as regression, correlation, analysis of variance and, t-tests is that the variables in the model must be normally distributed (Barri, 2019). It is important, to take normality results seriously as when the study fails to reject the null hypothesis, it is unable to draw accurate conclusions about real-life events (Tsagris & Pandis, 2021).

Table 5.14: Normality test results

Normality test	Jarque-Bera	P-value
	14.34757	0.000766

Source: Author's compilation from EViews 14

Table 5.14 above shows the results from the Jarque-Bera normality test. To determine whether the disturbances in the data set are normally distributed, the probability value should exceed 0.05. From the table it can be observed that the data set is not normally distributed as shown by the probability value of 0.000766, thus the study fails to reject the null hypothesis that the data set is normally distributed. It is also important to note that the literature argues in favour of non-normality for large sample data. According to the central limit theorem, if the data is close to normal, the sampling distribution will also be normal despite the shape of the data, therefore, random samples drawn from any distribution will have normal distributions (Soares *et al.*, 2019). In simpler terms, the theory explains that the normality assumption, is not violated when the sample sizes are greater than thirty or forty. As previously mentioned in Chapter 4, the study has a total of 165 observations, 33 time series multiplied by 5 cross sections, this means that parametric procedures can be used in cases where disturbances in the data set are not normally distributed (kwak and Kim, 2017; Barri 2019). Moreover, Harris (1995) argued that a non-normally distributed model is not an issue when some variables are

exogenous. The study found both foreign direct investment (0.8673), and the exchange rate (0.2080) to be endogenous.

5.16. Granger causality

Table 5.15 below shows the Dumitrescu and Hurlin (2012) Granger causality among the variables. The test was chosen for robust check purposes, and because it is suitable for panel data (Yüksel, 2017). One of the empirical objectives of the study is to investigate the dynamic causal relationship between participation in GVCs and its determinants. Table 5.15 details information about the causality relationship among the variables. The Dumitrescu and Hurlin (2012) test results show the absence of bidirectional causality among all of the variables, however, unidirectional causality exists among some of the variables.

Table 5.15: Dumitrescu-Hurlin causality test results

Null hypothesis	P-value	Conclusion	Type of causality
lnGVA does not homogenously cause lnGVCP	0.8280	Reject null hypothesis	No causality
lnGVCP does not homogenously cause lnGVA	3.E-06	Fail to eject null hypothesis	Unidirectional causality
lnGFCF does not homogenously cause ln GVCP	0.0164	Fail to reject null hypothesis	Unidirectional causality
lnGVCP does not homogenously cause lnGFCF	0.4109	Reject null hypothesis	No causality
lnFDI does not homogenously cause lnGVCP	0.4636	Reject null hypothesis	No causality
lnGVCP does not homogenously cause lnFDI	4.E-14	Fail to reject null hypothesis	Unidirectional causality
lnEXR does not homogenously cause lnGVCP	0.5586	Reject null hypothesis	No causality

lnGVCP does not homogenously cause lnEXR	0.0007	Fail to reject null hypothesis	Unidirectional causality
lnGFCF does not homogenously cause lnGVA	3.E-05	Fail to reject null hypothesis	Unidirectional causality
lnGVA does not homogenously cause lnGFCF	0.8532	Reject null hypothesis	No causality
lnFDI does not homogenously cause lnGVA	7.E-06	Fail to reject null hypothesis	Unidirectional causality
lnGVA does not homogenously cause lnFDI	0.2531	Reject null hypothesis	No causality
lnEXR does not homogenously cause lnGVA	0.4232	Reject null hypothesis	No causality
lnGVA does not homogenously cause lnEXR	2.E-05	Fail to reject null hypothesis	Unidirectional causality
lnFDI does not homogenously cause lnGFCF	0.0610	Reject null hypothesis	No causality
lnGFCF does not homogenously cause lnFDI	5.E-05	Fail to reject null hypothesis	Unidirectional causality
lnEXR does not homogenously cause lnGFCF	0.8373	Reject null hypothesis	No causality
lnGFCF does not homogenously cause lnEXR	5.E-06	Fail to reject null hypothesis	Unidirectional causality
lnEXR does not homogenously cause lnFDI	0.5734	Reject null hypothesis	No causality
lnFDI does not homogenously cause lnEXR	0.0000	Fail to reject null hypothesis	Unidirectional causality

Source: Author's compilation from EViews 14

The results indicate a unidirectional causality flowing from forward global value chains participation to gross value added, this means that higher participation in forward global value chains leads to higher gross value added. As South Africa participates more in forward GVCs, it specialises in specific production stages, thus improving its value addition to the market. This is in line with Kummritz (2016) who found that GVCs participation is positively related to gross value added in the value chain and productivity. Additionally, Solaz (2018), and Stolzenburg *et al.* (2019) found that, participation in forward GVCs is, positively correlated, with domestic value added, this means that countries participating more in forward GVCs increase their domestic value added.

This finding is, supported by the export-led growth hypothesis. The export-led school states that exports are one of the major determinants of a nation's economic growth, as it promotes specialisation, which results in an increase in production (Temiz & Gökmen, 2019). Additionally, exports ease the use of the exporting country's resources in the production process allowing, the surplus products to be sold, in global markets, satisfying foreign demand while increasing output in the country (Hemzawi & Umutoni, 2021). This means that as South Africa specialises in specific parts, and components in the automotive industry the production in the automotive industry increases, allowing for surplus parts and components from the automotive sector to be sold globally thus improving South Africa's integration in forward GVCs.

The results further indicate a unidirectional causality flowing from forward global value chains participation to foreign direct investment. This is in line with Kim (2023), who examined whether both forward and backward GVCs participation have an impact on a nation's investment policy and found that countries with higher forward participation are more likely to receive foreign investment compared to those with higher backward participation. This means that as South Africa's participation in GVCs increases, it can start developing a path dependency, where foreign investors begin to invest in the country. Thus, creating a cycle where higher GVCs integration increases FDI and improves South Africa's position in the global market. This results in path dependency of increased foreign direct investment (Sorensen, 2015). Path dependency refers to social processes that show positive feedback and produce branching patterns of

historical development (David, 2005). The concept of path dependence originates from different publications by David and Arthur on the economics of high-tech, knowledge-intensive industries, where learning and coordination effects occasionally result in increasing returns to scale. The more widely used a system is, the more beneficial it is for every user, which is a crucial component of improving returns (Aghion *et al.*, 2016).

The results also indicate a unidirectional causality from forward GVCs participation to the exchange rate. This can be explained using the Mundell-Fleming model, which explains that an expansionary monetary policy implemented in an economy to increase the money supply leads to an increase in the total output, this results in an increase in exports, as the demand for the domestic country's exports increases, the exchange rate appreciates (Asogwa *et al.*, 2016). This means that higher participation in GVCs increases the demand for the exports of South African products, which results in an increase in the demand for the rand (appreciation of the rand) (Ahmed *et al.*, 2017; Mayer and Steingress 2020).

The results further indicate a unidirectional causality from gross fixed capital formation to gross value added, foreign direct investment, and the exchange rate. This is explained as follows: The increase in gross fixed capital formation causes forward participation in GVCs to increase. An increase in gross fixed capital formation means that firms are investing in assets such as technology and machinery used in the production process in the manufacturing, automotive, construction, mining, and agriculture sectors (Kanu & Nwaimo, 2015). This leads to an increase in South Africa's production capacity (Mitakda *et al.*, 2024). According to the traditional neoclassical growth theory, productivity occurs as a result of increases in technological improvements and the total capital stock of a nation (Todaro & Smith, 2012). As the production capacity increases in those sectors, output increases, and this directly causes gross value added to increase in South Africa (Veeramani & Dhir, 2019). Hence, improving South Africa's integration in forward GVCs participation.

Lastly, the results indicate a unidirectional causality from gross fixed capital formation and the exchange rate. As mentioned earlier, an increase in GFCF signifies an increase in South Africa's assets used for production. This increase in the output and production capacity attracts foreign firms seeking to invest in the country's industries, thus resulting

in an increase in FDI (Kuo *et al.*, 2014). This increase in FDI then improves South Africa's integration and competitiveness in forward GVCs participation. As the country's global competitiveness is improved, exports level rise and the rand exchange rate appreciates (Iamsiraroj & Doucouliagos, 2015).

5.17. Conclusion

The chapter examined the sectoral analysis of global value chains participation in South Africa using a panel data analysis method and annual data from 1990 to 2022. The results show the existence of a long run relationship between GVCs participation and its explanatory variables from 1990 to 2022. This result is in line with literature and empirical evidence. It is observed that, gross fixed capital formation and gross value added, have a significant positive long run impact on forward GVCs participation. However, an appreciation of the rand negatively impacts, forward GVCs participation in South Africa. This is evidenced by Kutu (2017) and, Omolade and Ngawala (2014) who found that an appreciation of the rand adversely impacts industrial production due to a reduction in exports.

Furthermore, given the negative sign and significant value, the ECT results reveal a stable and balanced relationship in the establishment of the long run analysis. The ECT incorporates the short run dynamics with the long run equilibrium without losing information. Thus, the result indicates that a relationship exists between forward GVCs participation and its explanatory variables and that the equilibrium can be achieved in the long run. Overall, a conclusion can be confirming that all variables used in the model have a stable relationship and significantly impact with forward GVCs participation in both the short and long run. It is recommended that, policymakers in South Africa create policies targeting the variables significantly influencing global value chains participation (these are, gross fixed capital, gross value added, and foreign direct investment) and industrialisation to promote growth and development in the country.

CHAPTER 6: CONCLUSION, POLICY RECOMMENDATIONS, AND LIMITATIONS

6.1. Introduction

This final chapter presents the key components of the study. The study performed a sectoral analysis on global value chains participation and further investigated whether the explanatory variables Granger cause forward global value chains participation in South Africa. The study was motivated by the need to enhance economic growth and development through sectoral participation in value chains from the top five sectors participating in forward GVCs in South Africa. Further motivation for the study was to provide valuable quantitative information that can assist policymakers. The study used annual secondary data from five sectors from the period of 1990 to 2022, with forward linkages used as a measure of global value chains participation. The chapter presents a summary of the theoretical basis of the study, a summary of the research findings, policy recommendations, limitations and ends with concluding remarks.

6.2. Summary of the study

The first chapter provided a background of the study by explaining what is meant by global value chains and the different types of global value chains participation namely, backward GVCs participation and, forward GVCs participation. Thereafter, a discussion on the statement of the research problem, delineating the problems identified in the study, were provided as well as, the research questions, research objectives, and hypothesis of the study lastly, the significance of the study was discussed. The second chapter discusses the concept of economic development, followed by a discussion on the process of GVCs. Thereafter, the chapter discusses the top five performing industries participating in global value chains and ends with a discussion of the historical context of trade policy interventions in South Africa. The chapter also reviewed the changes that occurred in the South African industries from 1990 to 2022.

The third chapter reviews the relevant theories that help, to thoroughly discuss the impact of GVCs on sectoral development within the framework of the study as well, as the empirical literature review on GVCs and sectoral development. The third chapter, was divided into two sections. The first section introduced the international trade theories that drove the analysis of the study, these international trade theories suggested

that there is a link between trade and development. The second section discussed the empirical studies that have examined global value chains and development in South Africa and other nations.

