UNIVERSITY OF KWAZULU-NATAL

A GROWTH ANALYSIS OF THE SOUTH AFRICAN REVEALED COMPARATIVE ADVANTAGE EXPORTS WITHIN THE BRICS ECONOMIES

By

Student Name: Nobantu Madikizela

Student Number: 200273060

A dissertation submitted in partial fulfilment of the requirements for the degree of Master of Business Administration

Graduate School of Business & Leadership

College of Law and Management Studies

Supervisor: Dr Rosemary Sibanda

Year of submission: 2018

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

College of Law and Management Studies

Supervisors Permission to Submit Thesis/ Dissertation for Examination

Name: Nobantu Madikizela	No: 200273060		
Title: A Growth Analysis of the South African Revealed Comparative Advantage Exports Within the Brics Economies			
Qualification: MBA	School: Graduate School of Business & Leadership		
		Yes	No
To the best of my knowledge, the thesis/dissertation is primarily the student's own work and the student has acknowledged all reference sources		✓	
The English language is of a suitable standard for examination without going for professional editing.		✓	
Turnitin Report %		8%	
Comment if % is over 10%:			
I agree to the submission of this thesis/dissertation for examination		✓	
Supervisors Name: Dr Rosemary Sibanda			
Supervisors Signature: [redacted]			
Date: 10 January 2019			
Co- Supervisors Name: N/A			
Co- Supervisors Signature: N/A			
Date: N/A			

Declaration

DECLARATION

I Nobantu Madikizela declare that:

- The research reported in this thesis, except where otherwise indicated, is my original work.
- This thesis has not been submitted for any degree or examination at any other university.
- This thesis does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.
- This thesis does not contain other persons' writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then:

  a) their words have been re-written but the general information attributed to them has been referenced;

  b) where their exact words have been used, their writing has been placed inside quotation marks, and referenced.

  c) Where I have reproduced a publication of which I am author, co-author or editor, I have indicated in detail which part of the publication was actually written by myself alone and have fully referenced such publications.

  d) This thesis does not contain text, graphics or tables copied and pasted from the Internet, unless specifically acknowledged, and the source being detailed in the thesis and in the References sections.

Signed: 

Acknowledgements

I wish to express my sincere appreciation and gratitude to the following individuals, without whose assistance, this study would not have been possible:

- My family – Mrs Jabu Madikizela, Mr Sakhile Madikizela, Mr Mfundo Madikizela; for the support and motivation. Thank you for your love, support and motivation that gave me the strength to see this goal to completion.

- My Sister – Miss Thandazile Madikizela, for her dedication and going the extra mile to assist me with compassion. Thank you for your love and unwavering support during this period.

- My supervisor – Dr Rosemary Sibanda, for relentless support and understanding throughout my difficult time. Thank you for your professional and very valuable guidance.

Abstract

There is much debate about the long-term benefit of South Africa's membership to the BRICS partnership. Generally, there has been a perception that all the other BRICS partner countries are growing to the detriment of the South African economy. The purpose of this research was to analyse the performance of 20 product categories with a high revealed comparative advantage for South Africa within the BRICS bloc, to determine if these product categories have experienced growth in the period of 2012 to 2016. The population for this research comprised of the 37 product categories with a revealed comparative advantage for South Africa within the BRICS bloc in 2012, that the country could potentially export in greater quantities, or for the first time, to other BRICS markets. A quantitative approach was adopted for this study. Non-probability convenience sampling was used to select a sample comprised of all the 20 product categories that had a revealed comparative advantage which was much higher than that of the leading import sources in the BRICS bloc for South Africa in 2012.

To understand the impact of trade volumes on the trade values and therefore assess growth, the ordinary least squares regression method was applied on the time series data of the export categories. The study found a strong positive relationship between the flows of trade volumes and the strength of trade. The aim of this study was to analyse the level of growth for the identified exports during the specified period of 2012 to 2016 and the findings revealed that eight of the categories had experienced significant growth in trade during the period under review, while eleven experienced a decline in trade during the same period. One category of the exports did not experience any trade for the period, and thus remained unchanged. The findings further indicated that at country level trade was significantly higher for South Africa with China than the other BRICS partners. In conclusion, the product categories with a high revealed comparative advantage for South Africa within the BRICS bloc experienced significant growth in trade values and trade volumes between 2012 and 2016 implying a benefit to South Africa in joining the BRICS bloc. It is recommended that deeper diplomatic engagement by the South African government be embarked on with the BRICS partners to create further access to markets for South African exporters.

Key words: Revealed comparative advantage, international trade theory, trade agreements, BRICS

Table of Contents

List of Figures

List of Tables

Abbreviations

ROW	Rest of the World
N.e.s	Not elsewhere specified
IDC	Industrial Development Corporation
RCA	Revealed Comparative Advantage
WTO	World Trade Organisation
IMF	International Monetary Fund
BRICS	Brazil, Russia, India, China, South Africa
BRIC	Brazil, Russia, India, China
GDP	Gross Domestic Product
G20	Group of 20
FDI	Foreign Direct Investment

1. Chapter 1: Introduction

1.1. Introduction

There is much debate about the long-term benefit of South Africa's membership to the BRICS partnership. Generally, there has been a perception that all the other BRICS partner countries are growing to the detriment of the South African economy. The purpose of this research was to analyse the performance of 20 product categories with a high RCA for South Africa to the BRICS bloc to determine if these product categories had experienced growth between 2012 and 2016. This chapter provides a broad overview of the research problem and objectives. The background of the BRICS economies, justification for the research, possible contributions to literature that the research aimed to provide and methodology that was used to conduct the research are outlined. Finally, the chapter discusses delimitations of the research, and provides a brief outline of the following chapters as contained in this research paper.

1.2. Background of the study

1.2.1. BRICS Overview

As a developing country, one of South Africa's major economic goals is to reduce the unemployment rate which has remained stubbornly high, above the 20% mark, for decades. To stimulate growth in the domestic economy, one of the strategic levers that the government employs is the encouragement of exports through targeted and increased trade with global markets by taking advantage of trade agreements. The World Trade Organisation (WTO) broadly defines two types of trade agreements, namely regional trade agreements and preferential trade agreements (World Trade Organisation, 2018). Regional trade agreements comprise of trade agreements between countries considered to be peers, while preferential trade agreements comprise of all trade agreements, including free trade agreements with countries where one country is provided special treatment over other countries and enjoys some sort of exclusive arrangement (World Trade Organisation, 2018) in the engagement of trade. Trade agreements are theoretically aimed at facilitating trade, thereby making it easier and cheaper to do business between different countries or different geographical zones, as well as reducing barriers that would otherwise impede on trade.

Within the context of trade agreements and trading zones, South Africa enjoys membership to the exclusive BRICS economic bloc. BRICS is an economic and political cooperation as well as a trading zone formed by Brazil, Russia, India, China and South Africa. The BRICS economies are all significantly influential and are characterised to be leading developing economies both globally and in their respective regions (IDC, 2014). All five BRICS economies are part of the Group of 20 (G20) member countries. The G20 is an informal group of 19 countries and the European Union, with representatives of the International Monetary Fund and the World Bank, that have a mandate to broaden the dialogue on key economic and financial policy issues among systemically significant economies plus to promote cooperation to achieve stable and sustainable world growth that benefits all (Kirton, 1999). This attests to the BRICS's global influence, as the G20 is an important forum in the global economic agenda. Being part of this forum means that the BRICS are part of key decision-making for the world economies. There is deep cooperation between the BRICS nations providing for peer to peer flow of information, funds and skills (Roland, 2013). Providing a new world order – bilateral relations among BRICS nations are carried out on the basis of non-interference, equality, and mutual benefit (Roland, 2013). Given their significance, it has largely been forecasted that by 2020, the BRICS countries would be responsible for nearly half of all global gross domestic product (GDP) growth contribution (South African Government, 2016).

1.2.2. South African exports opportunities in the BRICS bloc

According to the Industrial Development Corporation (IDC), in 2014 the external trade (being exports and imports) of the BRICS economies accounted for 17% of the world total trade. Combined foreign direct investment (FDI) inflows in the BRICS economies were at an estimated USD322 billion in 2013 (IDC, 2014). Foreign direct investment is direct investment made by a foreign entity to acquire a controlling stake in a local entity (UNCTAD, 2016). Although China was unsurprisingly the leading foreign direct investment recipient in the same period amongst the BRICS economies, South Africa did record the highest rate of growth in foreign direct investment inflows during the same period (IDC, 2014).

Analyses undertaken by the Industrial Development Corporation (IDC) indicated that there was significant potential for the further development of South Africa's export trade with other BRICS countries (IDC, 2014). As part of that analysis a study examining goods produced in South Africa with a potential for growth due to their revealed comparative advantage (RCA)

was conducted using data of up to 2012. The RCA indicates whether a country is in the process of extending the products in which it has a trade potential, as opposed to situations in which the number of products that can be competitively exported is static (World Bank, 2016). The findings indicated that out of the 37 product categories that South Africa could potentially export in greater quantities or for the first time to other BRICS markets, the country had a high RCA in 20 instances compared to the leading sources of imports into BRICS economies (IDC, 2014). This means that for these twenty product categories, South Africa was already fully geared to increase export capacity upon an increase in the demand of those products from other BRICS nations.

1.3. Problem statement and justification to the study

The general perception is that most of the trade between South Africa and its BRICS partners is not being used to South Africa's full advantage, not least to the point where the South Africa can create and sustain jobs and grow the export sector (Gauteng Provincial Treasury Bulletin, 2013). Critics warn that the BRIC(S) may be developing at the expense of South Africa (Mazenda, 2016). This research therefore aimed to assess and determine if there was growth in the exporting of these 20 product categories in South Africa. Exports traditionally experience challenges due to setbacks such as language barriers and direct market penetration into foreign markets. As a bilateral trade agreement partner, South Africa should in theory have reduced barriers to market entry due to existing bilateral cooperation. This means that as a BRICS partner, South Africa should not be experiencing difficulties in finding buyers in other BRICS countries.

Current studies have addressed the general trade dynamics such as the BRICS trade policies, sectoral analyses and the deepening cooperation of the BRICS economies. The collective BRICS export share of world trade with the rest of the world economies is also well documented; as is the dominance of China as a trade partner with all the other nations in the bloc. There is a lack of studies focused on the South African engagements with the BRICS, as well as the empirical impact of the BRICS cooperation on the South African economy to date.

The results of this study may be resourceful to policy makers and businesses aiming to improve export revenue and market share. The results may also be important to policy makers and

regulators in their endeavours to promote export trade with the primary goal to grow the economy through the BRICS cooperation and improve employment levels as a result.

1.4. Statement of purpose

The purpose of this quantitative research was to analyse the performance of 20 product categories with a high RCA for South Africa to the BRICS bloc to determine if these product categories had experienced growth since 2012. The dependent variable was the position of trade in value, while the independent variable was the share of trade in volume. In other words, the position of trade in value for South African exports in the BRICS bloc was determined by the share of South African exports in volume within the bloc. A change in the position of trade, given a change in the share of trade indicated whether South African organisations had indeed been benefiting from the trade agreement or whether these opportunities had not been adopted.

1.5. Research objectives

The objective of this quantitative research was to analyse the growth trend of 20 export good categories that were identified to have a high revealed comparative advantage for South Africa within the BRICS bloc in the year 2012.

The sub-objectives of this quantitative research were:

1. To analyse if the position of trade in value for the South African export products with a high RCA changed between 2012 and 2016
2. To assess if the position of trade for the South African export products with a high RCA changed significantly between 2012 and 2016
3. To analyse if the South African export products with a high RCA changed in terms of volume between 2012 and 2016
4. To analyse if there is a significant change in volume in South African export products with a revealed comparative advantage between 2012 and 2016.

1.6. Research questions and hypotheses

The research questions and hypotheses are stated below:

1. What was the trade position in value of South African revealed comparative exports with other BRICS nations from 2012 to 2016?
2. Was there a significant change in the trade position of South African revealed comparative advantage exports within BRICS from 2012 to 2016?
3. What were the export volumes of South African revealed comparative advantage exports within the BRICS trade bloc from 2012 to 2016?
4. Was there a significant change to the volume of South African revealed comparative advantage exports to other BRICS nations from 2012 to 2016?

Given the above research questions, the following hypotheses could be tested:

H0: There was no change in the trade position of South African exports within BRICS from 2012 to 2016

H1: There was a change in the trade position of South African exports within BRICS between 2012 and 2016

And,

H3: The South African volume of exports to other BRICS nations did not change from 2012 to 2016

H4: The South African volume of exports to other BRICS nations changed between 2012 and 2016

1.7. Theoretical framework

A theoretical framework integrates a researcher's logical beliefs regarding how and why variables are related with published research, assisting the researcher to form the basis for investigating the research problem (Sekaran and Bougie, 2016). The framework that was used

in this research is the framework adopted from Creswell (2014) which aims to explain the interconnection between the research paradigm, research design and the research methods.

According to Creswell (2014), researchers may state a theory in many ways including hypotheses, if-then statements or visual models. For this research the theory was in the form of hypotheses. The dependent variable was the position of trade, while the independent variable was the share of trade. In other words, the position of trade for South African exports in the BRICS bloc could be determined by the share of South African exports within the bloc. The hypotheses tested if there had been a significant change in the position of trade for South African exports since 2012 on the goods that were identified to be potential focus areas for South Africa. A change in the position of trade, given a change in the share of trade signified that South African organisations had indeed been benefiting from the trade agreement or whether these opportunities had not been adopted.

1.8. Possible contribution of the study

The significance of this study will be that it will make an immense contribution to the development of the South African export industry. This will be achieved through identifying the current position of export trade with other BRICS partners, and then understanding the key gaps that can be further explored to improve the current standing of South African exports. This will also explore those elements that South African businesses may use to become more competitive in the global markets; and factors that the South African policy makers might consider to turn the situation around. As such then, the outcomes of this research are an understanding of the extent to which South Africa has taken advantage of new or expansion export opportunities in the areas of its bloc partners. The results of the study clarify if South Africa is benefitting from being a member country of the BRICS bloc, and if there is more that South Africa can do as a country to improve its position in the bloc trade dynamic and in global terms.

The knowledge gathered from this research adds to the available knowledge regarding the performance of South African exports, as well as assist business owners exploit markets that may enhance revenues to their businesses. The academic fraternity may use the results to enable possible forecasts in the future regarding the relationship between the variables as well as the performance of the country in the future, given current economic dynamics. The South African

government policy makers can gain insights into the extent of trade that is directly attributed to the exports in question, further analyses that can identify the increase in number or percentage increase in direct employment, be it permanent or temporary will be possible.

1.9. Delimitations of the study

This study was focused on the export market of South Africa, in particular with its BRICS partners. Anything outside BRICS economies and exports did not form part of the study. Any trade data outside the defined timespan of 2012 to 2016 is not considered. In the context of this research, it was therefore delimited by time and activity, definition and context.