The fourth chapter, discussed the estimation procedure and technique used to perform a sectoral analysis of forward GVCs participation in South Africa. The chapter covered the five sectors participating in forward GVCs in South Africa from 1990 to 2022 and discussed the research design, data sources, and the empirical model specification. It also discussed the unit root tests, the estimation technique, and the co-integration technique. Lastly, to identify both the strengths and weaknesses of the model used, the diagnostic tests to be performed were discussed.

The fifth chapter began by performing a descriptive analysis to examine the attributes of each explanatory variable employed in the study, thereafter a correlation analysis were conducted to check for the strength and direction between the variables. Furthermore, the panel unit root tests namely, the LLC and IPS were performed, with forward GVCs and FDI, GVA, GFCF and the exchange rate being stationary at either level or first difference. The study used the panel-autoregressive distributed lag model. The study then performed a lag length selection criteria, which choose the Akaike information criteria. Following the unit root results a cointegration test was performed to reveal whether a long run relation exists between forward GVCs and FDI, GVA, GFCF and the exchange rate. Thereafter, a Breusch-Pagan Lagrange multiplier test was, used to determine whether the study would remain with the pooled OLS model or the fixed effects model. The results showed that the fixed and random effects are employed in the study. The Hausman test was then conducted to determine which between the fixed effects model and the random effects model is more appropriate, with the random effects model being the chosen one.

The panel ARDL model results revealed that in the long run, two independent variables namely, gross value added, and gross fixed capital formation have a positive relationship with forward global value chains participation, however, foreign direct investment and the exchange rate have an inverse relationship with forward GVCs participation. In contrast to the long run, the short run results revealed a statistically insignificant relationship between both gross value added and forward GVCs participation, as well

as gross fixed capital formation and forward GVCs participation. Moreover, the results revealed a positive FDI relationship with forward GVCs participation. With the exchange rate being the only variable maintaining the same sign in both the short run and long run.

The two diagnostic tests, namely, the cross sectional dependence and normality test were performed, with the cross sectional dependence test rejecting the null hypothesis of interdependence, meaning that the model was suitable for identifying the main factors influencing forward GVCs participation in South Africa. Additionally, the normality test results revealed that the data set is not normally distributed as the p-value is smaller than 0.05. However, this does not pose an issue in the study as the data contains a large sample size and some independent variables were exogenous. Lastly, a granger causality test was performed and the results revealed no bidirectional causality among any of the variables.

6.3. Theoretical basis of the study

Chapter 3 provided a theoretical explanation of GVCs participation and sectoral development and reviewed theoretical concepts explaining trade and economic growth in South Africa. To understand the concepts of the study, chapter 2 defined global value chains, development, and distinguished development from economic growth. The theoretical background of chapter 3 explained the different international trade theories; the theories of absolute and comparative advantages, the HO model, the Prebisch-singer hypothesis, Porter national competitive advantage theory, and lastly, the fragmentation, which explained how participating in international trade through value chains positively benefit the economy.

The theory of absolute advantage revolves around specialisation. This means that productivity is attained largely, through the division of labour. As firms focus on the production of outputs, for which they have a comparative advantage, their quality and quantity of production increases. Production through value chains involves splitting tasks into different segments globally. Hence, a nation embraces an advanced division of labour, resulting in an increase in the total output. Similarly, the theory of comparative advantage explains how nations can benefit from trade by participating in value chains through specialising in specific tasks of production. This is similar to the

concept of fragmentation under the fragmentation theory, which involves dividing a unified production process into multiple components, allowing developing countries to take advantage of technologies and developing expansive production networks.

More so, the Prebisch-Singer hypothesis states, that in the long run it is less profitable for countries to export primary goods compared to manufactured products. This is because, there is a long run decline in the prices of real commodities as their income elasticity is lower compared to that of manufactured products. As a result, countries depending in the export of primary goods see a drop in their trade terms. The theory is, linked to GVCs as it highlights the importance of moving up the value chain from producing primary goods to producing manufactured goods to achieve growth.

Lastly, Porter's national competitive advantage theory explained, why the industries in some countries are globally competitive and how they are able to, continuously remain innovative. Porter (2008) explains the importance of value chains in maintaining a competitive advantage. He argues that competitive advantage is as a result of differences in competitor's value chains, as such an industry benefits from the value chains that arises from a firm's activities in that industry. The international trade theories all agree that GVCs participation has an impact on a nation's growth and development. The empirical studies reviewed enabled the study in identifying the key determinants of GVCs participation in South Africa.

6.4. Realisation of objectives and Key findings

This study investigated the impact of forward GVCs participation on sectoral development in South Africa, using the top five industries participating in forward GVCs from 1990 to 2022, these include the construction, manufacturing, agriculture, automotive, and mining industries. Forward GVCs participation was used as the dependent variable, while gross value added, gross fixed capital formation, foreign direct investment, and the exchange rate were the independent variables. These variables were seen as, the best suitable to explain the impact of forward GVCs participation in the country after reviewing the literature of similar studies and the variables adopted in those studies.

The study began the analysis by running the descriptive and correlation analysis. The descriptive statistics show that the average forward GVCs participation in the country from the five sectors under study was 14.37%, indicating a relatively low performance. The results also showed that the dataset distribution was platykurtic as the kurtosis was less than three. More so, the correlation analysis results indicate that, there is a positive relationship between forward GVCs participation, and its explanatory variables, and that some variables, namely FDI and gross fixed capital formation, the exchange rate and gross fixed capital formation, as well as, the exchange rate and FDI were highly correlated which means that changes to one variable are closely related to changes in the other variable. The study used the panel autoregressive distributed lag model to determine the impact of forward GVCs participation on sectoral development in South Africa as the unit root results are of both order zero and order one. The study conducted a lag length selection process, and the AIC criterion is chosen, with forward GVCs participation, FDI and the exchange rate using 1 lag, while gross value added, and gross fixed capital formation use no lags. The Breusch-Pagan LM test was employed to assess the importance of random effects in the model, and the Hausman test was conducted to determine which model between the fixed and random effects is appropriate, with the random effects model being chosen over the fixed effects model.

The panel ARDL results reveal that in the long run gross value added, gross fixed capital formation, FDI, and the exchange rate are statistically significant. Furthermore, gross value added, positively, influences forward GVCs participation. This indicates that an increase in gross value added leads to an increase in forward GVCs participation. As value added increases in the top five South African sectors participating in forward GVCs, the total output increases, this leads to an increase in the exports from the sectors, thus resulting in an increase in the sectors participation in forward GVCs. The results also revealed that gross fixed capital formation positively contribute to forward GVCs participation. This means that when investments in physical assets increases in South Africa, more output is produced in the construction, manufacturing, automotive, agriculture and mining sectors, thus increasing the quantity of output available for exports, and boosting the country's integration in forward GVCs participation. The findings further indicated that FDI does not bear the theoretically expected sign as FDI negatively influences forward GVCs integration. This means that an increase in FDI results in a decrease in forward GVCs integration. Lastly, the results reveal a negative

relationship between the exchange rate and forward GVCs participation. This means that an appreciation of the rand increases the cost of value added domestically, especially in the sectors dependent on imported intermediate goods (construction, manufacturing, and automotive sectors) resulting in higher production costs for South African firms and decreasing its integration in forward GVCs. In contrast to the long run, the short run results reveal a positive relationship between FDI and forward GVCs participation. This indicates that an increase in FDI leads to an increase in forward GVCs participation. As expected, a negative relationship was, obtained between the exchange rate and forward GVCs participation. Lastly, gross value added, and gross fixed capital formation were found to be statistically insignificant in the short run.

The granger causality results showed the absence of bidirectional causality among the variables, however, unidirectional causality is present in some of the variables. The results indicate a unidirectional causality flowing from forward GVCs participation to gross value added, supported by the export-led growth hypothesis, which explains the significance of exports in a country's growth. This means that as the country's integration in forward GVCs increases, exports increase, thus resulting in an increase in production. The results also revealed a unidirectional causality from forward GVCs to FDI, this means that as South Africa's participation in forward GVCs increases investment increases. The results also indicate a unidirectional causality from gross fixed capital formation to gross value added, FDI and the exchange rate. This means that as GFCF increases, investment in physical capital increases, thus increasing South Africa's production capacity. As South Africa's production capacity increases, total output increases, thus resulting in an increase in gross value added. As the country's production capacity rises, FDI is attracted, leading to an increase in FDI. The increase in FDI improves South Africa's export levels, and integration in the world market, ultimately resulting in an appreciation the rand. Table 6.1. below provides a summary of the study's objectives.

Table 6.1: Summary of research objectives

Objective	How it was addressed	Chapter
Identify the sectors that participate more in GVCs in South Africa.	Industrial data from 1990 to 2022 was retrieved from the UNCTAD database thereafter the data was grouped according to product, per sector. The values per sector showed that the automotive, agriculture, construction, manufacturing and mining sectors fall under the top 10 performing sectors in South Africa between 1990 to 2022, thus the study employed those sectors to perform a sectoral analysis on GVCs participation.	Chapter 2
Evaluate the significance of exporting in the leading South African sectors.	Chapter 2 discussed the literature on how the exports from the five different sectors are not only beneficial to the economy of South Africa, but to other countries in the Southern region. . Exporting is highly significant in South Africa's leading sectors, with mining, agriculture, automotive, construction, and manufacturing standing out as major drivers of foreign exchange revenue and economic growth. Exporting from these sectors contributes to economic expansion, job creation, and improved balance of payments.	Chapter 2
Review the theoretical perspectives on the significance of GVCs on both GDP and development	Two schools of thought namely, the classical thought and modern-firm school of thought, as well as Porter's national competitive advantage theory, the Prebisch-Singer hypothesis and the global value chains theory of fragmentation. The classical school argues that economic growth is primarily fuelled by the division of labour, thus increasing returns, leading to higher productivity and income per person as both GDP and employment rise, while the modern-firm school of thought highlights the importance of competitive advantage in the value chain to achieve GDP growth.	Chapter 3
Review literature on the relationship between GVCs and economic development.	The empirical findings encountered in the reviewed studies in Chapter 3 show that GVCs participation is an engine of growth and development among nations, as such the empirical findings on the impact of GVCs participation on selected variables show that an	Chapter 3

	increase in GVC participation led to higher domestic value added and productivity for all nations, additionally, employment has a positive impact on GVCs. More so, empirical findings on the impact of global value chains in Sub-Saharan Africa show trade openness, exchange rate, institutional quality and digital transformation positively influence GVCs integration. Lastly, empirical findings on trade facilitation and global value chains found that trade facilitation indicators support SSA countries' participation in global value chains.	
Identify the factors that attract sectoral GVCs participation in South Africa	The study reviewed the literature of similar studies to determine the variables used, by other studies that mostly impacted GVCs participation. After thoroughly examining all the variables the study employed the following variables attracting sectoral GVCs, gross value added, gross fixed capital formation, FDI and the exchange rate.	Chapter 4
Investigate the dynamic causal relationship between GVCs participation and its explanatory variables	Using the Dumitrescu and Hurlin (2022) granger causality test, the results obtained in the study showed the absence of bidirectional causality among all variables however, unidirectional causality was, obtained flowing from global value chains participation to gross value added, foreign investment, and the exchange rate. Additionally the results revealed causality flowing from gross fixed capital formation to GVCs participation, gross value added, FDI and the exchange rate, moreover, the study found a unidirectional causality from FDI to gross value added, and the exchange rate, lastly, the study found a unidirectional causality from gross value added to the exchange rate.	

6.5. Policy recommendations

Global value chains are remodelling the geography and world economy (Badr, 2019). By participating in forward global value chains, businesses are, given the opportunities to profit and investors a given a range of consumption and investment options.

Additionally, individuals' employment and income levels improve (Xubei & Gereffi, 2019). Due to improvements in ICT, developing countries can now participate in international markets by joining GVCs, by performing specific stages in the manufacturing process to boost their competitiveness and industrialise by increasing their integration in forward participation (Dutta, 2024). Foreign direct investment is described as, an individual or entity who invests in a business in another country, having the ownership and control of foreign productive assets (Hintošová, 2021). In South Africa, foreign direct investment has the potential to fill the investment gap and raise the needed revenue. At the same time, it can stimulate economic growth through the transfer of technologies and skills to the host economy. FDI can also create horizontal and vertical linkages with domestic companies and boost exports (Sawalha *et al.*, 2016; Akonnor, 2018).

The inverse relationship between FDI and forward participation in GVCs in the long run may indicate that FDI is not focused on, high-value sectors or activities that integrate the country's industries in global value chains. A study by Nchoe (2016) analysed the effect of FDI growth on three South African sectors namely, agriculture, industry, and service, from 1970 to 2014. The study's results show that FDI-growth effect is significant and positive in the industry and service sectors, while negative in the agricultural sector. As such, Nchoe (2016) confirms that the relationship obtained between FDI and GVCs participation depends on the sectors under study, some sectors positively influence FDI while others negative influence FDI.

To address this inverse relationship policymakers could promote FDI in sectors that add value to raw materials and promote FDI attraction in technological projects to boost the use of technology in production, leading to process upgrading. Moreover, policymakers could promote innovation, by boosting local capabilities, and enhancing regional and global participation. Lastly, adapting investment policies to match FDI inflows with the South Africa's development goals and GVCs strategies will boost GVCs participation and secure enduring advantages from participation in GVCs.

To foster the dynamism of forward GVCs in South Africa, another potential approach would be to pursue a regional development strategy by investing in people's skills, focusing on technical education, and promoting inclusive engagement. This, includes,

the participation of local firms and SMEs in sustainable value chains by helping them meet global standards, upgrading into higher value production, assisting in the creation of marketing channels in key end-markets, and promoting access to funding by eliminating barriers to risk capital. Additionally, the COVID-19 pandemic appears to have hastened the implementation of digital technologies, potentially affecting the global division of labour and ultimately altering its depth and scope. For South Africa to better integrate into regional and global production networks, it must leverage the synergy between information technology and local resources while using communication technologies to improve service-link connectivity.

6.6. Limitations of the study and future studies

The main limitation on the development of this study is the limited availability of relevant data on sectoral GVCs participation as the study had targeted to perform a sectoral analysis on the top 10 South African sectors participating in global value chains. Additionally, while the inclusion of more explanatory variables could have made the study more robust, the unavailability of sectoral data is a limitation. The available data for, global value participation is given by product however it was possible to group products per sector. This, study can be expanded by performing a sectoral analysis on the top 10 South African sectors participating in both forward and backward GVCs participation to include the sectors not covered in the study.

6.7. Concluding remarks

Global value chains are dynamic, and they provide new opportunities to developing nations to participate in the global economy. Nonetheless, simply participating in GVCs will not automatically lead to development benefits unless transparent trade and investment policies are put in place to foster a conducive economic atmosphere, along with necessary complementary policies to enhance production capacities, and promote widespread and inclusive growth. This study performed a sectoral analysis on the top five sectors participating in forward GVCs in South Africa. Using a panel ARDL model, the study shows the significance of forward GVCs participation in the South African economy. Furthermore, the study highlights the significance of investing in modern facilities and technologies in the agriculture, mining, construction, automotive, and manufacturing sectors, to remain competitive in the global market.

REFERENCES

- Aboobaker, A. & Michell, J., 2022. *Demand-side Policies for Employment Promotion in Low- and Middle-income Countries*. [Online] Available at: <http://ilo.org> [Accessed 18 June 2024].
- Aboulezz, N., 2016. The Effect of Motor Industry Development Programme on the Motor Vehicle Industry in South Africa. *Cairo Univ. Stud. Rev.*, 1(38), pp. 1-29.
- Abreha, K.G., Kassa, W., Lartey, E.K.K., Mengistae, T.A., Owusu, S., & Zeufack, A.G. (2021). *Industrialization in Sub-Saharan Africa: Seizing Opportunities in Global Value Chains*. Africa Development Forum; Washington, DC: World Bank.
- Adarov, A. & Stehrer, R., 2021. *Implications of Foreign Direct Investment, Capital Formation and its Structure for Global Value Chains. The World Economy, Wiley Blackwell*, 44(11), pp. 3246-3299.
- African Trade Center., 2020. African Trade Center - Trade & Investment Promotions. [Online] Available at: <https://africantradecenter.org> [Accessed 3 August 2024].
- Afjal, M., 2023. The Tapestry of Green Economics: Mapping the Nexus of CO₂ Emissions, Economic Growth, and Renewable Energy. *International Journal of Sustainability*, 42(1), pp. 1364-1390.
- Aghion, P., Dechezleprêtre, A., Henous, D., Martin, R. & Van Reenen, J., 2016. Carbon Taxes, Path Dependency, and Directed Technical Change: Evidence from the Auto Industry. *Journal of Political Economy*, 124(1), pp. 1-51.
- Ahmed, S., Appendino, M. & Ruta, M., 2017. Global Value Chains and the Exchange Rate Elasticity of Exports. *The BE Journal of Macroeconomics*, 17(1), p. 20150130.
- Akbar A., Imdadullah, M., Ullah, M. Aslam, M., 2011. Determinants of Economic Growth in Asian Countries: A Panel Data Perspective. *Pakistan Journal of Social Sciences*, 31(1), pp. 145-157.

Akkaya, M., 2021. *Vector Autoregressive Model and Analysis*, Istanbul: Research Gate.

Akonnor, K. T., 2018. *The Impact of Foreign Direct Investment (FDI) on Economic Growth: A Comparative Study of East and Central Africa* (Doctoral Dissertation, University of Ghana).

Alaloul, W. Musarat, M.A, Rabbani, M.B.A, Igbal, Q, Maqsoom, A. & Farooq, W., 2021. Construction Sector Contribution to Economic Stability: Malaysian GDP Distribution. *Sustainability*, 13(9), pp. 1-26.

Ali, M., Khan, Z.H. & Hossain, Md., 2022. Comparative Advantage, Export Diversification, Intra-Industry Trade, and Economic Growth Nexus: Evidence from Bangladesh's Textile and Clothing Industry. *AIUB Journal of Business and Economics*, 19(1), pp. 226-250.

Amat, A. & Robert, S., 2020. *Capital Dynamics, Global Value Chains, Competitiveness and Barriers to FDI and Capital Accumulation in the EU*, Vienna: The Vienna Institute for International Economic Studies.

Andre, H., 2017. *The Need for and Use of Panel Data*, Cologne: IZA World of Labour.

Antonakis, J., Bastardo, N. & Rönkkö., 2021. On ignoring the Random Effects Assumptions in Multilevel Models: Review, Critique, and Recommendations. *Organizations Research Methods*, 24(2), pp. 443-483.

Asamoah, F., 2020. *Agriculture sector*, Geneva: International Labour Organization.

Asamoah, M., 2014. Re-examination of the Limitations Associated With Correlational Research. *Journal of Educational Research and Reviews*, 2(4), pp. 44-52.

Asogwa, F., Joseph, A. I. A. & Ugorji, H., 2016. Testing the Empirical Validity of the Mundell-Fleming Model. *International Journal of Science and Research*, 5(2), pp. 2041-2045.

Athukorala, P.C., 2011. Production Networks and Trade Patterns in East Asia: Regionalization or Globalization?. *Asian Economic Papers*, 10(1), pp.65-95.

Auer, R., Borio, C. & Filardo, A., 2017. *The Globalisation of Inflation: the Growing Importance of Global Value Chains* (March 2017). CEPR Discussion Paper No. DP11905, Available at SSRN: <https://ssrn.com/abstract=2937754>.

Augustine, C., 2024. *SA Automotive Sector*. [Online] Available at: <http://www.gov.za> [Accessed 2 July 2024].

Automotive Supply Chain Competitiveness Initiative, (2021). *Annual Report 2021/2022*. [Online] Available at: <https://ascci.org.za> [Accessed 2 May 2024].

Badr, G., 2019. *The Determinants of Global Value Chains Participation: The Case of Developing Economies*. Prague, ISES International Academic Conference.

Bahmani-Oskooee, M. C. T., Elmi, Z. & Ranjbar, O., 2017. Re-testing Prebisch-Singer Hypothesis: New Evidence Using Fourier Quantile Unit Root Test. *Applied Economics*, 50(4), pp. 441- 454.

Bajona, C. & Kehoe, T., 2010. Trade, Growth, and Convergence in a Dynamic Heckscher-Ohlin Model. *Review of Economic Dynamics*, 13(3), pp. 487-513.

Bala, M. & Verma, D., 2018. A Critical Review of Digital Marketing. *International Journal of Management, IT & Engineering*, 8(10), pp. 321-329.

Balcilar, G., Lee, C. & Olasehinde-Williams, G., 2020. *Insurance and Economic Policy Uncertainty*, Pretoria: University of Pretoria.

Baldwin, R. & Lopez-Gonzalez, J., 2015. Supply-Chain Trade: A Portrait of Global Patterns and Several Testable Hypotheses. *The World Economy*, 38(11), pp. 1682-1721.

Barbieri, L., 2006. *Panel Unit Root Tests: A Review*, Milan: Università Cattolica Del Sacro Cuore.

Barnes, J., 2013. Capital Structure of the South African Automotive Industry: Historical Perspectives and Development Implications. *Transformation: Critical Perspectives on Southern Africa*, 81(1), pp. 236-259.

Barnes, J. & Black, A., 2013. *The Motor Industry Development Programme 1995-2012: What Have We Learned*, Johannesburg: TIPS.

Barreto-Pavón., 2020 Drivers of Participation in Global Value Chains: International Evidence on What Matters. *International Journal of Business*, 29(1), pp. 86.

Barri, M., 2019. A Simulation Showing the Role of Central Limit Theorem in Handling Non-Normal Distributions. *American Journal of Educational Research*, 7(8), pp. 591-598.

Barri, M., 2019. S Simulation Showing the Role of Central Limit Theorem in Handling Non-Normal Distributions. *American Journal of Educational Research*7, 7(8), pp. 591-598.

Baskaran, T., Blöchl, F., Brück, T. & Theis, F., 2011. The heckscher-Ohlin Model and the Network Structure of International Trade. *International Review of Economics and Finance*, 20(2011), pp. 135-145.