Limitations of the study:

This study aimed to contribute to the growth and development of exports in South Africa. By limiting the data to the product categories where there is a distinct revealed competitive advantage, efforts were deliberately focused on product categories where South African exporters need not improve capability, invest in additional resources or even increase innovation to increase their production capacity because they are already more efficient than the BRIC(S)'s source economies at producing those products.

1.10. Layout of the study

The study is presented in five chapters as detailed in the following sections:

Chapter 1 – Introduction

Chapter 1 outlines the research by introducing the study. The chapter includes the background to the research, the objectives, research questions, aims, significance and the overall structure of the research.

Chapter Two – Literature Review

Chapter 2 presents the review of literature. The review is organised into the literature review of the studies that are currently relevant to the topic. The topics pertain to international trade

theory, the formation of the BRICS and the world order, the new world order that the BRICS present in modern day, the performance of intra-Brics trade as well as specific studies relating to South African exports.

Chapter Three – Research Methodology

Chapter 3 presents the research methodology. The research methodology section highlights the theoretical foundation of the research, as well as the tools, collection methods and the analysis methodology followed.

Chapter Four – Research Findings

Chapter 4 presents the findings of the research analysis. Each category is individually analysed for growth in terms of value and volumes between 2012 and 2016. The results are then tested for statistical significance through the hypotheses, and the relationship between the variables is discussed.

Chapter Five – Discussion, Conclusions and Recommendations

Chapter 5 presents a discussion of the findings from Chapter 4. The findings are discussed relative to the current literature available on the subject, and are organised per BRICS partner and finally as a group. The findings of the literature review and primary data are then briefly summarised. Finally, the research conclusion, recommendations and areas of further study are highlighted.

1.11. Chapter summary

This chapter provided a broad overview of the BRICS bloc and South Africa in context of the research problem, as well as the details of the research aims and objectives. The research statements were further broken down into research questions and hypotheses that provide the basis for the statistical significance testing. Possible benefits to the broader economic and academic communities were highlighted. A brief outline of the methodology employed, plus

the theoretical framework were then discussed. Finally, the delimitations of the research were briefly outlined. The following chapter presents the literature related to the study.

2. Chapter 2: Literature Review

2.1. Introduction

This chapter provides a review regarding the existing literature on the subject of the BRICS economic bloc and the relationship between the BRICS bloc and the South African economy on various economic factors. The review starts with a general overview and brief history of the BRICS bloc formation and the contribution these countries have made to global economics, governance, multipolarity and their influence thereof. The next section reviews the existing literature on the traditional comparative advantage theories of trade plus the new non-comparative advantage theories of trade. The following section focuses on the review of empirical studies on the theories of economic growth. Thereafter the literature on the factors influencing economic growth as evidenced in practice, followed by a review on South Africa's trade relations and performance within the BRICS bloc is discussed. The final section briefly examines the dominant methodologies in studies conducted, plus the gaps in literature are then highlighted to provide a basis for future research.

2.2. The BRICS overview and the BRICS contribution to the new world order

This section discusses the history of South Africa in joining the BRICS bloc and the impact of the BRICS on global economics and politics. The section is presented as follows: firstly, an overview of the BRICS and a review of the literature around South Africa's membership in the BRICS bloc are discussed; then the review briefly highlights the various substantive contributions the BRICS economies have made to global politics.

2.2.1. An overview of the BRICS and South Africa in the BRICS

It is well documented that the term "BRIC" was coined in the paper written in 2001 by former Goldman Sachs economist Jim O'Neil, titled "Building Better Global Economic BRICs". The paper analysed and forecasted the emergence of Brazil, India, China and Russia (BRIC) as the next economic powerhouses, expected to grow and overtake most

developed economies to become part of the six largest economies in the world by 2050 (O'Neill, 2001).

South Africa officially joined the BRICS bloc of emerging economies in December 2010 in alignment with the South African government's foreign policy to strengthen South-South relations (South African Government, 2016). South-South cooperation is a broad framework for collaboration among developing countries in the political, economic, social, cultural, environmental and technical domains to meet their development goals through concerted efforts (UNOSSC, 2016). The first official BRICS forum was held in 2011 with the objective of encouraging commercial, political and cultural cooperation amongst the BRICS member countries (Industrial Development Corporation, 2014). Prior to this forum, there were BRIC forums which South Africa was not a part of.

The BRICS countries were deemed to have a lot in common in terms of population, GDP and unemployment (Gauteng Provincial Treasury Bulletin, 2013). Lumumba-Kasongo (2015) states that the BRICS economies are similar in their country composition characteristics in that a large portion of their population is politically disabled; meaning they are poor, unemployed and cannot participate meaningfully in the political process of the country. South Africa was invited to join the economic bloc as the then biggest economy in Africa and the then preferred gateway to the rest of the continent (Gauteng Provincial Treasury Bulletin, 2013). In joining the BRICS, South Africa not only represented the resource-rich African continent on BRICS, but at the same time had the potential to gain much from its membership (IDC, 2014). South Africa was expected to progressively reap the benefits of its economic and political relationships with fellow BRICS countries, especially if the BRICS counterparts increasingly opened up their economies, while domestically South Africa addressed the structural problems that constrain competitiveness, including improvements in productivity, infrastructure logistics, as well as skills development (IDC, 2014).

According to the Gauteng Provincial Treasury Bulletin of March 2013, there was much debate about the suitability of South Africa being part of the BRICS economic bloc due to its size – in terms of its economy, population and even GDP; because at the time of joining, South Africa was a much smaller economy than any of the other BRIC countries, and still is. This gave the impression that South Africa was invited to join the bloc for political reasons rather than economic reasons (Gauteng Provincial Treasury Bulletin, 2013).

In joining the BRICS, South Africa viewed the move as a step closer to re-integrating with the world in international affairs and relations after the long isolation experienced prior to 1994 (President Jacob Zuma, 2013). Through various bilateral agreements with other African nations, South Africa maintained its commitment to the consolidation of the African agenda and aimed to use its BRICS membership to increase strategic co-operation among emerging market economies of the South in support of this African agenda (South African Government, 2016). As a direct result of joining the BRICS, South Africa has enjoyed support for issues affecting Africa such as peace, security and development issues (President Jacob Zuma, 2013).

2.2.2. The influence of the BRICS economies on global governance

The BRICS have been able to demand a stronger political voice in international governance structures corresponding to their economic status (Singh, 2016). Onyekwena, Taiwo and Unenze (2014), discuss the emergence of the BRICS as an alternative world order in terms of global governance and global affairs. There is general consensus that as a collective, they have increased multipolarity in international relations, challenging the bias of Western leadership in global affairs and thus creating a shift of power away from the North (Onyekwena, Taiwo and Unenze, 2014). In international relations, multipolarity is a concept broadly defined as the balance of power amongst four or more countries that possess an almost equal amount of regional or world influence regarding military, culture and economics (Özsu 2013). This perspective implies the co-existence of several, but equally respected spaces of power with similar value systems (Lumumba-Kasongo, 2015). It is based on the laws of ecology and promotes social development (Lumumba-Kasongo, 2015). A multipolar approach underlines the decentralisation of world resources and their better management, as well as their fair distribution (Lumumba-Kasongo, 2015).

Prior to the 2008 era, global governance was the domain of the North, with profound influence on the Bretton Woods institutions such as the World Bank, UN, IMF (Onyekwena, Taiwo & Unenze, 2014). Countries of the South were largely excluded from global leadership and the conduct of global affairs (Onyekwena, Taiwo and Unenze, 2014). Attesting to the recognition of its contribution in global affairs, South Africa was invited to be a non-permanent member of the United Nations Security Council (Mhaka and Jeke, 2018).

Lumumba-Kasongo (2015), states that the BRICS present a new global political paradigm that articulates that the Western policies based on capitalism are exploitative and are a directly responsible for the global meltdown experienced in 2008. The failure of global politics in that era and the subsequent devastating social and environmental effects were thought to be the result of failed old Western ways of conducting business (Lumumba-Kasongo, 2015). As members of the G20, the South African government and its BRICS counterparts had the privileged position to work with other leading economies in crafting and articulating a co-ordinated response to the global financial crisis (Mhaka and Jeke, 2018). Lumumba-Kasongo (2015) also asserts that going forward, along with the European Union and the United States, the BRICS are projected to become great powers of the world.

The BRICS countries are increasingly recognised as championing the change in the international development co-operation architecture (Singh, 2016). In addition, the BRICS have increasingly gained importance as donors in the international financial architecture (Singh, 2016). Rolland (2013) states that there have been significant substantive and institutional contributions made by the BRICS to economic law, such as enhanced capacity at the WTO, increased participation in investment treaties, and decreased dependence on foreign aid. In addition to being recipients of foreign direct investment, the BRICS have become strong providers of foreign direct investment (Rolland, 2013). China and Brazil are actively involved in providing foreign aid, and now provide more aid than they receive (Rolland, 2013). Rolland (2013) also asserts that in some instances, these countries provide aid without policy conditionality (Rolland, 2013). Those terms are clearly more attractive than aid that carries extensive liberalisation and fiscal discipline conditions imposed by the West (Rolland, 2013). The BRICS view this strategy as a key part of the non-interference principle of engagement (Rolland, 2013). The BRICS primarily focus on the micro-sustainability of individual projects, while traditional donors tend to focus on long-run macroeconomic impacts (Rolland, 2013). Testament to proactively taking charge of their fate, the BRICS launched the New Development Bank; and created a contingency Reserve Arrangement (Singh, 2016) which continue to provide relief to other developing nations particularly in Africa.

The BRICS have also been taking their governance role seriously, continually committing to the course of anti-corruption in their member states, as well as taking active steps to deal with the issue of anti-corruption, including formulating a working group and having regular meetings, as well as re-iterating their full commitment during each annual summit. Because

of the global prominence now afforded to the BRICS bloc, in particular regarding issues of governance, corruption and anti-corruption, actions and activities from the bloc are also increasingly under the microscope (Kurakin and Sukharenko, 2018), as critics monitor their performance and anticipate their next movements. The group is making considerable progress in their endeavours to fight corruption and to this end, South Africa has been ranked the highest in the group according to the Transparency International Corruption Perceptions Index (Kurakin and Sukharenko, 2018). Other countries such as China and India follow closely to South Africa on their rankings (Kurakin and Sukharenko, 2018). To date though, Brazil and Russia are currently lowly ranked on the index (Kurakin and Sukharenko, 2018).

In conclusion, undisputed evidence can be found in literature as to the development of the BRICS, and the important role the BRICS have played in instituting inclusive structures of governance, decentralisation of power for the benefit of all, and championing structures of financial independence, while growing aid and co-operation with other developing countries of the world. From the literature reviewed, it appeared that the core of the BRICS intention is centred around equitable human development for all.

2.3. General theory on international trade and its practical applications on economic growth

This section provides a review of the literature on the theory of international trade, as it forms the theoretical basis for this research. This section is organised as follows: a review of traditional trade theories, plus are review of the new trade theories relevant to this research are presented. Finally, a brief review of the empirical studies that have been conducted utilising both traditional and new trade theories to evaluate the practicality, reliability and applicability of these theories in practice; is presented.

2.3.1. Comparative advantage theories of trade in goods (traditional theories)

The earliest theory that is identified in comparative advantage is the mercantilist theory of trade (Mhaka and Jeke, 2018). The mercantilist theory of trade asserted that wealth in a country was reflected by the amount of national wealth held in precious metals, traditionally in silver and gold coins (Mhaka and Jeke, 2018). This theory believed that the wealth of one nation had to be at the detriment of its trading partner (Mhaka and Jeke, 2018). Mercantilists believed that trade was a zero-sum game, meaning that gains by one country could be attributed to losses in its trading partner at the matching value (Mhaka and Jeke, 2018). Mhaka and Jeke (2018), explain that in those days, European emerging nations then focused on the acquisition of precious metals to increase wealth and well-being. Elements such as a strong army, strong navy and marine, plus a productive economy became critical in order to maintain and increase state power (Mhaka and Jeke, 2018). The conclusion Mhaka and Jeke (2018), drew is that the mercantilist theory of trade encouraged rich nations to use their power to benefit at the expense of poorer nations. The process was not mutually beneficial (Mhaka and Jeke, 2018). Mercantilists viewed the world as containing a finite amount of wealth, and that in order to increase a nation's wealth, a country had to take some wealth from another country and maintain a higher export to import ratio, in order to receive excess gold (Mhaka and Jeke, 2018).

Amongst the critics of the mercantilism theory were David Hume and Adam Smith (Mhaka and Jeke, 2018). David Hume developed the price species flow mechanism that challenged the mercantilism theory of trade surplus (Mhaka and Jeke, 2018). David Hume argued that the accumulation of gold through a trade surplus would ultimately lead to an increase in prices and wages, which would subsequently reduce the wealthy country's competitiveness (Mhaka and Jeke, 2018). According to Hume, a country would not be able to maintain a trade surplus indefinitely, since this surplus would lead to increases in money supply, in turn increasing domestic prices and lowering exports (Mhaka and Jeke, 2018). This would ultimately lead to an increase in imports in the long-run (Mhaka and Jeke, 2018). Hume's theory is an important one in trade economics, as it shows automatic price adjustment of the trade disequilibrium within a country (Mhaka and Jeke, 2018). This theory shows that economic forces automatically work to remove a surplus or deficit in a nation, ultimately leading to a zero-trade balance (Mhaka and Jeke, 2018).

Adam Smith stated that the productive capacity of a nation reflected its wealth, and therefore trade was a positive-sum game (Mhaka and Jeke, 2018). A positive-sum game means that both countries engaged in trade benefit from their trading activities (Mhaka and

Jeke, 2018). According to Smith each country had to specialise and export only those commodities where it had an absolute advantage; and then import commodities where its trading partner had an absolute advantage (Mhaka and Jeke, 2018). This way both nations gained in trade. According to Smith's theory, each country had to export the goods that it produced much more efficiently than the other country, because it would be cheaper for it produce that good, since the absolute labour requirement would be less per unit produced (Mhaka and Jeke, 2018). This theory asserted that trade should be based on the endowment of a country's natural resources, the more abundant the resources the more advantage that country possessed, and this determined a country's absolute advantages (Mhaka and Jeke, 2018). Adam Smith's theory was able to show the flow of trade in goods from one country to the other (Mhaka and Jeke, 2018). Adam Smith's theory was based on the trade of two goods between two countries. This theory also stated that in the case where one country had an absolute advantage in both goods, there would be no gains to be accumulated by the trading partner country, and therefore no mutually beneficial trade (Mhaka and Jeke, 2018). This meant that there would be no basis for trade in such a case (Mhaka and Jeke, 2018).

Another theory of comparative advantage is the Ricardian theory of comparative advantages, and it challenged the idea that there would be no basis for trade if one country had the absolute advantage in the production of both goods (Mhaka and Jeke, 2018). This theory stated that even if one country possessed the absolute advantage in the production of both goods, there would still be a basis for trade if there was a degree of relative efficiency across goods (Mhaka and Jeke, 2018) between the countries and thus a comparative advantage for the other country. A comparative advantage occurs when the relative labour requirements differ between two countries, in theory this means that the internal opportunity cost of producing the goods is different for the two countries before trade even begins, and using this advantage both countries may gain from trade (Mhaka and Jeke, 2018). Ricardian comparative advantage theory closed the gaps in Adam Smith's theory, demonstrating that if a country is relatively more efficient in the production of a good than its trading partner, there is still a basis for trade and gains to be benefitted from the trade (Mhaka and Jeke, 2018). This theory was able to demonstrate the flows of goods between two countries based on comparative advantages, and it also demonstrated that trade is mutually beneficial to all parties engaging in trade (Mhaka and Jeke, 2018). The importance of this theory in trade economics has been demonstrated by the extensive usage of the principles of this theory in practice to date (Mhaka and Jeke, 2018).

The other theory of trade is the Heckscher-Ohlin theory, which supports the Ricardian theory of comparative advantage (Mhaka and Jeke, 2018). The Heckscher-Ohlin theory states that the relative factor intensities across different goods are not equal, but the differences in these factor intensities are the same across different countries for each good (Mhaka and Jeke, 2018). This according to the theory implies that there are pre-trade price differences which then enable beneficial trade among trade partners (Mhaka and Jeke, 2018). The Heckscher-Ohlin theory suggests that the country with more capital will be able to produce more efficiently the relatively more capital-intensive goods, while the country with more labour will be able to produce more efficiently the relatively more labour-intensive goods (Mhaka and Jeke, 2018). In this regard, the theory asserts that a country will export the good that uses its abundant factor of production relatively intensively, and then import the good that uses its scarce factor of production relatively intensively (Mhaka and Jeke, 2018). This theory states that countries trade as a result of the differences in factor abundance and the intensities of the factors of the goods they produce (Mhaka and Jeke, 2018). These differences are the determinants of a country's comparative advantage (Mhaka and Jeke, 2018).

2.3.2. Non-comparative advantage theories of trade (new trade theories)

New trade theories differ from traditional trade theories which assumed perfect competition with constant returns to scale and a homogenous product (Mhaka and Jeke, 2018). These theories assert that the trade between countries is a result of scale economies, imperfect competition and trade differentiation not comparative advantages (Mhaka and Jeke, 2018). There are various new trade theories in literature, for the purposes of this research four are highlighted below due to their relevance. These are the intra-industry trade theory, the Krugman model, the Linder theory and the gravity model of trade.

Intra-industry trade theory states that intra-industry specialisation in each country enables the importation of some goods even in industries where the country is a net exporter, and by the same token a country will export some goods even in industries where it is a net importer due to intra-industry specialisation (Mhaka and Jeke, 2018). This means that intra-industry trade will exist between two countries due to product differentiation (Mhaka and Jeke, 2018).

The other theory is the Krugman theoretical model, which rests on economies of scale and monopolistic competition (Mhaka and Jeke, 2018). In this theoretic model, labour is assumed to be the only factor of production and economies of scale are a factor of the amount of labour required given a firm's production output (Mhaka and Jeke, 2018). This model is useful in explaining the basis of trade under monopolistic competition, where countries have economies of scale (Mhaka and Jeke, 2018).

Another trade theory is the Linder theory, which is applicable to manufactured goods (Mhaka and Jeke, 2018). This theory states that international trade in manufactured goods is more trade intensive between countries that have similar per capita levels of income, and less trade intensive between countries with dissimilar per capita levels of income (Mhaka and Jeke, 2018). In this theory in order for trade to occur, there must be an overlapping demand for goods (Mhaka and Jeke, 2018). Linder's theory of trade is important in trade economics as it explains the composition of a country's trade basket as well as the pattern of trade with its trade partners (Mhaka and Jeke, 2018). It therefore has implications for the type of countries that are most likely to trade with each other (Mhaka and Jeke, 2018).

The last theory of trade under review is the gravity model of trade, which is founded on the principles of Newton's Law in physics that states that the gravity between two objects correlates with the mass of the objects and the distance between them (Mhaka and Jeke, 2018). In economics, the gravity model is applied to international trade flows, and predicts bilateral trade flows between two countries based on the sizes of two economies and the distance between them; assuming that there are no trade barriers (Mhaka and Jeke, 2018). This is one of the more prominent theories applied in literature in the evaluation of factors affecting trade.

2.3.3. Empirical studies regarding the application of the theories of international trade on economic growth

Empirically, neoclassical trade theory explains international trade on the basis of comparative advantages (Costinot, 2009). Neoclassical trade theory uses comparative advantage to determine the direction and pattern of trade between two countries (Yenokyan, Seater and Arabshahi, 2014). In empirical studies, comparative advantage is mainly driven by technology or factor endowment (Costinot, 2009). Using a modified Ricardian model of trade, in which factors of production are produced as opposed to endowed; Yenokyan,

Seater and Arabshahi (2014) were able to show that trade can raise growth through comparative advantage. In addition, Costinot (2009) found that factor productivity and factor supply could be utilised to predict patterns of specialisation in a multifactor generalisation of the Ricardian model of neoclassical trade, by using the techniques of the mathematics of complementarity. These results offered insights into the joint effects of technology and factor endowments on specialisation (Costinot, 2009).

According to Yenokyan, Seater and Arabshahi (2014) the literature surrounding the debate as to whether or not international trade promotes economic growth suggests that through international trade, economic growth is indeed promoted in two ways; through an aggregate scale effect and technology transfer. The aggregate scale effect promotes trade by opening new markets for firms that then enable the firms to increase production capacity and hence sales (Yenokyan, Seater and Arabshahi, 2014). The technology transfer factor increases trade because it facilitates knowledge spill-overs when communication channels develop between domestic firms and their partners in the new markets (Yenokyan, Seater and Arabshahi, 2014). By increasing market size, trade enables the firms to increase activities that increase economic growth as profitability rises at firm level (Yenokyan, Seater and Arabshahi, 2014).

In their report, they purport that economists have generally been able to use the endogenous growth theory as a proper framework in which to analyse the economic growth effects of trade (Yenokyan, Seater and Arabshahi, 2014). The general two-sector model describes the growth part of the model, in which there are two goods produced in two sectors and both goods can be used as factors of production, necessary for production in both sectors (Yenokyan, Seater and Arabshahi, 2014). According to Yenokyan, Seater and Arabshahi (2014); allowing the factors of production to be traded generates growth effects of trade. The results of their study were that in general trade does generally increase the growth rate of an economy, while trade in itself need not increase a country's growth rate or lead to spill-over effects (Yenokyan, Seater and Arabshahi, 2014). This is dependent on the type of good that the country imports, with an increase in factors of production importing leading to an increased level of economic growth (Yenokyan, Seater and Arabshahi, 2014).

There has also been research on heterogenous firms that emphasises the relative growth of high-productivity industries, but these do not take into account the effects of comparative advantage because they consider only a single factor or industry (Bernard, Redding, Schott,

2007). “Neoclassical trade theory, with its focus on comparative advantages, stresses the reallocation of resources across industries and as well as changes in relative factor rewards but provides no role for firm dynamics” (Bernard, Redding, Schott, 2007). As countries liberalise and engage in international trade, the reallocation of resources is the main concern of neoclassical economic theory of comparative advantages (Bernard, Redding, Schott, 2007). Traditional neoclassical theory does not take into account the role of a firm in the reallocation, but rather that of the trading nation and industries (Bernard, Redding, Schott, 2007). Bernard, Redding and Schott (2007), modified the neoclassical model to include the heterogeneous firm as trade costs fall; they found evidence that with the inclusion of the heterogeneous firm to the model, trade generates aggregate welfare gains as well as distribution of income in the economy.

2.3.4. The concept of revealed comparative advantage

Revealed comparative advantage is an index applied to measure the relative ability of a country to produce goods in relation to its trading partners (French, 2014). Based on the Ricardian comparative advantage theory of trade, the index works on the principle that if differences in relative productivity are used to determine patterns of trade, then patterns of trade can be used to draw conclusions and make predictions regarding the differences in relative productivity (French, 2014). Revealed comparative advantage is applied to the relative trade performances of individual countries in individual commodities (Abdoulkarim, 2014). The revealed comparative advantage index therefore is applicable in the quantification of commodity specific comparative advantage as well as in displaying changes in competitive advantage and trade patterns of commodities (Abdoulkarim, 2014). Since this application is at an individual country level for specific commodities, then the revealed comparative advantage can be used to assess and make inferences regarding a country’s export potential (Chaudhary, 2016). This was the index that was used to determine South Africa’s export potential within the BRICS bloc, to identify the individual classes of goods that South Africa needed to focus on in terms of export growth (IDC, 2014).

In conclusion, the literature reveals two schools of thought when it comes to international trade theory. The first is the traditional neoclassical theories of trade which are based on absolute or comparative advantages in their explanation of trade between two countries, and naturally assume conditions of perfect competition. Secondly, the new theories of trade are based upon imperfect competition (including monopolistic competition), differentiation of scale economies, specialisation and product differentiation. These are conditions more realistically prevailing in current economic times, but the empirical studies prove that all the theories provide a sufficient base for economic modelling and prediction of bilateral trade flows depending on the choice of the researcher and the purposes of the study.

The fundamentals of the theory are kept intact, but economists modify the models and define the underlying variables (that define the endowments) to suit the purposes or the context of their studies. The theories, both the traditional neoclassical theories and the new theories of trade are not necessarily applied in their pure theoretical form, in order for the studies to make sense in practice. This may be due to the fact that the theories were developed in a different economic era, and are now being applied in current economic times which present new factors and variables of influence.

2.4. A review of empirical factors affecting trade

This section provides a practical review of the existing literature on some of the variables that affects economic growth. There are five areas that have been identified for the purposes of this research to have an impact on the development of an economy and an increase in economic growth. This section therefore examines empirical evidence in literature to review the effects of the reduction in trade costs, increased regional trade agreements, increased trade openness, foreign direct investment and export diversification on economic growth.

2.4.1. The effects of a reduction in trade costs on economic growth

International trade has long been understood to have an imperative role in reducing poverty and stimulating economic development which can increase employment opportunities. In almost all economies, economic growth is driven by international trade (Mhaka and Jeke, 2018). International trade has continued to play an essential role

in the development and in the reduction of poverty in world economies, especially in developing countries (International Monetary Fund, World Trade Organisation and World Bank, 2017:8). This growth was supported by other initiatives such as massive reductions in trade costs and increased trade openness (International Monetary Fund, World Trade Organisation and World Bank, 2017:8). The cost of trading goods tends to be higher for emerging and developing economies than for advanced economies (International Monetary Fund, World Trade Organisation and World Bank, 2017:11). Trade costs are explained as the costs of doing business between two countries, and the higher the trade costs, the lower the trade flows are expected to be (Arvis, Shepherd, Duval and Utoktham, 2013).

According to Horkon and Koren (2015), global exporters and importers are subjected to many administrative barriers in their trade which may include compliance to complex regulatory requirements, inspections and even customs clearance. This increases the cost of trading and may serve to discourage an exporter in that country, resulting in less trade with that particular country, as the exporter focuses instead on other markets that are more competitive and profitable (Hornok and Koren, 2015). Hornok and Koren (2015) stated that countries with high administrative barriers to importing receive fewer and larger shipments. The actual costs of trading can be quite profound, and can "reflect factors as diverse as the exchange rate, distance, investment climates, language, logistics, and transport, as well as trade policies" (International Monetary Fund, World Trade Organisation and World Bank, 2017:11).

2.4.2. The effects of an increase in regional trade agreements on economic growth

Key to the reduction of trade costs, has been an increasing number of regional trade agreements (International Monetary Fund, World Trade Organisation and World Bank, 2017:11), that have facilitated a larger degree of international trade openness in those economies. According to Mhaka and Jeke, (2018) trade agreements enable countries to offset the effects of unilateral self-serving interests and bind the countries to reduce trade restrictions. Ngepah and Udeagha (2018) investigated the effects of regional trade agreements in Africa and found that generally trade increased with the presence of regional trade agreements. Assessing trade creation and trade diversification effects

through the use of the gravity model, they found that regional trade agreements may enhance trade (Ngepah and Udeagha, 2018). Trade gains of regional trade agreements were not to the detriment of non-member countries (Ngepah and Udeagha, 2018).

2.4.3. The effects of an increase in trade openness on economic growth

There is a general consensus in literature and empirically that trade openness leads to the promotion of economic growth. Ulasan (20), investigated the relationship between trade openness and economic growth and found that there is a positive relationship between the two variables. According to the WTO (2017), trade openness – which is the value of trade as a percentage of GDP per capita, has been the key driver to improved living standards in both developed and developing economies. This was driven mainly by increased productivity and manufacturing exports which are attributed directly to the reduction in trade costs (International Monetary Fund, World Trade Organisation and World Bank, 2017). The extent to which trade openness impacts a country is dependent on the characteristics as well as the supporting policies of the economy (International Monetary Fund, World Trade Organisation and World Bank, 2017). In other words, the structure of the economy has a direct bearing on the extent to which trade openness can improve productivity, manufacturing export performance as well as the standard of living. Greater trade openness can also be linked to a higher income per capita, while trade reform can be linked to increased productivity, increased economic growth and ultimately the reduction of poverty levels (International Monetary Fund, World Trade Organisation and World Bank, 2017).

According to classical theorists, opening up an economy or industry to international trade creates structural changes in the domestic industries, closing off old inefficient firms and creating or strengthening efficient firms (Feenstra, 2018). In theory this process increases average productivity in the industry due to increased sales from the successful efficient productive firms (Feenstra, 2018). Naude, Szirmai and Lavopa, (2013) conducted a study analysing the effects of structural changes and technological advances on industrialisation in the BRICS economies. Naude, Szirmai and Lavopa, (2013) found that industrialisation and manufacturing, given endogenous growth theory is important for economic growth; while technological progress is a necessary factor for industrialisation (Naude, Szirmai and Lavopa, 2013). They also found that higher

per capita and higher productivity growth can be directly linked to structural changes and development in the economy, that is attributed to industrialisation (Naude, Szirmai and Lavopa, 2013). This study served to confirm what has been observed empirically as discussed above.

2.4.4. The effects of foreign direct investment in economic growth

In their study, Naude, Szirmai and Lavopa, (2013) found that developing countries can access international knowledge and technology transfer through domestic investment and foreign direct investment. Foreign direct investment (FDI) is direct investment made by a foreign entity to acquire a controlling stake in a local entity (UNCTAD, 2016). Akpan, Isihaka, and Asongu, (2014) in their study found that the benefits of FDI do not necessarily automatically translate directly into economic growth and technology transfer, but are rather dependent on the capacity of the human capital in the host country to sustainably absorb the knowledge brought about by FDI.