Befratello, L., 2024. Random Effects Regression for Panel Data. In: F. Maggino, ed. *Encyclopedia of Quality of Life and Well-being Research*. New York: Cham: Springer International Publishing, pp. 5811-5813.

Bekun, F.V., Emir, F., Sarkodie, S.A., 2019. Another Look at the Relationship Between Energy Consumption, Carbon Dioxide Emissions, and Economic Growth in South Africa. *Science of the Total Environment*, 655 (2019) 759-765.

Bellino, E. & Fratini, S., 2019. *Absolute Advantages and Capital Mobility in International Trade Theory*, Rome: Centro Sraffa Working Papers, 39.

Bennett, D., 2015. *Division of Labor*, Birmingham: Wiley.

Binder, A. R. J., 2024. *Encyclopedia Britannica*. [Online] Available at: <https://www.britannica.com/technology/automotive-industry> [Accessed 09 March 2024].

Black, A., Roy, P., El-Haddad, A. & Yilmaz, K., 2020. *The Political economy of Automotive Industry Development Policy in Middle Income Countries: A Comparative*

Analysis of Egypt, India, South Africa and Turkey (May 14, 2020. ESID Working Paper No 143. Manchester: Effective States and Inclusive Development Research Centre, The University of Manchester, Available at SSRN: <https://ssrn/abstract=3661553>.

Black, J. & Kohser, R., 2017. *DeGarmo's Materials and Processes in Manufacturing*. 1st Edition ed. New Jersey: John Wiley & Sons.

Boamah, J., Adongo, F., Essieku, R. & Lewis, J., 2018. Financial Depth, Gross Fixed Capital Formation and Economic Growth: Empirical Analysis of 18 Asian Economies. *International Journal of Scientific and Education Research*, 2(4), pp. 120-130.

Boffa, M., Jansen, M. & Solleder, O., 2021. Participating to Compete: Do Smaller Firms in Developing Countries Benefit from Global Value Chains. *Economics*, 9(1), pp.12.

Bolaji, A., Oluwaseyi, A., Emmanuel, M. & Sharikat, S., 2018. Enhancing Agricultural Value Chain for Economic Diversification in Nigeria. *African Journal of Economic Review*, 6(1), pp. 103-118.

Bontadini, F., 2019. *Trade and Economic Development in Global Value Chains: Insights from Input-Output Analysis and Customs Transaction Level Data*, Brighton: University of Sussex Thesis.

Bose, E., Hravnak, M. & Sereika, S.M., 2017. Vector Autoregressive Models and Granger Causality in Time Series Analysis in Nursing Research; Dynamic Changes Among Vital Signs Prior to Cardiorespiratory Instability Events as an Example. *Nursing Research*, 66(1), pp. 12-19.

Branquinho, L., 2024. *Popular Car Brands in South Africa | Expert Review 2024*. [Online]
Available at: <http://wisemove.co.za>
[Accessed 3 July 2024].

Brennan, L. & Rakhmatullin, R., 2017. Advances in the Theory and Practice of Smart Specialization. *Transnationalizing Smart Specialization Strategy*, 25 August, Issue 2017, pp. 249-268.

Brinčiková, Z., 2016. The Dutch Disease: An Overview. *European Scientific Journal*, 12(10), pp. 95-101.

Brodino, G., 2023. Fragmentation of Production, Comparative Advantage, and the Heckscher-Ohlin Theory. *Review of Political Economy*, 35(3), pp. 803-822.

Bubear, R., 2024. *SA's Top Automakers: 2023's Winners & Losers by Market Share*. [Online]

Available at: <http://cars.co.za>
[Accessed 2 July 2024].

Cai, J. & Leung, P., 2020. A Note on Linkage Between Gross Value Added and Final Use at the Industry Level. *Economic Systems Research*, 32(2), pp. 428-437.

Carneiro, S., Never, P., Afonso, O. & Sochirca, E., 2024. Meta-analysis: Global Value Chains and Employment. *Applied Economics*, 56(19), pp. 2295-2314.

Carpa, N. & Martínez-Zarzoso, I., 2022. The Impact of Global Value Chain Participation on Income Inequality. *International Economics*, 169(2022), pp. 269-290.

Carvalho, F., 2017. Mining Industry and Sustainable Development: Time for Change. *Food and Energy Security*, 6(2), pp. 61-77.

Ceesay, E. & Moussa, Y., 2022. Pooled Ordinary Least-square, Fixed Effects and Random Effects Modelling in a Panel Data Regression Analysis: A Consideration of International Commodity Price and Economic Growth Indicators in 35 Sub-Saharan African Countries. *International Journal of Technology and Commercialisation*, 1(19), pp. 23-44.

Chang, H.-J. & Zach, K., 2019. Industrial Development. In: D. Nayyar, ed. *Asian Transformations*. New York: Oxford University Press, pp. 187-215.

Choi, M., Sung, B. & Song, W., 2019. The Effects of the Exchange Rate on Value-Added International Trade to Enhance Free Trade Sustainability in GVCs. *Sustainability*, 11(2740), pp. 1-10.

Chudik, A. & Pesaran, H., 2013. *Large Panel Data Models with Cross-Sectional Dependence: A Survey*. Federal Reserve Bank of Dallas. Globalization and Monetary Policy Institute Working Papers. 10.24149/ gwp153.

Cia, J. & Leung, P., 2020. A Note on Linkage Between Gross Value Added and Final Use at the Industry Level. *Economic Systems Research*, 32(3), pp. 428-437.

CIDB, 2012. *The Construction Industry as a vehicle for Contractor Development and Transformation*, Pretoria: Construction Industry Development Board.

Claudio, B., Jona-Lasinio, C. & Sopranzetti, S., 2020. Productivity Growth and Global Value Chain Participation in the Digital Age. *Truy Cập*, 31(1), p. 2020.

Concor, 2024. *Concor - Construction*. [Online]. Available at <http://www.concor.co.za> [Accessed 20 August 2024].

Conde, C., Heinrigs, P. & O'Sullivan, A., 2015. Tapping the Potential of Global Value Chains for Africa. *Europe*, 57(2017), pp. 71-85

Constantinescu, C., Mattoo, A. & Ruta, M., 2019. Does Vertical Specialisation Increase Productivity?. *The World Economy*, 42(8), pp. 2385-2402.

Cowling, N., 2024. *South Africa: Construction Sector's Value Added to GDP*. [Online] Available at: <http://www.statista.com> [Accessed 5 July 2024].

Cox, M. & Weigert, M., 2022. *African Industrialization Index 2022*, Abidjan: African Development Bank Group.

Coyle, J., Novack, R., Gibson, B. & Langley, J., 2021. *Supply Chain Management: A Logistic Perspective*. 11th Edition ed. Boston: Cengage Learning.

Criscuolo, C. & Timmis, J., 2017. The Relationship Between Global Value Chains and Productivity. *International Productivity Monitor*, 32(2017), pp. 61-83.

Dagume, M. A., Mathebula, R. S. & Khangale, A. The Impact of Foreign Direct Investment on Economic Growth: Evidence for South Africa. *Journal of Smart Economic Growth*, 9(1), pp. 117-148.

Das, K. & Imon, A. H. M. R., 2016. A Brief Review of Tests for Normality. *American Journal of Theoretical and Applied Statistics*, 5(1), pp. 5-12.

David, P., 2005. Path Dependence in Economic Processes: Implications for Policy Analysis in Dynamical System Contexts. In: K. Dopfer, ed. *The Evolutionary Foundations of Economics*. Cambridge: Cambridge University Press, pp. 149-194.

Da-Wariboko, Y., Essi, D. & Etuk, E., 2022. Panel Auto-Regressive Distributed Lag (PARDL) Modelling of Exchange Rate in Oil Driveb Economies in Africa. *International Journal of Computer Science and Mathematical Theory (IJCSMT)*, 8(1), pp. 58-72.

Dean, E., Elardo, J., Green, M., Wilson, B. & Berger, S., 2020. *Principles of Economics: Scarcity and Social Provisioning*. 2nd Edition ed. Houston: OpenStax Economics.

DeBacker, K. & Miroudot, S., 2014. *Mapping Global Value Chains*, New York: SSRN.

Department of Agriculture, Land Reform and Rural Development, 2023. *Trends in the Agricultural Sector*. [Online] Available at: <http://www.dalrrd.gov.za> [Accessed 30 April 2024].

Deqiang, S., Zhijun, C., Hajduk-Stelmachowicz, M., Larik, A. & Rafique, M., 2021. The Role of the Global Value Chain in Improving Trade and the Sustainable Competitive Advantage: Evidence from China's Manufacturig Industry. *Fronteirs in Environmental Science*, 9(2021), p. 779295.

Devaux, A., Torero, M., Dovonan, J. & Horton, D., 2018. Agricultural Innovation and Inclusive Value-Chain Development: A Review. *Journal of Agribusiness in Developing and Emerging Economies*, 8(1), pp. 99-123.

Dollar, D., 2017. *Measuring and Analyzing the Impact of GVCs on Economic Development*, Washington, D.C: International Bank for Reconstruction and Development.

Dollar, D., 2019. Invisible Link: Value Chains Transform Manufacturing. *IMF Finance and Development*, 56(2), pp. 50-53.

Doorasamay., 2019. *Material Flow Cost Accounting Practices and Resource Efficiencies in South African Sugar Industry*. Durban: University of KwaZulu -Natal.

Dragoi, D., 2020. Economic Growth Versus Economic Development. *Atlantic Review of Economics*, 4(1), pp. 1-11.

DTIC, 2018. *The Department of Trade Industry and Competition*. [Online] Available at: <http://www.thedtic.gov.za> [Accessed 22 May 2024].

Dumitrescu, E. I. & Hurlin, C., 2012. Testing for Granger non-causality in Heterogenous Panels. *Economic Modelling*, 29(4), pp. 1450-1460.

Dutta, S., 2021. *Measurement of Global Value Chain (GVC) Participation in World Development Report 2020*, New York: Cornell UNiversity.

Dutta, S., 2024. *Review of Strategies and Policies for Enhanced Participation in Global Value Chains*, New Delhi: SSRN Electronic Journal.

Eckhardt, J. & Poletti, A., 2018. Introduction: Brining Institutions Back in the Study of Global Value Chains. *Global Policy*, 9(2), pp. 5-11.

Edo, S. & Kanwanye, H., 2023. Global Value Chain Participation of Selected African Countries: The Contrasting Role of Initial Factors and the Covid-19 Pandemic. *African Insight*, 52(4), pp. 51-70.

Effiom, L. & Uche, E., 2022. The Political Economy of Industrialization in Sub-Saharan Africa: Evaluating te Role of Institutions. *Institutions and Economics*, 14(1), pp. 77-108.

Efogo, F. O., 2020. AfCFTA and Structural Transformation in Africa. *Africa Insight*, 50(1), pp. 90-106.

Efogo, F., Wonyra, K. O. & Osabuohien, E., 2022. Foreign Direct Investment and Participation of Developing Countries in Global Value Chains: Lessons from the Last Decade. *International Review of Applied Economics*, 36(2), pp. 264-284.