Alemu and Lee (2015), asserted that by introducing both capital and technology to the recipient country, foreign direct investment promotes economic growth. They furthermore attribute foreign direct investment for the flow and distribution of technology, management skills and modern business practices across different economies (Alemu and Lee, 2015). Together with the implicit benefits to production, such as employee training, improved production capabilities and networks, improved access to markets foreign direct investment can bring about structural change to the economy and sustainability (Alemu and Lee, 2015). In their study; Naude, Szirmai and Lavopa (2013), also emphasise that foreign direct investment is the main channel through which emerging economies may access international knowledge.

2.4.5. The role of export diversification in economic growth

Export diversification allows countries to offset negative trade effects, such as unexpected exchange rate shocks, but can also enable transfer of positive spill-overs that result from trading in higher skill and technology goods (Matthee, Idsardi and Krugell, 2015). Matthee, Idsardi and Krugell (2015), define two types of trade

diversification, namely, extensive and intensive export diversification. Extensive export diversification involves an increase in the number of products a country exports or an increase in the number of a country's trading partners (Matthee, Idsardi and Krugell, 2015). Intensive export diversification involves the shares of export volumes across existing export products or partners, which implies a more balanced export basket (Matthee, Idsardi and Krugell, 2015). In intensive export diversification, fewer primary resources and more manufacturing and higher valued services is desired in the export portfolio (Matthee, Idsardi and Krugell, 2015).

Matthee, Idsardi and Krugell (2015) state that export diversification involves a country having a varied export production structure that includes new, as well as higher value products. Matthee, Idsardi and Krugell (2015) further stated that export diversifications can be closely linked to structural transformation of the economy. This is defined as the reallocation of resources across different sectors and products over time goods (Matthee, Idsardi and Krugell, 2015). Structural transformation is therefore a prerequisite for higher levels of economic development. According to their study, Matthee, Idsardi and Krugell (2015) found that generally new exporting companies take an average of two years to realise success, therefore most export growth is experienced by organisations already exporting existing products, as the new exporters struggle for survival. These organisations achieve this through increased volumes or higher prices to mostly existing clients (Matthee, Idsardi and Krugell, 2015).

From the review of the above factors, it is evident that economic growth through international trade in any economy is dependent on many factors working concurrently. In practice, international trade appears to be accredited with the reduction of poverty, as it assists in creating employment opportunities and increasing income per capita levels. This is an important factor, because improving livings standards and employment is also one of the goals of the South African government. If improved exports can be shown by empirical evidence to increase employment, then the export categories examined in this research can be expected to contribute to this national goal.

Trade costs, including administrative and logistical barriers slow down trade activities. They are more prevalent and have a bigger effect on developing countries than they do in developed countries, possibly because systems in developed countries are more advanced. Regional trade

agreements have been observed to be successful in curbing the costs of doing trade. Trade openness; which is reliant on trade costs, the structure of the economy and underlying economic policies governing the country; and trade reform have been shown to promote higher manufacturing activity thereby improving livings standards. The role of FDI is also undisputed because it facilitates transfer of knowledge faster, and has implicit benefits that are beneficial at organisational level but increase the whole country's productivity levels, which can translate to improved economic growth and benefits to society. From practical observations; through diversification efforts, South Africa can improve employment level and increase income per capita levels, associated with better standards of living.

2.5. A review of factors affecting South African economic development within the BRICS bloc

This section discusses the various studies that have been conducted pertaining to the SA-BRICS relations and evaluates South Africa's performance with regards to factors that are considered important to economic growth; such as trade openness, export diversification, trade intensity, trade complementarity and also reviews the extent of the South African economy's dependency to the other BRICS economies though trade linkages.

2.5.1. A review of trade openness in the SA–BRICS relations

Ncube and Cheteni (2015), conducted a study to examine the impact of the BRICS alliance on South Africa's economic growth. Their study used the vector error correlation model (VECM), and the results indicated that South Africa had gained from the international trade between the BRICS bloc (Ncube and Cheteni, 2015). Ncube and Cheteni (2015) explained that South Africa's economy gains from the BRICS alliance through an improved human capital factor. In their study, Ncube and Cheteni (2015) asserted that in terms of trade openness, all the BRICS countries had improved since the alliance formed, even though all the BRICS economies are mainly export-oriented economies.

The surprising result, however, was that the study also found that given the trade practices of some other trade partners, South Africa's openness will in the long run impact the

economy negatively (Ncube and Cheteni, 2015). South African labour intensive and low skill industries, such as textiles and clothing, leather products as well as furniture face the highest level of Chinese import penetration (Ncube and Cheteni, 2015). In these industries, South Africa's trade openness is especially detrimental, as it impacts domestic employment which increases the level of unemployment in the low skills sector (Ncube and Cheteni, 2015). Even though there are political gains, in the long run South Africa should still work to reduce its trade openness to the BRICS alliance in the long run (Ncube and Cheteni, 2015). This would be effective if domestic industries are stimulated, plus domestic prices are competitive and infant industries are protected through policies against the multinational companies who benefit from lower production costs, economies of scale and economies of scope (Ncube and Cheteni, 2015).

Shayanewako (2018), also conducted a study to assess the relationship between trade openness and economic growth for the BRICS economies. The study used panel data and assumed cross-sectional homogeneity in order to analyse the relationship between trade openness and economic growth in the BRICS countries (Shayanewako, 2018). The results of the study confirmed the presence of a long run relationship between trade openness and economic growth in the BRICS countries (Shayanewako, 2018). Shayanewako (2018) concluded that there is bidirectional causality from trade openness to economic growth in just about all the BRICS alliance members. This implies that there is co-operation in facilitating trade within the alliance (Shayanewako, 2018).

2.5.2. A review of South African export diversification efforts in BRICS

Since South Africa joined the BRICS bloc, China has become the key export destination and principal market for South Africa within the BRICS economies (IDC, 2014). In 2012, China was the destination for almost 84% of South Africa's exports to other BRICS economies, followed by India (close to 15% share), while shares claimed by Brazil and Russia were almost negligible (IDC, 2014). Trade with India and China had a favourable surplus position following the inclusion of South Africa to BRICS (Onyekwena, Taiwo and Unenze, 2014). Trade amongst the BRICS has increased substantially over the years, but the dominant theme in intra-BRICS trade is the trade relationships between China and every other member (IDC, 2014). In contrast, the other BRICS members have had little success

in selling consumer goods to China, with the group meeting just 4.6% of Chinese demand for consumer products in 2012 (IDC, 2014).

In comparison to other BRICS economies, South African exports have enjoyed the least growth in the group (Matthee, Idsardi and Krugell, 2015). The poor performance of South African exports has been ascribed to the lagging structural transformation that has resulted in an overreliance on commodities to achieve export growth (Matthee, Idsardi and Krugell, 2015). However, there has been a shift towards medium and high technology sectors, which has brought the corresponding demand for high skills and capital investment (Matthee, Idsardi and Krugell, 2015). For instance, vehicles and accessories amounted to R130.21bn in 2017, up from R73.57bn in 2012; plus, cell phone and electrical equipment exported in 2017 was R20.04n in 2017, as compared to from R19.08bn in 2012 (SARS, 2019). This is indicative of growth in the medium and high technology sectors.

Considering the country's income per capita, the South African export portfolio has remained relatively unsophisticated though, which has limited economic growth and export growth in general (Matthee, Idsardi and Krugell, 2015). South Africa's exports to the BRICS economies collectively have largely been dominated by minerals and beneficiated products, with iron ore exports representing almost one-third of the export basket in 2012 (IDC, 2014). The South African export basket has remained largely unchanged for decades, comprising mainly of primary resources (Matthee, Idsardi and Krugell, 2015). There is scope for manufacturing development, however, as the country does possess technological knowledge (Matthee, Idsardi and Krugell, 2015).

Coal products dominated the export trade with India and Brazil, whilst vehicles for the transportation of goods led the list of export products sold in the Russian market (IDC, 2014). Although relatively smaller, the export baskets destined for Brazil and Russia were more diverse and included higher value-add products, while export baskets destined for the two Asian countries are highly concentrated and dominated by mineral commodities (IDC, 2014).

Studies reveal that since joining the BRICS, South African exports to BRICS have steadily increased and have even surpassed exports to the European Union (EU), which had been the main export destination for South Africa previously (Onyekwena, Taiwo and Unenze, 2014). The direction of trade for South Africa therefore changed away from the traditional US and EU markets to more developing markets (Cakir and Kabundi, 2013). With the

resulting weak export demand from South Africa to the European Union, South Africa has been able to substitute this weak export demand with a stronger export demand by the BRICS (Onyekwena, Taiwo and Unenze, 2014). This is an important development, since the BRICS are accredited with contributing significantly to the global recovery post 2008, thereby introducing a much more stable demand for South African exports (Onyekwena, Taiwo and Unenze, 2014). While this shift was viewed by some as political rather than economic, Onyekwena, Taiwo and Unenze, (2014) found evidence in their study that the growth in trade with the BRICS for South Africa was demand-side induced rather than supply-side induced. This implies that the growth has been stimulated by higher growth levels within the BRICS economies and a slower recovery in the European Union (Onyekwena, Taiwo and Unenze, 2014).

2.5.3. A review of South African trade intensities and complementarities with the BRICS bloc

"Export intensity is defined as the share of a country's exports going to a trading partner relative to the share of world exports going to that partner. (Onyekwena, Taiwo & Unenze, 2014:12)." By 2011, trade intensities for South Africa were the highest with India and China both in terms of exports and imports (Onyekwena, Taiwo and Unenze, 2014). Export trade with China was recorded at R115.57bn in 2017 up from R84.69bn in 2012; while export trade with India was recorded at R55bn in 2017, up from R30.67bn recorded in 2012 (SARS, 2019). The high intensities with India were attributed to various factors, such as historical links between the two countries, as well as the high demand for precious metals such as gold and silver (Onyekwena, Taiwo and Unenze, 2014). High trade intensities for China are not surprising, because it is the largest trade partner of all the BRICS economies. In the study of Intra-BRICS trade of the BRICS countries, Singh (2016) found that the trade intensities for Brazil and South Africa were greater than one; signifying higher trade flows than expected. This means that trade between South Africa and Brazil has increased over the years.

> "While trade intensity measures the importance of a trading partner relative to the rest of the world, trade complementarity measures the extent to which two countries are 'natural partners', in the sense of the degree to which the sectoral composition of a

country's exports overlaps (or correlates) with the sectoral composition of imports by a trading partner" (Onyekwena, Taiwo & Unenze, 2014:12).

With respect to trade complementarity, India was identified to the be most complementary trade partner in the BRICS to South Africa, as evidenced by the similarity between the country's import demands compared to South Africa's exports (Onyekwena, Taiwo and Unenze, 2014). China is increasingly becoming the natural trade partner of South Africa, but this is concerning because the structure of the trade is resource heavy for South Africa which is not inducive of employment (Onyekwena, Taiwo and Unenze, 2014).

2.5.4. A review of the effects of BRICS trade linkages on the South African economy

Mhaka and Jeke assert that trade expansion displays evidence of globalisation in an economy. Economic globalisation is defined as the process of the integration of national economies into the international economy by means of trade (Mhaka and Jeke, 2018). Mhaka and Jeke (2018) state that countries are becoming more closely interrelated as globalisation has become more accepted.

Trade linkages between South Africa and the BRIC that assess the degree of trade linkages and shock transmission between South Africa and the BRIC countries over a specified period, have been investigated (Cakir and Kabundi, 2013). Cakir and Kabundi (2013) asserted that as a result of increased globalisation and economic integration, countries become increasingly exposed and vulnerable to external shocks. They investigated the response of South African trade and output to shocks originating from the BRIC countries as a bloc and from individual countries (Cakir and Kabundi, 2013). Since China is dominant in terms of trade with the other BRICS member countries, it is unsurprising that it experiences the least external trade shocks, while South Africa is vulnerable to shocks from China. This is also unsurprising, as China is the major trading partner to South Africa in the BRICS bloc.

From the above discussion, some concrete conclusions regarding the SA-BRICS relations can be made. Firstly, all the BRICS economies are open to trade, implying that South Africa has a market within the BRICS. Secondly, South Africa is diversifying from its traditional trading

partners of the USA and the EU, meaning in terms of export diversification the partners of trade are increasing with the BRICS. In general, there is active trade between SA and the BRICS partners, although the potential for South Africa has not reached full capacity. Also, South Africa is diversifying in terms of export structure, even though the composition of exports is still largely comprised of primary goods. This is relevant to the research since it aims to assess areas within the BRICS that are improving in trade.

Thirdly, trade complementarity and trade intensities provide the direction that SA-BRICS trade is expected to flow. Trade intensities measure the strength of trade between SA and BRICS, while complementarity indicates the most probable demand sources. This is relevant to this study, as it serves to point to countries that might be the first areas of focus for SA government to open up trade in. Lastly, trade linkages information is important because as countries become more globally integrated, resistance to external factors occurring in other countries is important in the economic stability. This information displays South Africa's vulnerability in terms of massive catastrophic events in other BRICS countries. All these factors have been indicated as some of the important contributors to economic development and growth.

2.6. Dominant methodology

In reviewing the literature, studies were dominated by statistical methodologies and analyses employing gravity models to measure the effects of variables under study. The use of panel data to analyse the behaviour of past variables and forecast future behaviour, was a recurring theme. To analyse the effects of trade on an economy, researchers have predominantly modified the neoclassical endogenous growth theory, while to measure empirical performance of the economy, researchers use panel data analysis, regression analysis and more complex models developed specifically for those studies. The use of panel timeseries data, as is used in this research is therefore consistent with current practice in the study of trade data.

2.7. Areas for further review

Overall, there is a need for South Africa to renegotiate terms of trade with Brazil and Russia to encourage more trade between the countries, as this is the area where South African export potential remains underexplored (Onyekwena, Taiwo and Unenze, 2014). Trade studies examining the trade patterns and relations between South Africa and each BRICS member state are another area that is underexplored, instead studies focus is on China and India, or the BRICS bloc as a whole. There is also a gap in the literature on South African trade performance regarding individual export and import categories. Studies also lack a distinction between the trade of products and tertiary services, and tend to aggregate at the macroeconomic level. This research is focused on the individual South African export categories with the aim to contribute to a better understanding of the individual categories in all the BRICS partners as identified by the South African government.

2.8. Conclusion

In conclusion, studies focus on the origination of the term BRIC(s) and the subsequent formation of BRICS thereof. The similarities and individual compositions of the BRICS economies is well documented, as well as the collective BRICS contribution to global economics and politics. In terms of international trade theory, traditional comparative advantage theories of trade and non-comparative advantage theories of trade form the basis of the majority of empirical studies, and have been able to display the relationship between economic growth and international trade empirically. In general, international trade can be linked to economic growth, with factor such as trade costs, regional trade agreements and trade openness playing a critical part. The literature also reveals that even though that there are opportunities of further trade with the BRICS partners for South Africa, trade is currently most active with China and India. Numerous studies have also indicated that there is a general lack of trade between South Africa and Russia and well as with Brazil. There is a gap in the in-depth analysis of the performance of the South African export commodities that have a distinct revealed comparative advantage within BRICS as studies focus on the overall export categories. There is therefore room to investigate this category of exports further for policy and export growth recommendations to South Africa.

2.9. Chapter Summary

This chapter focused on reviewing the literature surrounding the theory of international trade, as well as empirical evidence on the studies that have been conducted regarding the subject of international trade. Determinants of economic growth and their impacts were reviewed from various studies that have been carried out. In addition, the literature surrounding South Africa's economic growth performance and development were reviewed with a particular focus on export diversification, relations with BRICS. Finally, the studies relating specifically to the impacts of the BRICS alliance on South Africa's trade openness, intensities, complementarities and trade shocks were examined. The following chapter provides a detailed discussion pertaining to the methodology followed in conducting this research.

3. Chapter 3: Research Design and Methodology

3.1. Introduction

This chapter presents the methodology that was followed in conducting the research. A discussion regarding the research philosophy, research design and methodology as well as the sampling and data collection methods are presented. Finally, the chapter highlights the research analysis tools that were employed, plus the measures taken to ensure reliability, validity and ethical considerations.

3.2. Purpose of the study

According to Creswell (2014), the statement of purpose aims to convey the overall intent of a study, indicating what the research aims to study and what it aims to achieve. Simon (2011), also stated that a statement of purpose provides the direction, scope and data collection methods of the study in a concise manner. The section below briefly revisits the statement of purpose as indicated in the preceding chapter.

3.2.1. Statement of purpose

The purpose of this quantitative research was to analyse the performance of 20 product categories with a high RCA for South Africa to the BRICS bloc to determine if these product categories had experienced growth since 2012. The dependent variable was the position of trade in value, while the independent variable was the share of trade in volume. In other words, the position of trade in value for South African exports in the BRICS bloc was determined by the share of South African exports in volume within the bloc. A change in the position of trade, given a change in the share of trade indicated whether South African organisations had indeed been benefiting from the trade agreement or whether these opportunities had not been adopted.

3.3. Research Design and Methods

Creswell (2014) defined a research design as a type of inquiry within qualitative, quantitative or mixed method approaches that provides a specific direction for the procedures in a research design, providing a clear strategy of inquiry. It is a process of collecting and interpreting data with a clear objective (Rahi, 2017:2). Qualitative designs employ a variety of inquiries including case studies and interviews. Typically, qualitative designs explore the meaning attached to social problems involving an inductive form of inquiry (Creswell, 2014). Mixed research methods involve qualitative and quantitative forms of inquiry, often using the themes derived from the qualitative portion of the research to explain the results of the quantitative section of the research (Creswell, 2014). Quantitative research designs reflect a postpositivist philosophy, where the research identifies and assesses specific causes that influence outcomes (Creswell, 2014).

Typical quantitative designs involve experimental and non-experimental designs (Creswell, 2014). Experimental designs incorporate true experiments, quasi-experiments and applied behavioural analyses (Creswell, 2014). Non-experimental designs include surveys, causal-comparative analyses and correlation designs which may involve structural equation modelling (Creswell, 2014). Causal-comparative designs compare groups over time in terms of a cause that has already taken place, while correlation designs use the correlation statistic to describe and measure the degree of association between variables (Creswell, 2014). This research followed a causal-comparative research design, which is a non-experimental quantitative design; as it compared two groups of data for the South African exports with a high RCA within the BRICS bloc which already existed. The first set of data was the data analysed by the IDC for exports for the periods of 2008 up to 2012. The same group of data was analysed in this research as the second set of data for the periods of up to 2016. Because of the scientific nature of the nature of inquiry, the identification and assessment of the performance of high RCA exports within BRICS according to defined hypotheses which were based on knowledge that already existed, the design of this research therefore qualified to adopt a quantitative research design, and disqualified both qualitative design and mixed methods design. The subjective requirements of the qualitative design failed to be met.

Research methods provide a framework that prescribes the forms of data collection, analysis and interpretation for a study (Creswell, 2014). Research methods may be qualitative, quantitative or mixed in nature depending on the type of data collected, the analysis techniques and interpretation of the data. Qualitative research methods typically involve open-ended questions that may emerge from participants in the study (Creswell, 2014). The data analysed

may involve information gathered in scales of instruments, voice recordings or text information recorded from participants; which is then interpreted to reveal themes and patterns (Creswell, 2014). Qualitative research methods were not suitable for this research as there were no emerging themes to be analysed from participants.

Quantitative research methods involve the collection of predetermined observational data with close-ended questions, that are then statistically analysed and interpreted (Creswell, 2014). In collecting the data from global economic databases, the type of information collected was defined in advance for the BRICS countries importing specified South African exports. The analysis of the data was statistical in nature, and the interpretation of the data was also based on statistical significance tests and results. As export data yields numerical information that lends itself to quantitative analysis; the research was deemed to be quantitative and descriptive in nature, fitting the requirements of quantitative research designs and methods. This therefore justified the selection of a quantitative research method approach as followed for this research. Mixed research methods involve a combination of both approaches. Mixed research methods were not suitable for this research because there was no qualitative component.

3.4. Research Paradigm

A research paradigm is a "general philosophical orientation about the world and the nature of research that a researcher brings to a study" (Creswell, 2014:6). A research paradigm can be defined as a belief system that guides the research investigation (Krauss, 2005). Research paradigms guide the research methodology and often inform the type of research approach that a researcher will select, whether it be qualitative, quantitative or mixed methods in nature (Creswell, 2014). A qualitative research paradigm is interpretive in nature, while a quantitative research paradigm is empirical in nature (Atieno, 2009).

Research paradigms can be characterised through their ontology, epistemology and methodology philosophies (Patel, 2015). Ontology can be defined as the philosophy of reality, while epistemology is derived from the Greek word of knowledge and therefore explains how researchers come to know reality (Krauss, 2005). The methodology is the process that researchers use to acquire the knowledge of this reality (Krauss, 2005). A researcher's ontology, epistemology and methodology provide a holistic view of how the researcher views knowledge, how the researcher sees themselves relative to this knowledge, as well as the

methodological strategies that the researcher uses to process this knowledge (Patel, 2015). Patel (2015) asserts that a researcher's awareness of philosophical assumptions increases the quality of the research and contributes significantly to the researcher's creativity.

There are various paradigms in literature, but the most prominent are the positivism, constructivism and pragmatism (Creswell, 2014). The positivist paradigm is sometimes known as the scientific method or science research (Creswell, 2014:6). This paradigm has assumptions that are suited to quantitative research (Creswell, 2014). Williams (2017) describes the positivism philosophy as the research philosophy that is based upon a structured methodology that enables quantifiable observations and generalisations, and the evaluation of the results with statistical methods. Post-positivism forms part of the positivism, but enhances it by acknowledging that researchers do not always fully have the absolute truth of knowledge (Creswell, 2014). This paradigm holds a deterministic philosophy in which causes determine the outcomes or the effects (Creswell, 2014). Research conducted by post-positivists identify and assess the causes that influence the outcomes (Creswell, 2014:7). This research is also reductionist in nature, meaning that it attempts to break down ideas into smaller, discrete ideas that can be tested or verified (Creswell, 2014:7). An example of this kind of research would involve variables that are broken further into hypotheses and research questions (Creswell, 2014). Post-positivist research is based on measurement of an objective reality that already exists in the world (Creswell, 2014:7). In post-positivist research, a researcher "begins with a theory, collects data that either refutes or supports the theory, and then makes the necessary revisions and conducts additional tests" (Creswell, 2014:7). The South African data for exports with a high RCA within the BRICS is objective, and was already in existence prior to the research being conducted. The observation of the data involved variables that were broken into hypotheses and research questions, while the statistical analyses were interpreted to either support or refute the hypotheses of the growth of these exports within BRICS. The research was not subjective, but objective and was based on empirical evidence. Due to the nature of this research, it then follows that the research philosophy is post-positivist in nature, as it is aligned with the requirements of this paradigm.

A constructivism paradigm holds that "there is no single reality or truth, and therefore reality needs to be interpreted, and therefore constructivists are more likely to use qualitative methods to get those multiple realities" (Patel, 2015). This paradigm is typically associated with qualitative research, as it focuses on understanding the various meanings participants develop and contextualise about the world they operate in (Creswell, 2014). In this paradigm,

researchers are aware that their own backgrounds influence their interpretation of results and position themselves in the research to acknowledge how their personal backgrounds flow into the interpretation of the research (Creswell, 2014). This research is not in alignment with this paradigm, as the background of the researcher was immaterial to the interpretation of the research.

A pragmatism paradigm asserts that "reality is constantly renegotiated, debated, interpreted, and therefore the best method to use is the one that solves the problem" (Patel, 2015). This paradigm arises out of actions, situations and consequences rather than conditions that already exist (Creswell, 2014:8). This paradigm focuses on the researcher emphasising the research problem and using all approaches available to understand the problem, which is suitable to mixed research methods (Creswell, 2014). The pragmatism paradigm was therefore not suitable for this research because this research holds that the knowledge about the exports with a high RCA for South Africa within the BRICS was already known in 2012, and it aimed to either support or refute the hypotheses that these grew between 2012 and 2016.

3.5. Research Site

This research is focused on the BRICS partnership as an economic bloc and therefore the study area for this research comprised of all the BRICS economies. While the there was no physical site that the research focused on, the study area was the BRICS bloc as an economic area. Collectively the BRICS represented over 3.6 billion people in 2014 (IDC, 2014). According to the Industrial Development Corporation (IDC), in 2014 the external trade (being exports and imports) of the BRICS economies accounted for 17% of the world total trade. The five BRICS nations have a combined nominal gross domestic product (GDP) of USD16.6 trillion (equivalent to approximately 22% of the gross world product) and an estimated USD4 trillion in combined foreign reserves (IDC, 2014). The exports under investigation were from the geographic area of South Africa, while the export destinations of those exports defined the remaining geographic study area.

3.6. Population and Sampling Procedures

3.6.1. Research Population

A population is defined as the complete group that is to be studied that possess at least one common characteristic (Singaravelu, 2017). A population can comprise of cases, people or objects (Etikan, Musa, Alkassim, 2015:1). The population for this research comprised of the 37 South African export categories that were calculated to have a revealed comparative advantage within the BRICS bloc in 2012 (IDC, 2014).

3.6.2. Sampling Design

The sampling design is a definite plan for obtaining a sample within a population (Singaravelu, 2017). Sampling is also defined as the process of selecting a portion of the population for investigation (Rahi, 2017:3). "The aim of all quantitative sampling approaches is to draw a representative sample from the population, so that the results of studying the sample can then be generalized back to the population" (Marshall, 1996).

Research may follow one of two types of sampling, either probability sampling or non-probability sampling (Etikan, Musa, Alkassim, 2015:1). Probability sampling employs random procedures to select a sample from the population, and all elements of the population have an equal chance of selection (Etikan, Musa, Alkassim, 2015:1). The usefulness of probability sampling is in its ability to extrapolate the results of the random sample to the entire population, as well as the reduction in bias of selection (Etikan, Musa, Alkassim, 2015:1). Probability sampling is useful for large populations. There are various types of probability sampling methods such as cluster sampling, systematic sampling, cluster random sampling and stratified random sampling (Marshall, 1996).

Non-probability sampling employs subjective procedures to select a sample from a population (Etikan, Musa, Alkassim, 2015). Due to this limitation, non-probability samples may be considered biased, and there is a risk that the sample selected is not a good representation of the population because the units in the population do not have an equal chance of selection (Etikan, Musa, Alkassim, 2015). Non-probability sampling is useful however when randomisation of data is not possible, for example when the population is very small, or when there is a limit on the available time or resources to conduct the research (Etikan, Musa, Alkassim, 2015). Two types of non-probability sampling methods are prominent in literature, namely convenience sampling and purposive sampling. Purposive sampling allows the

researcher to select the most appropriate sample in answering the research questions (Marshal, 1996); with a specific purpose in mind (Etikan, Musa, Alkassim, 2015). Purposive sampling is associated with qualitative research methods, and therefore does not qualify to be used for this quantitative research.

Convenience sampling is suitable to both quantitative and qualitative research methods (Etikan, Musa, Alkassim, 2015). "Convenience sampling is a type of nonprobability or non-random sampling where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of the study" (Etikan, Musa, Alkassim, 2015). Another characteristic of convenience sampling is that the units of the target population are homogenous (Etikan, Musa, Alkassim, 2015). The main objection to this type of sampling is the high probability of bias, because the sample might not end up being representative of the population (Etikan, Musa, Alkassim, 2015). For the purposes of this quantitative research, the convenience sampling technique was used because of its applicability. The sample therefore was selected on the basis of convenience and it fit a specific purpose as intended. The data of interest was that which yielded a high comparative advantage for South Africa in the BRICS bloc in 2012. This characteristic therefore fulfilled the requirement of homogeneity of the population and deemed this sampling method suitable for this research.

3.6.3. Sampling Frame and Sampling Size

The sampling frame is a complete list of all items within the population which may be sampled (Singaravelu, 2017). The population for the research comprised of the 37 export product categories with a revealed comparative advantage for South Africa, that the country could potentially export in greater quantities, or for the first time, to other BRICS markets (IDC, 2014). The sampling frame comprised of the export product categories that had a revealed comparative advantage which was much higher than that of the leading import sources in the BRICS bloc for South Africa. There were 20 export product categories that fulfilled the sampling frame requirement, and since this was a sample of convenience all 20 export product categories were selected into the sample. The sample size for this research was therefore 20 export product categories.

3.7. Data Collection Techniques

In collecting the data for this research, the following secondary and primary sources of data were explored:

- Previous studies and documents on the subject from various online sources, and university databases.
- Official documents, from official economics and statistics offices of the BRICS organisations as well as reliable sources such as, International Trade Centre, Statistics SA, The World Trade Organisation and The World Bank.
- Archived research data and studies of a similar nature, sourced from library journals and database sources of Economic societies, JSTOR and the university library.

The primary advantage of using this form of data was that it is unobtrusive, and cost effective in retrieving large quantities of official data that would otherwise be difficult to locate. The data was available in one central point for all the countries, enabling the analysis to be performed on similar data that had the same format. The quality of the data was assumed to be high, with the data uncorrupted and complete as possible. This was because the sources of data are credible institutions used by global officials, institutions, researchers and analysts.

The disadvantages that were encountered were that the exercise of collecting the data was time-intensive. Due to the structure of the data files and the amount of irrelevant data contained within each file, the data loading process was very slow. This was an issue because of additional internet data charges that had previously been unaccounted for in the planning.