Engle, R.F. & Granger, C. W., 1987. Co-integration and Error Correction: Representation, Estimation, Testing. *Econometrica: Journal of the Econometric Society*, pp. 251-276.

Epaphra, M., 2018. *An Econometric Analysis of the Determinants of Foreign Direct Investment in Africa*, Arusha: ReserachGate.

European Commission., 2016. *Economic Partnership Agreement (EPA) Between the European Union and the Southern African Development Community (SADC) EPA Group*. [Online] Available at <http://ec.europa.eu> [Accessed 11 July 2024].

Esmacilian, B., Behdad, S. & Wang, B., 2016. The Evolution and Future of Manufacturing: A Review. *Journal of Manufacturing Systems*, 39(39), pp. 79-100.

Espior, D., Bannor, F. & Sunge, R., 2024. Intra-Africa Agricultural Trade, Governance Quality and Agricultural Total Factor Productivity: Evidence from a Panel Vector Autoregressive Model. *The European Journal of Development Research*, pp. 1-43

Faccarello, G., 2015. The Elgar Companion to David Ricardo. In: H. Kurz & N. Salvadori, eds. *Comparative Advantage*. Cheltenham: Edward Elgar Publishing, pp. 69-77.

Fagerberg, J., Lundvall, B. & Srholec., 2018. Global Value Chains, National Innovation Systems and Economic Development. *The European Journal of Development Research*, 30(2018), pp. 533-556.

Fang, K., Yunheng, Z. & Wang, S., 2018. Assessing National Renewable Energy Competitiveness of the G20: A Revised Porter's Diamond Model. *Renewable and Sustainable Energy Reviews*, 93(2018), pp. 719-731.

Fernandes, A., Kee, H. & Winkler, D., 2017. *Determinants of Global Value Chain Participation: Cross Country Evidence*, Washington, D.C: World Bank Group.

- Fernandes, A., Kee, H.L. & Winkler, D., 2020. *Determinants of Global Value Chain Participation*. Policy Research Working Paper. Washington, D.C: The World Bank
- Fernandes, A., Nievas, G. & Winkler, D., 2021. *Trade and Global Value Chain Integration in Latin America: Stylized Facts*, Washington, D.C.: The World Bank.
- Fernandez-Stark, k. & Bamber, P., 2022. North America in Global Value Chains. *North America*, 2(2022), pp. 241-261.
- Frederick, S., 2019. Global Value Chains Mapping. In: S. Frederick, ed. *Handbook on Global Value Chains*. Cheltenham: Edward Elgar Publishing, pp. 29-53.
- Freight News., 2024. *South African Vehicle Exports Surge*. [Online] Available at <http://www.freightnews.co.za> [Accessed 8 August 2024].
- Galassi, J., 2019. Discussing the Symmetry Principle: Towards a Realist Dialogue Inside Global STS Theory. *Tapuya: Latin American Science, Technology and Society*, 2(1), pp. 32-41.
- Gander, J., 2017. *International Trade, Crowding Out, and Market Structure: Cournot Approach*, Salt Lake City: Econstor.
- Gani, A., 2017. The Logistics Performance Effect in International Trade. *The Asian Journal of Shipping and Logistics*, 33(4), pp. 279-288.
- Gbatsoron, A., Dennis, N. & David, A., 2019. Is There a Trade-off Between Employment and Economic Growth in Nigeria? *Journal of Economics and Sustainable Development* Doi: 10.7176/JESD. 10(14). Available from: <https://www.researchgate.net/publication/335676990>
- Gauteng Growth & Development Agency, 2014. *Gauteng Automotive Sector*. [Online] Available at <https://ggda.co.za> [Accessed 2 May 2024].
- Gengebach, C., Palm, F. & Urbain, J., 2005. *Panel Cointegration Testing in the Presence of Common Factors*, Massatricht: Core.

Giovannetti, G. & Sanfilippo, M., 2016. Do Chinese Exports Crowd-Out African Goods? An Econometric Analysis by Country and Sector. In: S. Henson & O. Yap, eds. *The Power of the Chinese Dragon*. London: Palgrave Macmillan, pp. 10-41.

Global Affairs Canada., 2011. *The Evolution of Global Value Chains*. [Online] Available at: <http://www.international.gc.ca> [Accessed 27 May 2024].

Gochero, P. & Boopen, S., 2020. The Effect of Mining Foreign Direct Investment Inflow on the Economic Growth of Zimbabwe. *Journal of Economic Structures*, 9(1), pp. 54.

Gogtay, N. & Thatte, U., 2017. Principles of Correlation Analysis. *Journal of the Association of Physicians of India*, 65(2017), pp. 78-81.

Gonzalez, L., 2017. *Using Foreign Factors to Enhance Domestic Export-Performance: A Focus on Southeast Asia (OECD Trade Policy Papers, No. 191)*, Paris: OECD Publishing.

Görgün, M., 2019. Classical International Trade Theories. In: S. Coban, S. Dalpour, C. Marrangoz & E. Bulut, eds. *Recent Economic Approaches and Financial Corporate Policy*. 1st Edition ed. London: IJOPEC Publication Limited, pp. 247-252.

Govinda, C., 2014. *Routledge Handbook of Civil Wars*. 1st Edition ed. London: Routledge.

Granger, C.W.J., 2004. Time Series Analysis, Cointegration, and Applications. *American Economic Review*, 94(3), pp. 421-425.

Greene, W.H., 2008. *Econometric Analysis*. 6th Edition, Pearson Prentice Hall, Upper Saddle River.

Gries, T. & Grundmann, R., 2020. Modern Sector Development: The Role of Exports and Institutions in Developing Countries. *Review of Development Economics*, 24(2), pp. 644-667.

Group Five., 2024. *Group Five Construction Proprietary Limited*. [Online] Available at <http://www.g5.co.za> [Accessed 20 August 2024].

- Gungor, H. & Simon, A., 2017. Energy Consumption, Finance and Growth: The Role of Urbanization and Industrialization in South Africa. *International Journal of Energy Economics and Policy*, 7(3), pp. 268-276.
- Gupta, S., 2015. Comparative Advantage and Competitive Advantage: An Economics Perspective and a Synthesis. *Athens Journal of Business and Economics*, 1(1), pp. 9-22.
- Gutterman, A., 2023. *Research and Development*, Berlin: Research Gate.
- Halunga, A.G., Orme, C.D. & Yamagata, T., 2017. A Heteroskedasticity Robust Breusch-Pagan Test for Contemporaneous Correlation in Dynamic Panel Data Models. *Journal of Econometrics*, 198(2017), pp. 209-230.
- Handique, C., 2020. An Empirical Analysis of Inter-Industry and Intra-Industry Trade Between India and ASEAN - The Impact of Revealed Comparative Advantage (RCA) in Commodities. *International Journal of Managements (IJM)*, 11(12), pp.108-117.
- Han, X. & Lee, L.F., 2013. Bayesian Estimation and Model Selection for Spatial Durbin Error Model with Finite Distributed Lags. *Regional Science and Urban Economics*, 43(5), pp. 816-837.
- Hansen, K., 2021. 2. *Trade Theory: Mercantilism, Smith and Ricardo*, Leipzig: Universitat Leipzig.
- Harris, D. & Fuller, D., 2014. Agriculture: Definition and Overview. In: C. Smith, ed. *Encyclopedia of Global Archaeology*. New York: Springer, pp. 104-113.
- Harris, J. R., 1995. Where is the Child's Environment? A Group Socialization Theory of Development. *Psychological Review*, 102(3), pp.458-489.
- Hayakawa, K. & Mukunoki, H., 2021. Impacts of COVID-19 on Global Value Chains. *The Developing Economies*, 59(2), pp.154-177.
- Hemzawi, B. & Umutoni, N., 2021. *Impact of Exports and Imports on the Economic Growth*, Jonköping: Jonköping University.

- Hermida, C., Santos, A. & Brittencourt, M., 2022. Does International Fragmentation of Production AND Global Value Chains Participation Affect the Long-run Economic Growth?. *Foreign Trade Review*, 57(4), pp. 367-389.
- Hernandez, H., 2021. *Testing for Normality: What is the Best Method?*, Medellín: ForsChem Research Reports.
- Hintošová, A., 2021. Inward FDI: Characterizations and Evolutions. *Encyclopedia*, 1(2021), pp. 1026-1037.
- Hsiao, C., 2007. Panel Data Analysis-Advantages and Challenges. *TEST*, 16(16), pp. 1-22.
- Huang, Y., Wang, L. & Liang, S., 2020. *Overview of Manufacturing*. [Online] Available at: <http://www.worldscientific.com> [Accessed 29 April 2024].
- Huggins, R. & zushi, H., 2015. The Competitive Advantage of Nations: Origins and Journey. *Competitiv Review*, 25(5), pp. 458-470.
- Hugos, M., 2024. *Essentials of Supply Chain Management*. 5th Edition ed. New Jersey: John Wiley & Sons.
- Hviding, K., 2006. Liberalizing Trade and Capital Transactions: An Overview. In: M. Nowak & L. Ricci, eds. *Post-Apartheid South Africa: The First Ten Years*. Washington, D.C: International Monetary Fund, pp. 133-141.
- Iamsiraroj, S. & Doucouliagos, H., 2015. Does Growth Attract FDI. *Economics*, 9(1), p. 20150019.
- Idris, J., Yusop, Z. & Habibullah, M., 2016. Trade Openness and Economic Growth: A Causality Test in Panel Perspective. *International Journal of Business and Society*, 17(2), pp. 281-290.
- Ikechukwu, F., Fyनेface, P. & Anochie, C., 2022. Assessing the Concept of Heckscher Ohlin Model. *Innovative Journal of Marketing Management*, 10(3), pp. 44-50.

Im, K. S., Pesaran, M. H. & Shin, Y., 2003. Testing for Unit Roots in Heterogenous Panels. *Journal of Econometrics*, 115(1), pp. 53-74.

Im, K. S., Pesaran, M. H. & Shin, Y., 2023. Reprint of: Testing for Unit Roots in Heterogenous Panels. *Journal of Econometrics*, 234(2023), pp. 56-69.

Insitute, C. F., 2022. *Exchange Rate- Overview, How it Works, Importance*. [Online] Available at: <https://corporatefinanceinstitute.com> [Accessed 12 November 2024].

International Finance Corporation, 2021. *How Firms are Responding and Adapting During COVID-19 and Recovery: Opportunities for Accelerated Inclusion in Emerging Markets*, Washington, D.C.: International Finance Corporation.

Iskenderoglu, O. & Ozturk, I., 2016. A Research for the Competitive Environment Hypothesis in the Short-run for the Turkish Manufacturing Industry. *Economic Research-Ekonomska Istraživanja*, 29(1), pp. 140-147.

Ivanon, V., Pavlenko, I., Evtuhov, A. & Trojanowska, J., 2023. *Product Design*, Berlin: Research Gate.

Jahan, I., Murad, W. & Hossain, S., 2021. Revisiting the Prebisch-Singer Hypothesis in the Era of Flobalization. *Journal of Economic Research*, 26(2), pp. 131-158.