3.8. Data Analysis Techniques

After the data is collected, the first step in the analysis is to the calculate the descriptive statistics for the data which represents the characteristic features of the data, and thereafter present the descriptive statistics in table or graph format (Larson, 2006). Comparative designs are used to compare past and present or different parallel situations that may involve macro conditions that the researcher has no control over (Walliman, 2011). For this research, the primary analysis of the data took the form of a comparative analysis. Various forms of display, such as tables and graphs were used to display the data and analyse it further. The South African

export data was sorted and categorised by type, destination and volumes between 2012 and 2016. The rationale for analysing this data was to assess the performance of the exports under investigation. This also fulfilled the first and third research questions.

Inferential statistics is a different, but related category of statistical analysis which focuses on calculating statistics that enable the researcher to make inferences about the populations from which the data was sampled (Larson, 2006). Inferential statistics test the significance and strength of the relationships and associations between research variables under investigation (Creswell, 2014:225). This research also employed inferential statistics to test the strength and significance of the performance of the exports under investigation. The aim of this exercise was to fulfil the requirements of the second and fourth research questions.

In order to test the means of the sample, a t-test was used. The rationale for this decision was that the sample size was small, due to the fact that the dataset for each series was small. In other words, the sample size for each time series was small. Also, since the data from the previous periods was available, it provided a comparison for the hypothesis testing of whether there had been any real growth in the categories, hence the 2-sided t-test was applicable in analysing the hypotheses for this research.

For this research, time series data was used; which is quantitative in nature. To verify the association between the dependent and independent variable, cross correlation was therefore utilised, as is required by the nature of the data. To understand the nature of the relationship between the dependent variable and the independent variable, regression was used. The difference between correlation and regression is that correlation determines the strength of association between the variables, while regression describes that association between the variables, essentially explaining the relationship in more detail (Campbell and Campbell, 2008). Regression is used to determine the linear relationship between two or more variables, and used for prediction and causal inference between the dependent variables and the independent variables (Campbell and Campbell, 2008). The technique displays the manner in which one variable co-occurs with another (Campbell and Campbell, 2008). The ordinary least squares method regression was the methodology selected for this research. This method was based on its applicability when stationarity of the variables was assumed; hence it could be applied to assess the impact of trade volumes on trade value.

3.9. Validity and Reliability

Regression analysis enabled the data of the study to be verified for reliability as well as validity. To assess reliability of the results, the regression analysis provided a p-value from the analysis of variance, which gave a significance factor between the variables. This value indicated the reliability of the model and thus the relationship between the variables. It is the same value as the correlation co-efficient. R-squared also provided a goodness of fit measure for the predicted value, indicating the degree of reliability of the regression results, as it measured the correlation.

The regression also provided an analysis of the errors and residuals from the estimations the model produces. This gave an indication of the validity of the model. The validity determines the extent to which the research measures what it is supposed to measure (Maree, 2007). The residual analysis was also assessed for goodness of fit, and that provided conclusions about the validity of the model produced. It indicated if the independent variable was an underlying cause for the dependent variable. This gave an indication of the dependability and repeatability of the tests. Further validation of the results was done using the Durbin-Watson statistic on the residuals, to understand if there was an existence of autocorrelation between the first lag and the series for each category. If autocorrelation was found to exist, this indicates that the linear regression model may not be the most suitable to describe the relationship between the variables, an alternative model should be utilised.

3.10. Ethical Considerations

The approach to data collection and analysis did not in any manner:

1. Falsify information – The data collection phase was expected to be laborious and time consuming. No information was falsified in order to speed up the data collection process and save on internet data costs or transportation costs to libraries and institutions that held the data.

2. Distort results – by overemphasising certain aspects as significantly more important or relevant than others, when there is no justification to do so. Also, in dealing with numbers,

accuracy in the capturing of values was of critical importance as inaccurate capturing could create distortion and incorrect interpretation.

3. Misuse information – Information collected was used solely for the purposes of the study as intended.

4. Use inappropriate research methods – Care was taken to ensure that no unsuited research methods were used to analyse the data. The analysis of the data was not conducted in a qualitative or mixed research method, since the study was quantitative in nature.

5. Allow bias to influence results and interpretation – Bias was eliminated by collecting the data from different sources and conducting cross-verification of the numbers. This ensured results were objective and not directional towards a certain trend of preference.

3.11. Limitations to the study

This research focused only on trade between South Africa and the other BRICS countries; the results of the research cannot be adapted for other bilateral agreements or economic trading zones. The research also only focused on South African exports opportunities within BRICS economies, not the imports into South Africa from other BRICS economies. The results of this research are therefore not meant to be inferred for the import market. It was assumed that the information regarding the commodities traded by South Africa and its trade partners was complete and accurate when published.

3.12. Chapter Summary

This chapter outlined the research methodology utilised in this research. Due to the nature of inquiry, plus the intention to understand causality and outcomes between two groups of data, a quantitative research methodology was adopted for this research. Convenient sampling was used to collect predetermined data for 20 South African export products that have a high RCA within the BRICS from a population of 37 products. The use of information management systems and online economic and academic databases was the key component of the data collection process. A brief discussion on the data analysis methods of the descriptive analysis and inferential statistics is followed by strategies used to enhance the imperative factors of

research reliability and validity using correlation and regression analysis. Finally, the chapter discussed factors considered in improving ethical considerations and the limitations of the study. The following section presents the detailed results of the research.

4. Chapter 4: Research Findings

4.1. Introduction

This chapter presents and discusses the results from the analysis. The twenty product categories that were identified to have a revealed comparative advantage for South Africa are briefly presented in summary for potential markets identified. Thereafter, each category is individually analysed for growth in terms of value and volumes since 2012. An assessment is also made to assess growth in terms of overall demand for the product in the target country, as well as growth in terms of the sector in South Africa. The results are then tested for statistical significance through the hypotheses. Each category is then assessed for performance in comparison to the main source countries for the target country. This step provides conclusions as to the growth of the category in the target country. A consolidated view of the results per country and for the BRICS bloc as a whole are then presented as a final step in the analysis of performance. The final section addresses correlation and regression between the dependent and the independent variables to determine the strength of existing associations and linear relationships between the variables.

4.2. South African high RCA export category performance in target countries

This section presents and discusses the findings of the research questions as set out in Chapter 1. Each category of exports with a high revealed comparative advantage (RCA) was analysed to answer the four research questions. The first part of the findings represents the descriptive analysis, presented in bar graph and trend format. The second part presents the results of the hypotheses analysis and provides the response to the statistical significance of findings. The imports of the target countries are then analysed to determine whether the performance of the specified South African export categories can be linked to an increased share of imports in those target countries. This adds a dimension to the analysis as to whether or not the specified South African export categories are growing in the target countries as a portion of total imports.

The main research objective for the research is briefly restated below:

The objective of this quantitative research was to analyse the growth trend of 20 export good categories that were identified to have a high revealed comparative advantage for South Africa within the BRICS bloc in the year 2012.

The research questions and hypotheses are briefly restated below:

1. *What was the trade position in value of South African revealed comparative exports with other BRICS nations from 2012 to 2016?*
2. *Was there a significant change in the trade position of South African revealed comparative advantage exports within BRICS from 2012 to 2016?*
3. *What were the export volumes of South African revealed comparative advantage exports within the BRICS trade bloc from 2012 to 2016?*
4. *Was there a significant change to the volume of South African revealed comparative advantage exports to other BRICS nations from 2012 to 2016?*

Given the above research questions, the following hypotheses could be tested:

H0: There was no change in the trade position of South African exports within BRICS from 2012 to 2016

H1: There was a change in the trade position of South African exports within BRICS between 2012 and 2016

And,

H3: The South African volume of exports to other BRICS nations did not change from 2012 to 2016

H4: The South African volume of exports to other BRICS nations changed between 2012 and 2016

The section that follows provide a brief discussion on the findings that have been classified into the individual categories of exports and a consolidated view of the BRICS bloc.

4.2.1. Individual categories per potential partner (s)

4.2.1.1. H0805: Citrus fruit, fresh or dried

The citrus fruits category had one import partner for potential expansion in BRICS, being China. The following depicts the findings for this category:

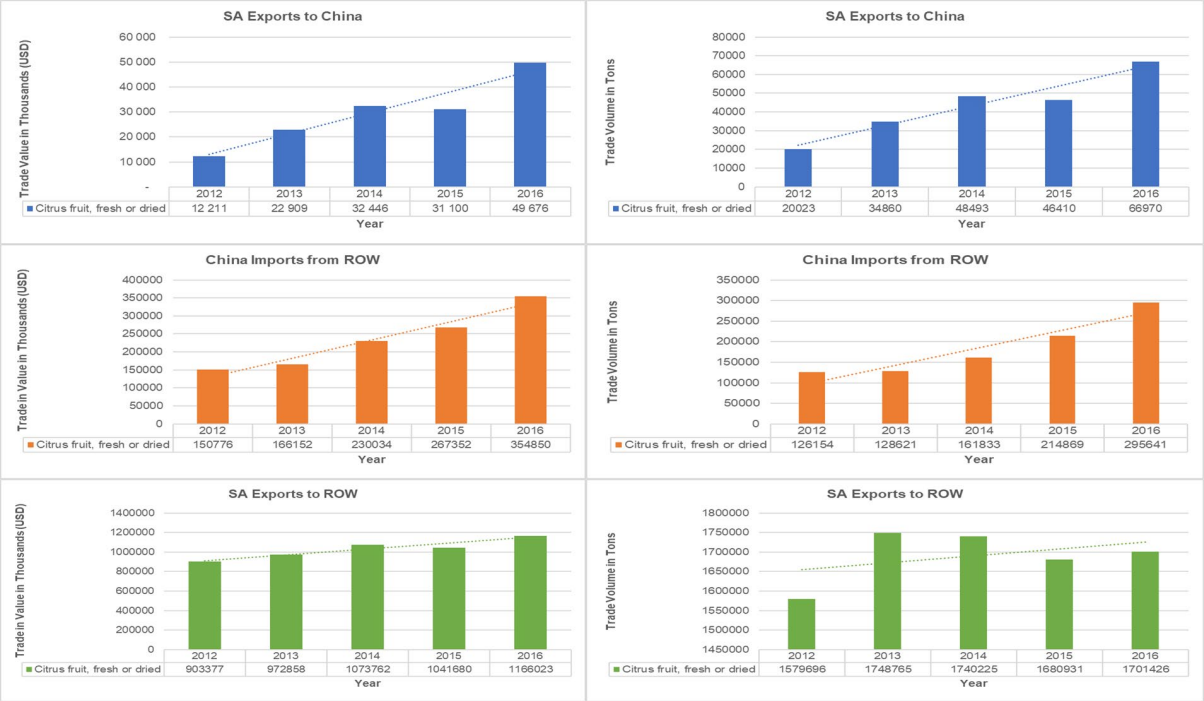


Figure 1: Growth Results: Citrus Fruits. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, it is evident that in terms of value South Africa increased in its trading position with the identified target BRICS partner of China from US$12,2million in 2012 to US$49,7million in 2016 for the citrus fruits export category. The direction of the trade value trendline was positive, indicating an increasing trade status from 2012 to 2016. South African citrus fruits increased in volume over the period from 20,023 tons in 2012 to 66,970 tons in 2016. The general trend for volumes was also positive and increasing. Therefore, trade value and trade volume increased for citrus fruits exports from South Africa to China between 2012 and 2016.

In assessing the overall demand for the citrus fruits' category, the following was found; Chinese imports for citrus fruits showed a general increase over the period of 2012 to 2016 both in terms of value and volume, regardless of South African performance. This indicated that even though South African exports of citrus fruits to China had increased over this period, Chinese demand had increased from other sources as well.

However, when assessing the entire export portfolio of citrus fruits for South Africa in volume terms, the overall trend was positive and increasing from 2012 to 2016. This confirmed that this particular product had been increasing in terms of exports in South Africa in general, even to the rest of the world not just the target BRICS partner. This means that despite strong Chinese demand for this product, South Africa was taking advantage of its revealed comparative advantage and grew in this category of exports.

To understand the significance of this increase in trade, the following results were found:

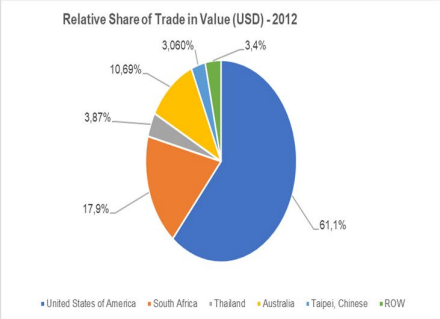
Table 1: Hypothesis Test Results – Citrus Fruits

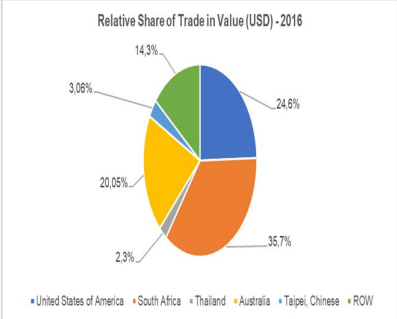
No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
1	0805	Citrus fruit, fresh or dried	0,006186	0,005102

Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

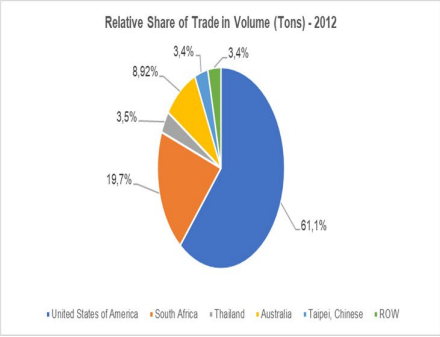
At the 5% level of significance, the two-sided t-test had a probability of 0.0062 for trade value position, therefore the null hypothesis was rejected. There was evidence of a change in the position of trade in terms of value with China between 2012 and 2016 for the citrus fruits' category. The two-sided t-test had a probability of 0.0051 for trade volumes of the same category, therefore that null hypothesis was rejected as well. There was evidence of a change in the volume of citrus fruits exports to China between 2012 and 2016.

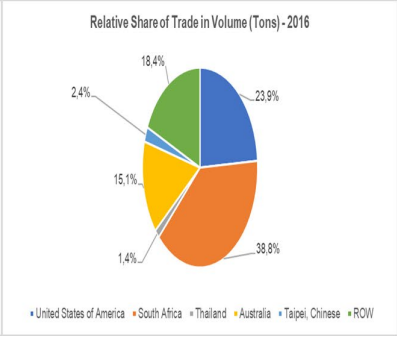
Zooming in on the trading position of South African citrus fruits imported by China, in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value - 2012	Relative Position of Trade in Value - 2016
United States of America	1	2
South Africa	2	1
Thailand	4	7
Australia	3	3
Taipei, Chinese	5	6





Source Country	Relative Position of Trade in Volume - 2012	Relative Position of Trade in Volume - 2016
United States of America	1	4
South Africa	2	1
Thailand	3	9
Australia	4	3
Taipei, Chinese	5	8

Figure 2: Relative Share of Trade Results: Citrus Fruits. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

In 2012, South Africa was among the top import sources of citrus fruits in China, only second after the USA, both in volume and in value terms. By 2016, South Africa was the leading source of import for citrus fruits in China, both in terms of value and volume.