Jangam, B. & Akram, V., 2019. Does Participation in Global Value Chains Foster Export Concentration. *Economics Bulletin*, 39(4), pp. 2913-2920.

Jangam, B. & Rath, B., 2021. Do Global Value Chains Enhance or Slog Economic Growth?. *Applied Economics*, 53(36), pp. 4148-4165.

Johnson, K., 2023. Impact of Export Diversification on Economic Growth in Sub-Saharan Africa (SSA). *South Asian Journal of Social Studies and Economics*, 20(3), pp. 289-299.

Joffe, A., Kaplan, D., Kaplinsky, R. & Lewis, D., 1995. *Improving Manufacturing Performance in South Africa*. 1st Edition ed. Cape Town: UCT Press.

Kao, C., 1999. Spurious Regression and Residual-based tests for Cointegration in Panel Data. *Journal of Econometrics*, 90(1), pp. 1-44.

Kannadhasan, M., Aramvalarthan, S., Balasubramanian, P. & Gopika, A., 2017. Determinants of Dividend Policy of Indian Manufacturing Companies: Panel Autoregressive Distributed Lag Analysis. *Academy of Accounting and Financial Studies Journal*, 21(2), pp. 1-12.

Kanu, S.I; Ozurumba, B.A., 2014. Capital Formation and Economic Growth in Nigeria: *Global Journal of Human-Social Science: Economics*, 14(4), pp. 43-58.

Kanu, I. & Nwaimo, E., 2015. Capital Expenditures and Gross Fixed Capital Formation in Nigeria. *Research Journal of Finance and Accounting*, 6(12), pp. 188-197.

Kaplinsky, R., 2015. Global Value Chains in Manufacturing Industry. In: R. Kaplinsky, ed. *Routledge Handbook of Industry and Development*. London: Routledge, pp. 184-203.

Keho, Y. & Read, R., 2021. Determinants of Trade Balance in West African Economic and Monetary Union (WAEMU): Evidence From Heterogenous Panel Analysis. *General and Applied Economics*, 9(1), pp. 1-16.

Keller, G., 2017. *Statistics for Management and Economics*. 11th Edition ed. Boston: Cengage Learning.

Kersan-Škabić, I., 2019. The Drivers of Global Value Chain (GVC) Participation in EU Member States. *Economic Research*, 32(1), pp. 1204-1218.

Keter, W., 2012. *An Application of Porter's Theory of the Competitive Advantage of Nations in Determination of the Competitiveness of the Kenyan Tea Export Industry*, Nairobi: School of Business, University of Nairobi.

Khaertdinova, A., Maliashova, A. & Gadelshina, S., 2021. *Economic Development of the Construction Industry as a Basis for Sustainable Development of the Country*, Kazan: Kazan National Research Technological University.

Khatun, N., 2021. Applications of Normality Test in Statistical Analysis. *Open Journal of Statistics*, 11(01), pp. 113-122.

Khayal, O. & Elagab, E., 2022. A Review Study in Mining Industry. *International Journal of Enginnering Applied Sciences and Technology*, 7(6), pp. 1-14.

Kim, K., 2023. Global Value Chains and its Implication on Investment. *Journal of Global and Area Studies*, 7(4), pp. 105-122.

Kim, Y. G. & Pyo, H. K., 2016. *Trade in Intermediate Goods: Implications for Productivity and Welfare in Korea*. KIEP Research Paper, Working Papers 16-14, Available at SSRN: <https://ssrn.com/abstract=2929118>.

Kok, W. & Selvaratnam, D., 2018. Can Ricardian Model Really Explain Trade?/Kok Wooi Pap and Dorris Padmini Selvaratnam. *Journal of International Business, Economics and Entrepreneurship*, 3(1), pp. 21-29.

Kowalski, P., Lopez-Gonzalez, J., Ragoussis, A. & Ugarte, C., 2015. *Participation of Developing Countries in Global Value Chains*, Paris: OECD.

Kummritz, V., 2016. *The Graduate Institute Geneva*. [Online] Available at: <http://www.repec.graduateinstitute.ch> [Accessed 16 March 2024].

Kummritz, V., Taglioni, D. & Wrinkler, D., 2017. Economic Upgrading Through Global Value Chain Participation. *Policy Research Working Papers*. The World Bank.

Kunroo, M. & Ahmad, I., 2023. Heckscher-Ohlin Theory or the Modern Trade Theory: How the Overall Trade Characterizes at the Global Level?. *Journal of Quantitative Economics*, 21(1), pp. 151-174.

Kuo, K., Lai, S., Chancham, K. & Liu, M., 2014. Energy Consumption, GDP, and Foreign Direct Investment in Germany. *Applied Mechanisms and Materials*, 675-677(2014), pp. 1797-1809.

Kutu, A., 2017. *Monetary Policy Shocks and Industrial Production in Countries*, Durban: University of KwaZulu Natal.

Kwak, S. & Kim, J., 2017. Central Limit Theorem: the Conerstone of Modern Statistics. *Korean Journal of Anaesthesiology*, 70(2), pp. 144-156.

Laing, M., 2021. *Evaluating the Development Potential of the Automotive Industry in South Africa: A Product Space and Location Framework Approach*, Stellenbosch: Stellenbosch University.

Lamprecht, N., 2021. *Automotive Export Manual 2021*. [Online] Available at: <http://naacam.org.za> [Accessed 19 August 2024].

Laursen, K., 2015. Revealed Comparative Advantage and the Alternatives as Measures of International Specialization. *Eurasian Business Review*, 5(2015), pp. 99-115.

Levin, A., Lin, C. F. & Chu, C. S. J., 2002. Unit Root Tests in Panel Data: Asymptotic and Finite-sample Properties. *Journal of Econometrics*, 108(1), pp. 1-24.

Lewis, M., 2016. *Industrialization*. [Online] Available at: <http://www.ecsecc.org> [Accessed 12 June 2024].

Li, K. & Lin, B., 2015. Impacts of Urbanization and Industrialization on Energy Consumption/CO2 Emissions: Does the Level of Development Matter?. *Renewable and Sustainable Energy Reviews*, 52(2015), pp. 1107-1122.

Loewald, C., 2024. *Big Drivers of Export and Import Volumes: How Have These Relationships Shifted Amidst Large Shocks?*, Pretoria: South African Reserve Bank.

Loizou, E., Karelakis, C., Galanopoulos, K. & Mattas, K., 2019. The Role of Agriculture as a Development tool for a Regional Economy. *Agricultural Systems*, 173(2019), pp. 482-490.

- Los, B., Timmer, M. & Vries, G., 2014. How Global Value Chains? A New Approach To Measure International Fragmentation. *Journal of Regional Science*, 55(1), pp. 66-92.
- Luu, H., Nguyen, N., Ho, H. & Tien, D., 2019. Infrastructure and Economic Development in Developing Economies: New Empirical Evidence from Night-time Satellite Imagery in Vietnam. *International Journal of Social Economics*, 46(4), pp. 581-594.
- MacCarthy, B.L., Blome, C., Olhager, J., Srai, J.S. & Zhao, X., 2016. Supply Chain Evolution - Theory, Concepts and Science. *International Journal of Operations & Production Management*, 36(12), pp. 1696-1718.
- Maddala, G.S. & Wu, S., 1999. *A Comparative Study of Unit Root Tests With Panel Data and a New Simple Test*, Oxford: Blackwell Publishers.
- Mahmood, Z., 1990. *The Competitive Advantage of Nations*, New York: Free Press.
- Makoni, T. & Chikobvu, D., 2023. Evaluating and Predicting the Long-Term Impact of the COVID-19 Pandemic on Manufacturing Sales Within South Africa. *Sustainability*, 15(12), pp. 1-18.
- Malefane, M., 2018. *Trade Openness and Economic Growth: Experience from Three SACU Countries*, Pretoria: University of South Africa.
- Malefane, M. & Odhiambo, N., 2017. The Dynamics of Trade Openness in South Africa: An Explanatory Review. *International Journal for Quality Research*, 11(4), pp. 887-902.
- Mamvura, K., 2018. *Capital Flow Volatility, Financial Deepening and Capital Market Performance in Low-Income Countries*, Durban: University of Kwazulu-Natal.
- Mapuva, J. & Muyengwa-Mapuva, L., 2014. The SADC Regional Bloc: What Challenges and Prospects for Regional Integration. *Law, Democracy and Development*, 18(2014), pp. 22-36.

Marandu, H., 2018. *The Impact of FDI on Economic Growth in Southern African Countries*, Cape Town: University of Cape Town.

Masunda, S & Mupaso, N., 2019 *A Microeconometric Analysis of Factors Affecting Global Value Chain Participation in Zimbabwe*. *Cogent Economics & Finance*, 7(1), pp.1-9.

Mathonsi, M. & Thwala, W., 2012. Factors Influencing the Selection of Procurement Systems in the South African Construction Industry. *African Journal of Business Management*, 6(10), pp. 3583-3594.

Mayer, T. & Steingress, W., 2020. Estimating the Effect of Exchange Rate Changes on Total Exports. *Journal of International Money and Finance*, 106(2020), p. 102184.

Mbatha, C., 2019. South Africa and USA Trade: What are the Scenarios Beyond the 'Africa Growth and Opportunity Act' AGOA for South Africa's Wine Exports and Wine Tourism Sector?. *African Journal of Hospitality, Tourism and Leisure*, 8(3), pp. 1-18.

Mekić, E. & Mekić, E., 2014. *Supports and Critiques on Porter's Competitive Strategy and Competitive Advantage*, Berlin: ResearchGate.

Miao, G., 2023. *South African Reserve Bank Working Paper Series*, Pretoria: South African Reserve Bank.

Mishi, S. & Maredza, A., 2024. *Research Methods for Economics*. 1st Edition ed. Pretoria: Van Schaik Publishers.

Mishra, P., Pandey, C.M., Singh, U., Gupta, A., Sahu, C. & Keshri, A ., 2019. Descriptive Statistics and Normality Tests for Statistical Data. *Annals of Cardiac Anaesthesia*, 22(1), pp. 67-72.

Mitakda, V., Budiharjo, H. & Lufti, E., 2024. The Impact of Upstream Oil and Gas Investment on Petroleum Production in Indonesia. *Journal of Energy Research and Reviews*, 16(5), pp. 12-18.

- Mladen, M., 2015. Economic Growth and Development. *Journal of Process Management*, 3(1), pp. 55-62.
- Mnguni, P. & Simbanegavi, W., 2020. *South African Manufacturing: A Situational Analysis*, Pretoria: South African Reserve Bank.
- Modi, S., 2016. *Material Qualification in the Automotive Industry*, Ann, Arbor, MI: Center for Automotive Research.
- Mohr, P., 2015. *Economics for South African Students*. 5th Edition ed. Pretoria: Van Schaik Publishers.
- Molepo, W. & Jordaan, A., 2024. A Causal Analysis Between Exports, Imports and GDP Per Capita in the Southern African Customs Union Countries. *Studies in Economics and Econometrics*, 48(2), pp. 168-185.
- Montalbano, P. & Nenci, S., 2022. Does Global Value Chain Participation and Positioning in the Agriculture and Food Sectors Affect Economic Performance? A Global Assessment. *Food Policy*, 108(2022), pp. 1-14.
- Morris, M., Barnes, J. & Kaplan, D., 2021. *Value Chains and Industrial Development in South Africa*, Cape Town: Policy Research on International Services and Manufacturing.
- Moshikaro-Amani, L., 2023. *Industry Study: Auto Manufacturing*, Pretoria: Trade & Industrial Policy Strategies.
- Moss, T.J., Ramachandran, V. & Shah, M.K., 2004. *Is Africa's Scepticism of Foreign Capital Justified? Evidence from East African Firm Survey Data*. Washington, D.C.: Center for Global Development.
- Mthembu, L., 2024. *International Trends in the Capital Goods Industry*, Pretoria: Trade & Industrial Policy Strategies.