Therefore, compared to other leading sources of imports for citrus fruits in China, South Africa moved from being the second largest import source in 2012 to the largest import source in 2016 both in terms of volume and value of trade. This implied that the South African share of trade for this category has increased in China.

4.2.1.2. H0808: Apples, pears and quinces, fresh

The fresh apples, pears and quinces category had two import partners for potential expansion in BRICS, being Brazil and India. The following depicts the findings for this category:

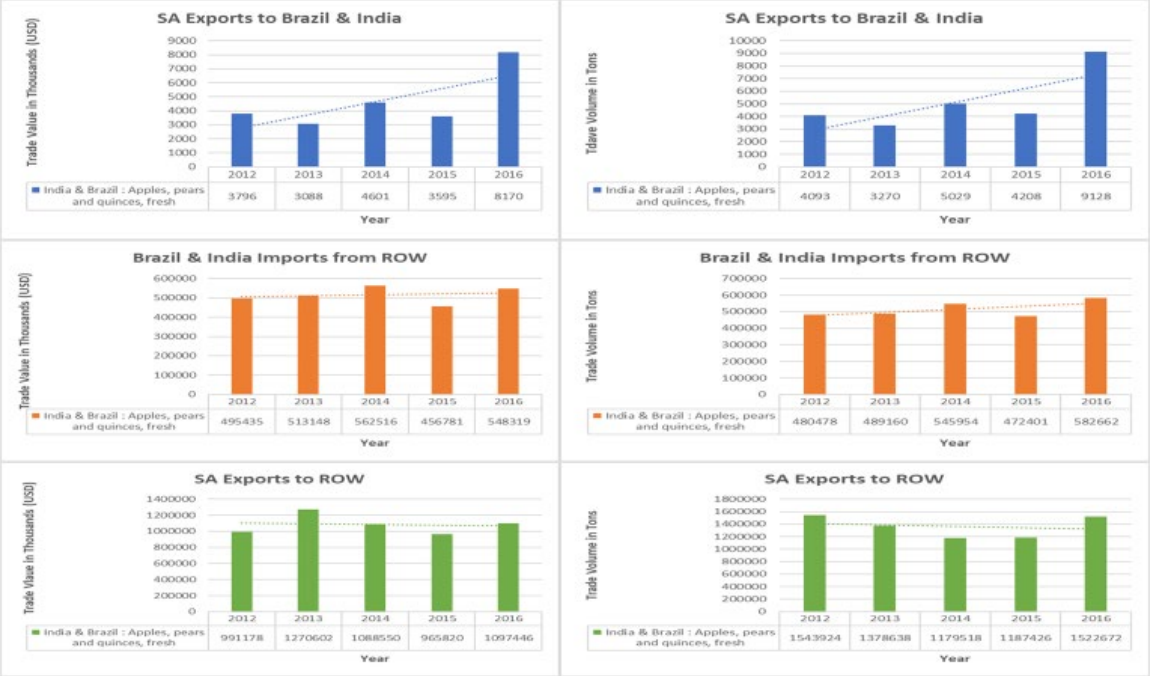


Figure 3: Growth Results: Fresh Apples, Pears and Quinces. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, it is evident that in terms of value South Africa increased its position of trade with the combined identified target BRICS partners of Brazil and India from US$3,7 million in 2012 to US$8,1 million in 2016 for the fresh apples, pears and quinces export category. The direction of the trendline was positive, increasing from 2012 to 2016. South African fresh apples, pears and quinces increased in volume over the period from 4,093 tons in 2012 to 9,128 tons in 2016. The general trend for volumes was also positive and increasing. Therefore, both in terms of value and volume; fresh apples, pears and quinces exports from South Africa to Brazil and India combined increased from 2012 to 2016.

In assessing the overall demand for the fresh apples, pears and quinces category, Brazilian and Indian imports for fresh apples, pears and quinces showed a slight increase over the period of 2012 to 2016 both in terms of value and volume. Therefore, even though South African exports of fresh apples, pears and quinces to Brazil and India increased over this period, combined demand from these countries had increased from other sources as well.

However, when assessing the entire export portfolio of fresh apples, pears and quinces for South Africa in value and volume terms, the overall trend was negative and decreasing from

2012 to 2016. This indicated that this product had been declining in terms of exports in South Africa in general to the rest of the world, even though it had increased for the targeted BRICS partners. This meant that in terms of BRICS, South Africa was taking advantage of its revealed comparative advantage and was growing in this category of exports; while not strongly pursuing opportunities in the rest of the world.

To understand the significance of this increase in trade, the following results were found:

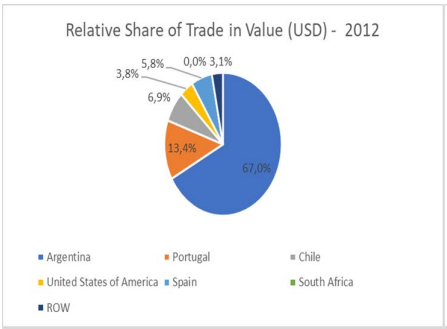
Table 2: Hypothesis Test Results – Fresh Apples, Pears and Quinces

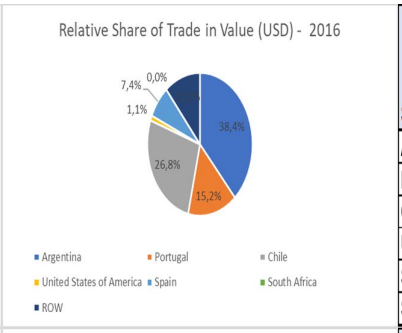
No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
2	0808	Fresh apples, pears and quinces	0,027707	0,028232

Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

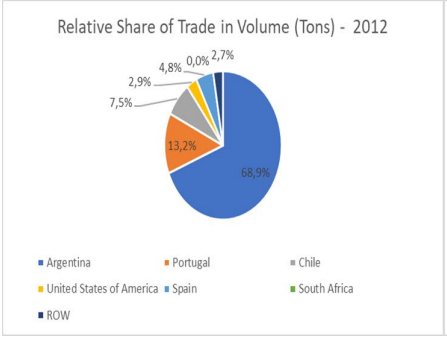
At the 5% level of significance, the two-sided t-test has a probability of 0.0277 for trade value position, therefore the null hypothesis was rejected. There was evidence of a change in the position of trade in terms of value with Brazil and India since 2012 for the fresh apples, pears and quinces category. The two-sided t-test has a probability of 0.0282 for trade volumes, therefore that null hypothesis was rejected as well. There was evidence of a change in the volume of fresh apples, pears and quinces exports to Brazil and India between 2012 and 2016.

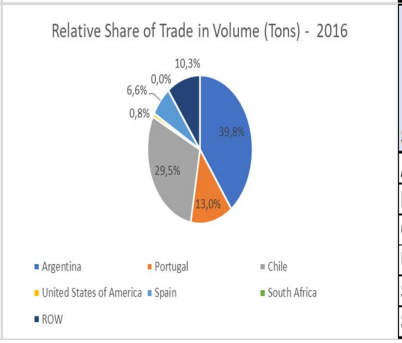
Zooming in on the trading position of South African fresh apples, pears and quinces imported by Brazil in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
Argentina	1	1
Portugal	2	3
Chile	3	2
United States of America	5	7
Spain	4	5
South Africa	16	16



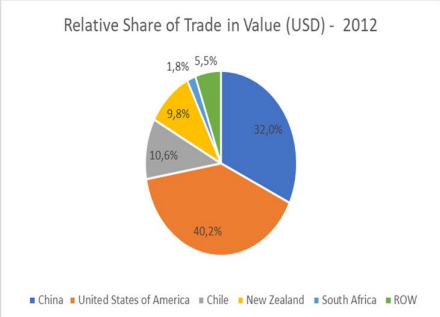


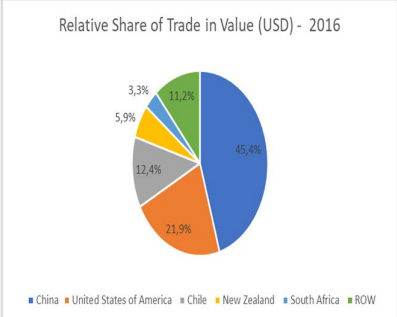
Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
Argentina	1	1
Portugal	2	3
Chile	3	2
United States of America	5	7
Spain	4	5
South Africa	16	16

Figure 4: Relative Share of Trade Results: Fresh Apples, Pears and Quinces for Brazil. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

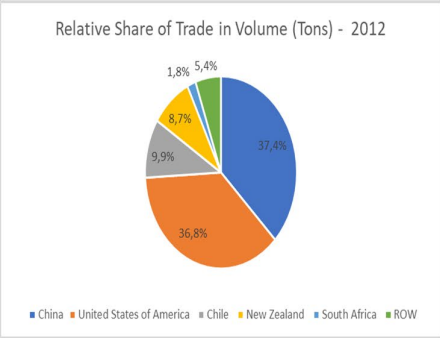
In 2012, South Africa was among the lowest import sources of fresh apples, pears and quinces in Brazil, both in volume and in value terms as trade was almost negligible. By 2016, South Africa's trade position had not improved much. In this category for Brazil in particular, it seemed that South Africa was not taking advantage or benefiting from its BRICS relations.

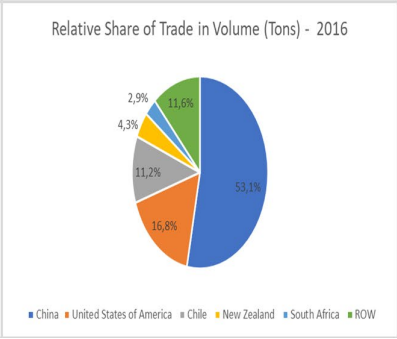
Zooming in on the trading position of South African fresh apples, pears and quinces imported by India, in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
China	2	1
United States of America	1	2
Chile	3	3
New Zealand	4	4
South Africa	5	6





Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
China	1	1
United States of America	2	2
Chile	3	3
New Zealand	4	4
South Africa	5	7

Figure 5: Relative Share of Trade Results: Fresh Apples, Pears and Quinces for India. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

In 2012, South Africa was among the lower import sources of fresh apples, pears and quinces in India, both in volume and in value terms. By 2016, South Africa's share in imports had improved and almost doubled from 1,8% to 3,3%. In this category for India in particular, it seemed that South Africa was taking advantage and was benefiting from its BRICS relations, although the growth was marginal.

So, while as a combined category fresh apples, pears and quinces had grown for the combined target countries, South Africa was performing better in India than in Brazil at the individual country level.

4.2.1.3. H2009: Fruit and vegetable juices, unfermented

The unfermented fruit and vegetable juices category had one import partner for potential expansion in BRICS, being Russia. The following depicts the findings for this category:

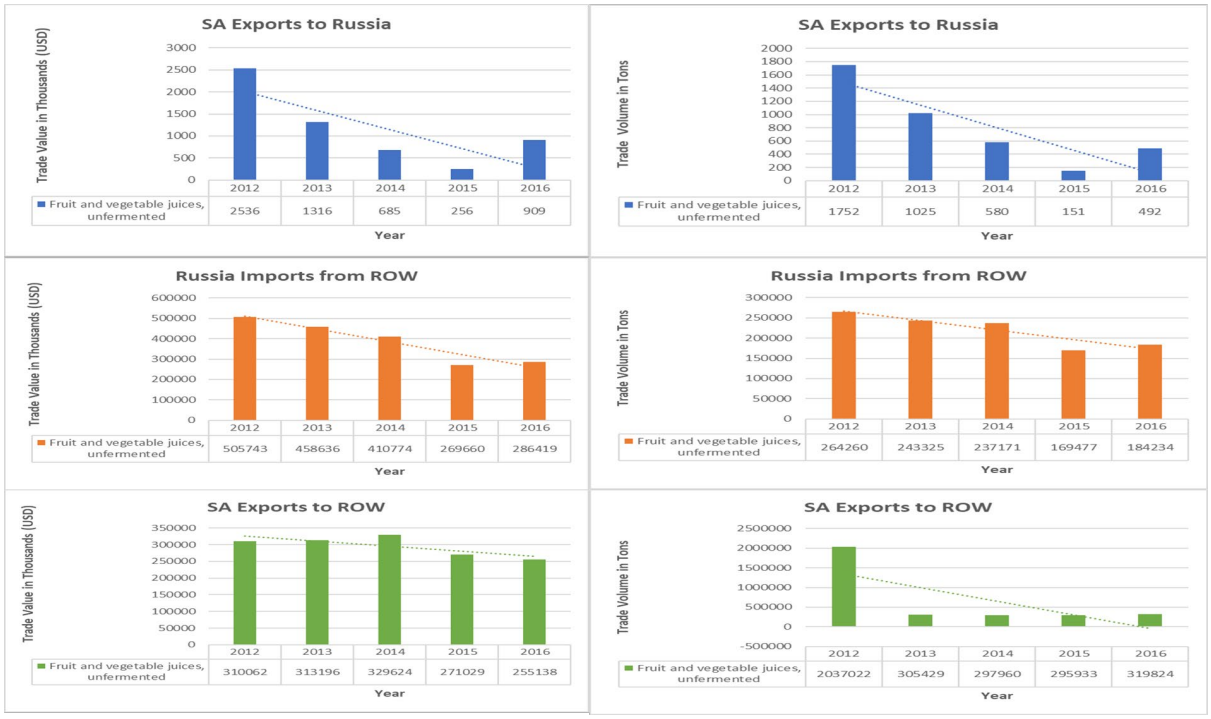


Figure 6: Growth Results: Unfermented Fruit and Vegetable Juices. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, in terms of value South Africa decreased its position of trade with the identified target BRICS partner of Russia from US$2,5million in 2012 to US$909 thousands in 2016 for the unfermented fruit and vegetable juices export category. The direction of the trade value trendline was negative, indicating a decline in trade from 2012 to 2016. South African unfermented fruit and vegetable juices also fell in volume over the specified period from 1,752 tons in 2012 to 492 tons in 2016. The general trend for volumes was negative and declining. Therefore, both in terms of value and volume, unfermented fruit and vegetable juices exports from South Africa to Russia dropped between 2012 and 2016.

In assessing the overall demand for the citrus fruits' category, Russian imports for unfermented fruit and vegetable juices showed a general decline over the period of 2012 to 2016 both in terms of value and volume, regardless of South African performance. This indicated that demand for this product had decreased in Russia, even from the other sources from the rest of the world, not just with South Africa.

When assessing the entire export portfolio of unfermented fruit and vegetable juices for South Africa in volume terms, the overall trend was also negative and declining from 2012 to 2016.

This confirmed that this product had been declining in terms of exports in South Africa in general, even to the rest of the world not just the target BRICS partner. This meant that unfermented fruit and vegetable juices as an export category were struggling despite South Africa's revealed comparative advantage.