Murray, J., 2024. *Oxford Dictionary of National Biography*. [Online] Available at: <https://www.oecd.com> [Accessed 28 July 2024].

Musora, T. & Matarise, F., 2023. *Determinants of Economic Growth for Southern African Development Community Nations: A Panel Data Approach*. Berlin: International Conference on Modern Research in Management, Economics and Accounting.

Naamsa, 2024. *Fuelling the Economy - Naamsa*. [Online] Available at: <http://www.naamsa.net> [Accessed 28 October 2024]..

Naumann, E., 2015. *An Overview of AGOA's Performance Beneficiaries, Renewal Provisions and the Status of South Africa*, Stellenbosch: Tralac.

Nchoe, K. C., 2016. *The Effect of Foreign Investment Inflows on Economic Growth: Sectoral Analysis of South Africa*. Pretoria: University of South Africa.

Ndiaya, C. & Lv, K., 2018. Role of Industrialization on Economic Growth: The Experience of Senegal (1960-2017). *America Journal of Industrial and Business Management*, 8(2018), pp. 2072-2085.

Ndubuisi, G. & Owusu, S., 2021. How Important is GVC Participation to Export Upgrading. *The World Economy*, 44(10), pp. 2887-2908.

Newman, S., Baloyi, B. & Ncube, P., 2010. *A New Growth Path for South African Industrialisation: An Input-Output Analysis*, Johannesburg: The Corporate Strategy and Industrial Development Research Programme (CSID).

Nkoro, E. & Uko, K., 2016. Autoregressive Distributed Lag (ARDL) Cointegration Technique: Application and Interpretation. *Journal of Statistical and Econometric Methods*, 5(4), pp. 63-91.

Normaminovich, Y., Payziyenva, A. & Azimdjanyova, A., 2021. Analysis of the Effectiveness of the Textile Industry. *Journal of Human University*, 48(12), pp. 1587-1597.

NRGI reader., 2015. *The Mining Industry*. [Online] Available at: <https://resourcegovernance.org> Accessed [8 May 2024].

Nülle, G. & Davis, G., 2018. Neither Dutch nor Disease? - Natural Resource Booms in Theory and Empirics. *Mineral Economics*, 31(1), pp. 35-59.

Nwakuya, M. & Ijomah, M., 2017. Fixed Effects Versus Random Effects Modelling in a Panel Data Analysis; A Consideration of Economic and Political Indicators in Six African Countries. *Journal of Statistics and Applications*, 7(6), pp. 275-279.

Obashi, A. & Kimura, F., 2018. Are Production Networks Passé in East Asia? Not Yet. *Asian Economic Papers*, 17(3), pp.86-107.

Obeng, C. K., Mwinlaaru, P. Y. & Ofori, I.K., 2022. Global Value Chain Participation and Inclusive Growth in Sub-Saharan Africa. In *The Palgrave Handbook of Africa's Economic Sectors* (pp.815-840). Cham: Springer International Publishing.

OECD, 2024. *South Africa (ZAF) Exports, Imports, and Trade Partners*. [Online] Available at: <http://www.oec.world> [Accessed 10 August 2024].

Oluseye, C. & Gabriel, A., 2017. Determinants of Inclusive Growth in Nigeria: An ARDL Approach. *American Journal of Economics*, 7(2017), pp. 97-109.

Omolade, A. & Ngawala, H., 2014. Oil Revenue and Manufacturing Sector Growth in Africa's Oil-exporting Countries. *Journal of Economic and Finance Sciences*, 7(3), pp. 925-944.

Onyimadu, C., 2015. An Overview of Endogenous Growth Models: Theory and Critique. *International Journal of Physical and Social Sciences*, 5(3), pp. 498-514.

Örgün, B., 2014. GVCs Participation as Development Strategy. *Procedia: Social and Behavioural Sciences*, 150(2014), pp. 1287-1296.

Öz, Ö., 2002. Assessing Porter's Framework for National Advantage: The Case of Turkey. *Journal of Business Research*, 55(2002), pp. 509-515.

Pahl, S., Timmer, M., Gouma, R. & Woltjer, P., 2019. . Washington, D.C:World Bank Policy Research Working Paper No. 8953.

Pahl, S. & Timmer, M., 2020. Do Global Value Chains Enhance Economic Upgrading? A Long View. *The Journal of Development Studies*, 56(9), pp. 1683-1705.

Pantea, V., Csobra, L. & Irina, O., 2008. *Porter's Strategy, Value Chains and Competitive Advantage*, Timișoara: Editura Mirton.

Porter, M. (2008). *The Competitive Advantage: Creating and Sustaining Superior Performance*. Reprint. Simon and Schuster.

Pástor, R., 2022. *Global Value Chain (GVC) in Automotive Industry*. [Online] Available at: <http://www.projectdriven.eu> [Accessed 22 April 2024].

Patrick, M., 2024. *Biggest Construction Companies in South Africa*. [Online] Available at: <https://constructionreviewonline.com> [Accessed 9 August 2024].

Pavón-Cuéllar, L. & Barreto-Pavón, A., 2024. Drivers of Participation in Global Value Chains: International Evidence on What Matters. *International Journal of Business*, 29(1), pp. 88-107.

Pedroni, P., 1999. Critical Values for Cointegration Tests in Heterogenous Panels with Multiple Regressors. (Department of Economics Working Papers No. 2000-02).

Pesaran, M. H., Shin, Y. & Smith, R. J., 2001. Bounds Testing approaches to the Analysis of Level Relationships, *Journal of Applied Econometrics*, 16(3), pp. 289-326.

Pesaran, H. M., 2004. *General Diagnostic Tests for Cross-sectional Dependence in Panels*. University of Cambridge, Working Papers in Economics, 435.

Petre, D., Giovannetti, G. & Marvasi, E., 2017. Global Value Chains Participation and Productivity Gains for North African Firms. *Review of World Economics*, 153(4), pp. 675-701.

Pesaran, H., 2011. *On The Interpretation of Panel Unit Root Tests*, Cambridge: University of Cambridge, Faculty of Economics.

Pesaran, M., Shin, Y. & Smith, R., 2001. Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics*, 16(3), pp. 289-326.

Pesaran, M., 2020. General Diagnostic Tests for Cross-sectional Dependence in Panels. *Empirical Economics*, 60(1), pp. 13-50.

Pokharel, B., 2018. Tax Reforms and Economic Growth With Reference to SAARC Countries: A Study Note. *Journal of Business and Social Sciences Research*, 3(1), pp. 91-106.

Porter M. E, 1985. *The Competitive Advantage: Creating and Sustaining Superior Performance*. NY: Free Press.

Porter, M, 1990. *The Competitive Advantage of Nations*. Free Press, New York.

Porter, M. E, 2008. The Five Competitive Forces that Shape Strategy. *Harvard Business Review*, 86(2008), pp. 79-93.

PWC, 2023. *Manufacturing Workforce 2023 Press Release*. [Online] Available at: <http://www.pwc.co.za> [Accessed 22 May 2024].

Raei, F., Ignatenko, A. & Mircheva, B., 2014. *Global Value Chains: What Are the benefits and Why Do Countries Participate?*. 1st Edition ed. Washington, D.C.: International Monetary Fund.

Rahman, N., Rahman, M. & Manini, M., 2024. Determinants of Global Value Chain Participation in Regional Trade Agreements: The Case of Regional. Comprehensive Economic Partnership (RCEP). *Journal of Industrial and Business Economics*, 51(1), pp. 111-134.

Raubex Group., 2024. *Raubex Group Limited*. [Online] Available at: <http://www.raubex.com> [Accessed 20 August 2024}.

- Reader, N., 2015. *The Mining Industry*. [Online] Available at: <http://resourcegovernance.org> [Accessed 27 May 2024].
- Rehal, V., 2022. *Lagrange Multiplier Test: Testing for Random Effects*. [Online] Available at: <https://spureconomics.com> [Accessed 30 July 2024].
- Romaniuk, S., 2017. Dependency Theory. In: P. Joseph, ed. *The SAGE Encyclopedia of War: Social Science Perspectives*. Thousand Oaks: SAGE Publications, Inc., pp. 482-483.
- Roos, G., 2016. *Manufacturing: Facts, Trends and Implications*, Adelaide: University of South Africa.
- Rosol, M., Młyńczak, M. & Cybulski, G., 2022. Granger Causality Test with Nonlinear Neural-network-based Methods: Python Package and Simulation Study. *Computer Methods and Programs in Biomedicine*, 216, p. 106669.
- Rossouw, A. & Khutlang, V., 2023. *Adapt to Thrive*, Johannesburg: PwC.
- Rubin, A. & Segal, D., 2015. The Effects of Economic Growth on Income Inequality in the US. *Journal of Macroeconomics*, 45(2015), pp. 258-273.
- Ruffini, P.-B., 2016. International Trade and Foreign Affairs - Some reflections on Economic Diplomacy. *Journal of International Logistics and Trade*, 14(1), pp. 3-28.
- Safitri, V. & Gamayuni, L., 2019. Research and Development (R&D), Environmental Investments, to Eco-Efficiency, and Firm Value. *The Indonesian Journal of Accounting Research*, 22(3), pp. 377-396.
- SARS., 2021. Automotive Production Development Programme (APDP) [Online] Available at <http://www.sars.gov.za> [Accessed 20 August 2024].
- Saslavsky, D. & Shepherd, B., 2014. Facilitating International Production Networks: The Role of Trade Logistics. *The Journal of International Trade & Economic Development*, 23(7), pp. 979-999.

Sawalha, N. n., Elia, M. I. & Suliman, A. H., 2016. Foreign Capital Inflows and Economic Growth in Developed and Emerging Economies: A Comparative Analysis: *The Journal of Developing Areas*, 50(1), pp. 237-256.

Schaffnit-Chatterjee, C., 2014. *Agricultural Value Chains in SUB-Saharan Africa. From a Development Challenge to a Business Opportunity*, Frankfurt: Deutsche Bank Research.

Schneider, G., 2000. The Development of the Manufacturing Sector in South Africa. *Journal of Economic Issues*, 34(2), pp. 413-424.

Schoeman, M., 2015. South Africa as an Emerging Power: From Label to 'Status Consistency'? *South African Journal of International Affairs*, 22(4), pp. 429-445.

Schumacher, R., 2012. Adam Smith's Theory of Absolute Advantage and the Use of Doxography in the History of Economics. *Erasmus Journal for Philosophy and Economics*, 5(2), pp. 54-80.

Schumacher, R., 2012. *Free Trade and Absolute and Comparative Advantage: A Critical Comparison of Two Major Theories of International Trade*. 1st Edition ed. Potsdam: Universitätsverlag Potsdam.

Schwank, O., 2008. *Linkages in South African Economic Development: Industrialization Without Diversification*, Vienna: Phd Thesis, Vienna University of Economics.

Seiko, Z., 2016. The Impact of Foreign Direct Investment on Economic Growth in Eastern Africa: Evidence from Panel Data Analysis. *Applied Economics and Finance*, 3(1), pp. 146-161.

Sheytanova, T., 2015. *The Accuracy of the Hausman Test in Panel data: A Monte Carlo Study*, Fakultätsgatan: DiVA.

Shojaie, A. & Fox, E. B., 2022. Granger Causality: A Review and Recent Advances. *Annual Review of Statistics and its Application*, 9 (1), pp. 289-319.

Siba, E., 2022. *Value Chains in Africa: What Role for Regional Trade?* [Online] Available at <http://www.oecd-development-matters.org> [Accessed 3 August 2024].

Sigmund, M. & Ferstl, R., 2021. Panel Vector Autoregression in R With the Package PanelVAR. *The Quartely Review of Economics and Finance*, 80(2021), pp. 693-720.

Silver, D., 2018. Alienation in a four factor world. *Journal for the Thepry of Social Behaviour*, 49(1), pp. 84-105.

Smit, A., 2010. The Compettitive Advantage of Nations: Is Porter's Diamond Framework a New Theory that Explains the International Competitiveness of Countries?. *Southern African Business Review*, 14(1), pp. 105-130.

Smith, M., 2023. Adam SMith on Growth and Economic Development. *History of Economics Review*, 86(1), pp. 2-15.

Soares, D., Soares, T. & Emiliano, P., 2019. An Application of the Central Limit Theorem. *Brazilian Journal of Development*, 5(12), pp. 31165-32173.

Solaz, M., 2018. Value Added and Participation in Global Value Chains: The Case of Spain. *The World Economy*, 41(10), pp. 2804-2827.

Sorensen, A., 2015. Taking Path Dependence Seriously : An Historical Institutional Research Agenda in Planning Histort. *Planning Perspectives*, 30(1), pp. 17-38.

Soyres, F., Frohm, E. & Gunnella, V., 2020. *How Global Value Chains Change the Trade-Currency Relationship*, Washington, DC: The Federal Reserve System.

Standard Bank., 2022. *2022 Construction Trends*. [Online] Available at: <http://www.standardbank.co.za> [Accessed 24 June 2024].

Statista, 2024. *Mining Industry in South Africa- Statistics & Facts*. [Online] Available at: <http://www.statista.com> [Accessed 28 May 2024].

StatsSA, 2022. *Motor Trade Industry*. [Online] Available at: <http://statssa.gov.za> [Accessed 17 June 2024].

StatsSA, 2024. *Stats SA*. [Online] Available at: <http://www.statssa.gov.za> [Accessed 06 March 2024].

Stefanutti Stocks., 2024. *Multidisciplinary Construction Group*. [Online] Available at <http://www.stefanuttistocks.com> [Accessed 20 August 2024].

Stern, M. & Ramkolowan, Y., 2021. *Undertsanind South Africa's Trade Policy Performance*. [Online] Available at: <http://www.resbank.co.za> [Accessed 7 June 2024].

Stokes, P. & Purdon, P., 2017. A Study of Problems Encountered in Granger Causality Analysis from a Neuroscience Perspective. *Proceedings of the National Academy of Sciences*, 114(34), pp. 7063-7072.

Stolzenburg, V., Taglioni, D. & Winkler, D., 2019. Chapter 30: Economic Upgrading Through Global Value Chain Participation: Which Policies Increase the Value-added Gains?. In: S. Ponte, G. Gereffi & G. Raj-Reichert, eds. *Handbook on Global Value Chains*. Cheltenham: Edward Elgar Publishing, pp. 483-505.

Taglioni, D & Winkler, D., 2016. *Making Global Value Chains Work for Development*. World Bank Publications.

Tajoli, L. & Felice, G., 2018. Global Value Chains Participation and Knowledge Spillovers in Developed and Developing Countries: An Empirical Investigation. *The European Journal of Research*, 30(2018), pp. 505-532.

Takpara, M., Djiogap, C. & Sawadogo, B., 2023. Trade Policy and African Participation in Global Value Chains: Does Trade Facilitation Matter?. *Journal of Economic Integration*, 38(1), pp. 59-92.

Tan, K., Duong, L. & Chuah, H., 2019. Impact of Exchange rates on ASEAN's Trade in the Era of Global Value Chains: An Empirical Assessment. *The Journal of International Trade & Economic Development*, 28(7), pp. 873-901.

Tanyanyiwa, I. & Hakuna, C., 2014. Challenges and Opportunities for Regional Integration in Africa: The case of Sadc. *IOSR Journal of Humanities and Social Science*, 19(12), pp. 103-115.

Taylor, D., 2024. *All-New X3 Reveal for June 2024*. [Online] Available at: <http://www.cars.co.za> [Accessed 02 July 2024].

Taylor, M., 2017. Comments on the "The Main Contribution of the Ricardian Trade Theory" By Ronald W. Jones. In: R. Jones & R. Weder, eds. *200 Years of Ricardian Trade Theory*. Berlin: Springer, Cham, pp. 117-127.

Temiz, D. & Gökmen, A., 2019. Export-led Economic Growth and the Case of Brazil; An Empirical Research. *Journal of Transnational Management*, 24(2), pp. 122-141.

Thwala, D., 2022. *Sector Study: Construction*, Durban: Trade & Investment Kwazulu-Natal.

TIPS, 2016. *Analysis of Existing Industrial Policies and the State of Implementation in South Africa*, Johannesburg: Friedrich-Ebert-Stiftung.

Timmer, M., Abdul, A., Bart, L., Robert, S. & Gaatzen, J (2014). Slicing Up Global Value Chain. *Journal of Economic Perspectives*, 28(2), pp.99-118.

Todaro, M. & Smith, S., 2012. *Economic Development*. 11th Edition ed. Boston: Addison-Wesley.

Traoré, M., 2018. *Government Spending and Inclusive Growth in Sub-Saharan Africa: A Panel VAR Analysis*, Clermont-Ferrand: Université Clermont Auvergne, CERDI.

Treasury, 2023. *Speech By Deputy Minister of Finance, Growing the South African Automotive Component Manufacturing Sector: A State Perspective*. [Online] Available at: <http://www.treasury.gov.za> [Accessed 2 July 2024].

Tsagris, M. & Pandis, N., 2021. Normality Test: Is it Really Necessary?. *American Journal of Orthodontics and Dentofacial Orthopedics*, 159(4), pp. 548-549.

Tugcu., 2018. *Panel Data Analysis in the Energy-Growth Nexus (EGN)*. In *The Economics and Econometrics of the Energy-growth Nexus* pp. 255-271. Academic Press.

Urata, S. & Baek, Y., 2020. *The Determinants of Participation in Global Value Chains: a Cross-Country, Firm-Level Analysis*, Tokyo: Asian Development Bank Institute.

Urata, S. & Baek, Y., 2022. Impacts of Firm's GVC Participation on Productivity: A Case of Japanese Firms. *Journal of the Japanese and International Economies*, 66(2022), p. 101232.

Veeramani, C. & Dhir, G., 2019. *Reaping Gains From Global Production Sharing: Domestic Value Addition and Job Creation By Indian Exports*, London: Forum for Research in International Trade.

Vigne, R. & Cobbing, J., 2024. *South Africa - Resources, Power, Economy*. [Online] Available at: <https://www.britannica.com> [Accessed 15 December 2024].

Warren, S., 1990. The New Palgrave: A Dictionary of Economics. *Economics and Philosophy*, 6(2), pp. 301-309.

Williams, B., 2015. *African Growth and Opportunity Act (AGOA): Background and Reauthorization*, Washington, D.C.: Congressional Research Service.

Wiryawan, B.A., Aginta, H. & Fazaalloh, A.M., 2022. Does GVC Participation Help Industrial Upgrading in Developing Countries? New Evidence from Panel Data Analysis. *The Journal of International Trade & Economic Development*, 32(7), pp. 1112-1129.

Wiśniewski, Z., 2017. Mp Estimation Applied to Platykurtic Sets of Geodetic Observations. *Geodesy and Geography*, 66(1), pp. 117-135.

Witkowska, E., 2016. Reconsideration of the Prebisch-Singer Hypothesis. *Real-World Economics Review*, 30(76), pp. 95-108.

Wolhuter, A., 2022. *Note on Supply Chain Pressures in South Africa*, Pretoria: South African Reserve Bank.

World Development Report, 2020. *Trading for Development in the Age of Global Value Chains*, Washington, D.C: The World Bank Group.

Xubei, L. & Gereffi, G., 2019. Participation in Global Value Chains: Challenges and Opportunities. In: C. Monga & J. Lin, eds. *The Oxford Handbook of Structural Transformation*. Oxford: Oxford Handbooks, pp. 273-290.

Yameogo, C. & Omojolaibi, J., 2021. Trade Liberalisation, Economic Growth and Poverty Level in Sub-Saharan Africa (SSA). *Economic Research*, 34(1), pp. 754-774.

Yang, B. & Zeng, T., 2014. A Note on the Real Currency Exchange Rate: Definitions and Implications. *Journal of International Business and Economics*, 2(4), pp. 45-55.

Yanikkaya, H. & Altun, A., 2020. The Impact of Global Value Chain Participation on Sectoral Growth and Productivity. *Sustainability*, 12(4848), pp. 1-18.

Yong, L., 2015. *World Economic Forum*. [Online] Available at: <http://www.weforum.org> [Accessed 21 May 2024].

Yoshii, S., Fujimoto, T. & Shiozawa, Y., 2019. *Was Adam Smith a Proponent of Absolute Advantage Theory? A Formative History of an Urban Legend and Lessons Learned*, Tokyo: NUCB Discussion Paper Series.

Yüksel, S., 2017. The Impacts of Research and Development Expenses on Export and Economic Growth. *International Business and Accounting Research Journal*, 1(1), pp. 1-8.

Zhang, M., 2014. What Can Cities do to Enhance Competitiveness? Local Policies and Actions for Innovation. In: N. Pengfei & Q. Zheng, eds. *Urban Competitiveness and Innovation*. Edward Elgar Publishing ed. Cheltenham: Edward Elgar Publishing, pp. 112-136.

Zahonogo, P., 2016. Trade and Economic Growth in Developing Countries: Evidence from Sub-Saharan Africa. *Journal of African Trade*, 3(1-2), pp. 41-56.

Zamora, E., 2016. Value Chain Analysis: A brief Review. *Asian Journal of Innovation and Policy*, 5(2), pp. 116-128.

Zhuqing, M., 2019. *Global Value Chains (GVCs) Upgrading and Economic Growth*, Seoul: Seoul National University.

Zimo, T., 2023. *South African Localisation Policies Consistency With the Basic Principles of WTO Law*, Johannesburg: University of Witwatersrand.