To understand the significance of this decrease in trade, the following results were found:

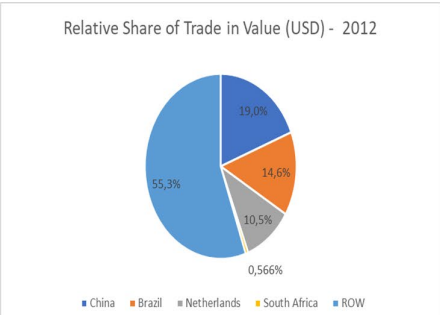
Table 3: Hypothesis Test Results – Fruit and vegetable juices, unfermented

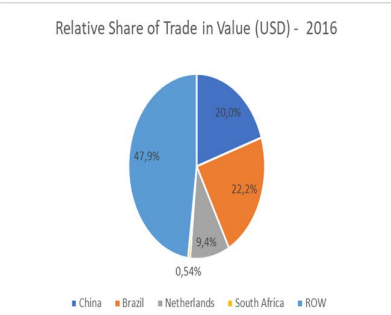
No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
3	2009	Fruit and vegetable juices, unfermented	0,847863	0,822736

Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

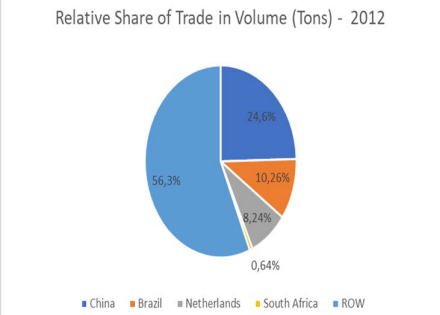
At the 5% level of significance, the two-sided t-test had a probability of 0.8479 for trade value position, therefore the null hypothesis failed to be rejected. There was no significant evidence of a change in the position of trade in terms of value with Russia since 2012 for the citrus fruits' category. The two-sided t-test had a probability of 0.0051 for trade volumes, therefore that null hypothesis failed to be rejected as well. There was not enough evidence of a change in the volume of unfermented fruit and vegetable juices exports to Russia since 2012.

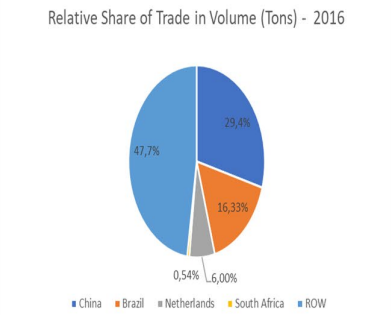
Zooming in on the trading position of South African unfermented fruit and vegetable juices imported by Russia, in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
China	1	2
Brazil	3	1
Netherlands	4	5
South Africa	23	23





Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
China	1	1
Brazil	3	2
Netherlands	5	5
South Africa	18	18

Figure 7: Relative Share of Trade Results: Unfermented Fruit and Vegetable Juices. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

In 2012, South Africa was among the lowest import sources of unfermented fruit and vegetable juices in Russia, with trade almost negligible, both in volume and in value terms. By 2016, South Africa was still not amongst the leading sources of import for unfermented fruit and vegetable juices in Russia, both in terms of value and volume. In this category, it seemed that South Africa was not benefiting from its BRICS relations.

4.2.1.4. H2204: Wine of fresh grapes

The wine of fresh grapes category had one import partner for potential expansion in BRICS, being Brazil. The following depicts the findings for this category:

Figure 8: Growth Results: Wine of Fresh Grapes. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, it is evident that in terms of value South Africa decreased its trading position with the identified target BRICS partner of Brazil from US$2,7million in 2012 to US$1,78 million in 2016 for wine of fresh grapes export category. The direction of the trendline was negative, indicating a decline in trade activity from 2012 to 2016. South African wine of fresh grapes dropped in volume over the specified period from 675 tons in 2012 to 661 tons in 2016. The general trade trend for volumes was also negative and decreasing. Therefore, both in terms of trade value and trade volume, wine of fresh grapes exports from South Africa to Brazil had been declining overall since the IDC study was conducted using 2012 data.

The overall demand from the rest of the world for the wine of fresh grapes category, Brazilian imports for wine of fresh grapes showed a general decline over the period of 2012 to 2016 in terms of value but an increasing trend in terms of volumes for the same period. This could be attributed to a number of factors, such as a possible indication of a reduction in tariffs. This indicated that there was increasing demand for this product in Brazil, but at lower prices.

When assessing the entire export portfolio of wine of fresh grapes for South Africa in volume terms, the overall trend was also negative and declining from 2012 to 2016. This confirmed

that this product had been declining in terms of exports in South Africa in general, even to the rest of the world not just the target BRICS partner. This meant that wine of fresh grapes as an export category was struggling despite South Africa's revealed comparative advantage.

To understand the significance of this decline in trade, the following results were found:

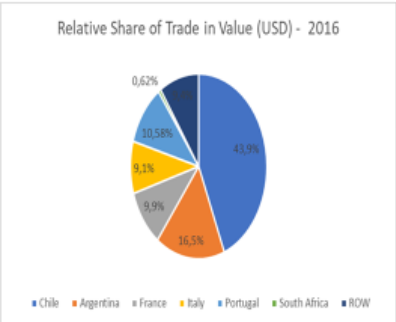
Table 4: Hypothesis Test Results – Wine of Fresh Grapes

No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
4	2204	Wine of fresh grapes	0,061262	0,684334

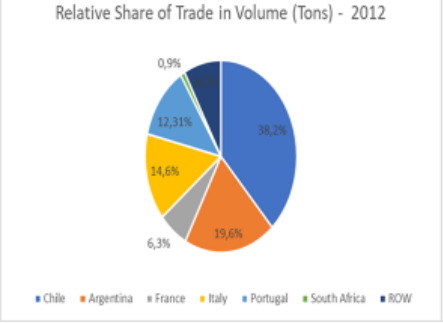
Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

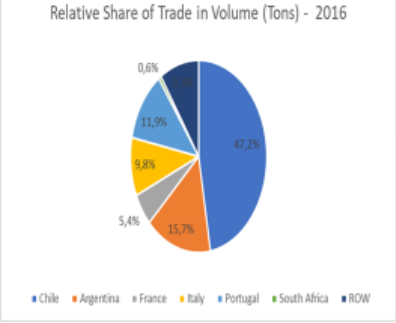
At the 5% level of significance, the two-sided t-test had a probability of 0.0613 for trade value position, therefore the null hypothesis failed to be rejected. There was no statistically significant evidence of a change in the position of trade in terms of value with Brazil since 2012 for the wine of fresh grapes category. The two-sided t-test had a probability of 0.6843 for trade volumes, therefore that null hypothesis failed to be rejected. There was not enough evidence of a change in the volume of wine of fresh grapes exports to Brazil since 2012.

Zooming in on the trading position of South African wine of fresh grapes imported by Brazil, in 2012 compared to 2016 relative to other import sources, the following was found:



Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
Chile	1	1
Argentina	2	2
France	3	4
Italy	5	5
Portugal	4	3
South Africa	8	9





Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
Chile	1	1
Argentina	2	2
France	5	5
Italy	3	4
Portugal	4	3
South Africa	8	9

Figure 9: Relative Share of Trade Results: Wine of Fresh Grapes. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

In 2012, South Africa was among the lowest import sources of wine of fresh grapes in Brazil, with trade almost negligible, both in volume and in value terms. By 2016, South Africa was still not amongst the leading sources of import for wine of fresh grapes in Brazil, both in terms of value and volume. In this category, it appeared that South Africa was not benefiting from its BRICS relations.

4.2.1.5. H2601: Iron Ores and Concentrates; Including Roasted Iron Pyrites

The iron ores and concentrates category had one import partner for potential expansion in BRICS, being Russia. The following depicts the findings for this category:

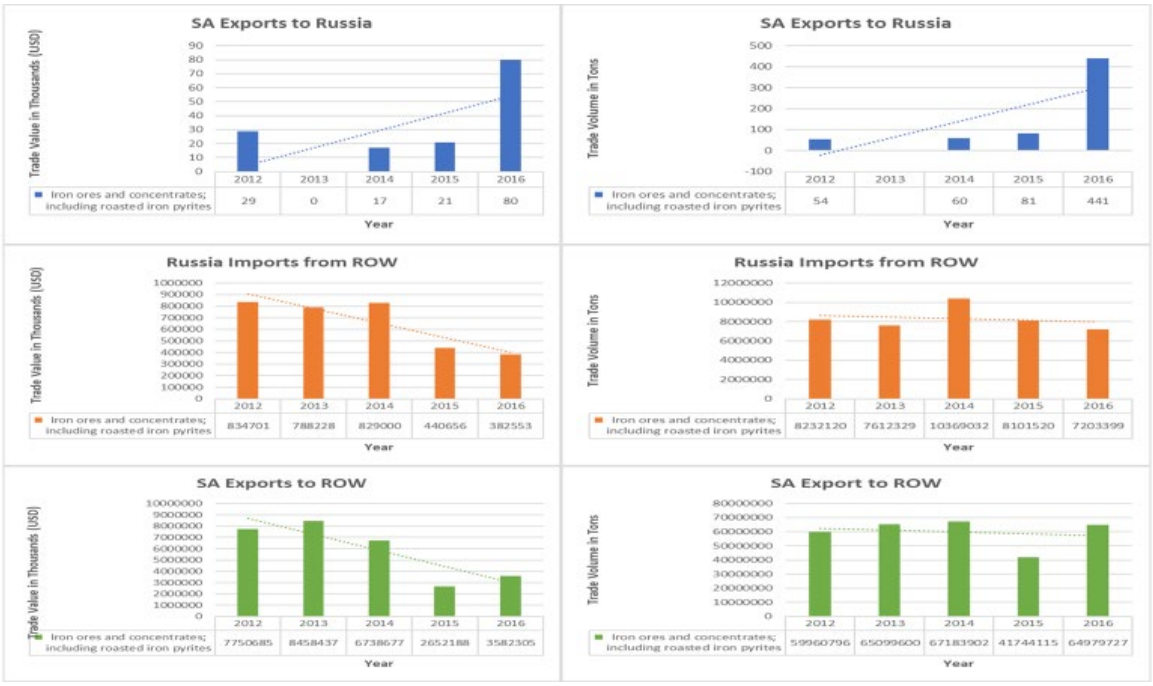


Figure 10: Growth Results: Iron Ores and Concentrates; Including Roasted Iron Pyrites. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, it is evident that in terms of value South Africa had increased its trading position with the identified target BRICS partner of Russia from US$29 thousands in 2012 to US$80 thousands in 2016 for the iron ores and concentrates export category. The direction of the trendline was positive, indicating an increasing trend for trade value from 2012 to 2016. South African iron ores and concentrates also increased in volume over the period from 54 tons in 2012 to 441 tons in 2016. The general trade volume trend was positive and increasing. Therefore, both in terms of trade value and trade volume, iron ores and concentrates exports from South Africa to Russia had been increasing since the IDC study was conducted using 2012 data.

In assessing the overall demand for the iron ores and concentrates category, Russian imports for iron ores and concentrates showed a general decline over the period of 2012 to 2016 both in terms of value and volume. This indicated that even though South African exports of iron ores and concentrates to Russia have increased over this period, overall Russian demand for this product was decreasing.

However, when assessing the entire export portfolio of iron ores and concentrates for South Africa in volume and value terms, again the overall trend was negative and declining from 2012 to 2016. This confirmed that this product had been increasing in terms of exports to Russia

in particular, while the rest of the world was buying this product for less than before from South Africa. Therefore, for this product it seemed South Africa was taking advantage of its revealed comparative advantage and was growing in this category of exports in the BRICS bloc.

To understand the significance of this increase in trade, the following results were found:

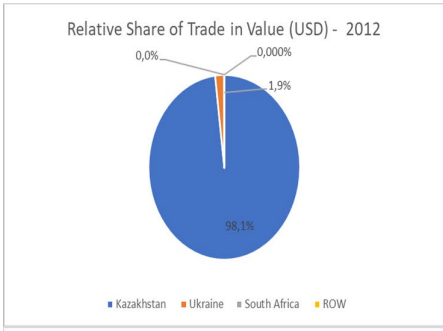
Table 5: Hypothesis Test Results – Iron Ores and Concentrates; Including Roasted Iron Pyrites

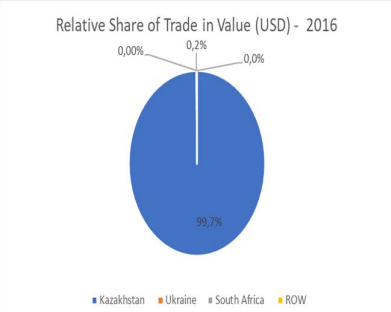
No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
5	2601	Iron ores and concentrates; including roasted iron pyrites	0,272502	0,276161

Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

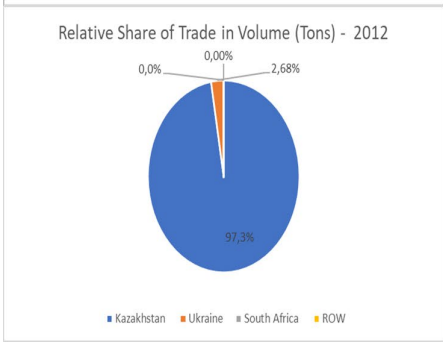
At the 5% level of significance, the two-sided t-test had a probability of 0.2725 for trade value position, therefore the null hypothesis was rejected. There was evidence of a change in the position of trade in terms of value with Russia since 2012 for the iron ores and concentrates category. The two-sided t-test had a probability of 0.2761 for trade volumes, therefore that null hypothesis was rejected as well. There was evidence of a change in the volume of iron ores and concentrates exports to Russia since 2012.

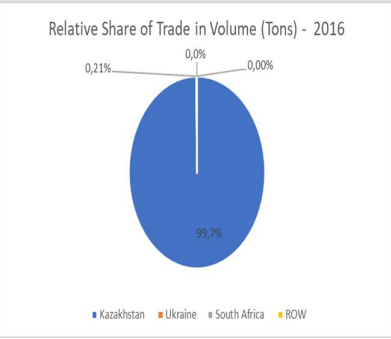
Zooming in on the trading position of South African iron ores and concentrates imported by Russia, in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
Kazakhstan	1	1
Ukraine	2	2
Sweden	6	3
Iran (Islamic Republic of)	7	8
Brazil	11	10
South Africa	19	19





Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
Kazakhstan	1	1
Ukraine	2	2
Sweden	6	3
Iran (Islamic Republic of)	7	8
Brazil	13	11
South Africa	19	19

Figure 11: Relative Share of Trade Results: Iron Ores and Concentrates; Including Roasted Iron Pyrites. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

In 2012, South Africa was among the lowest import sources of iron ores and concentrates in Russia, both in volume and in value terms. By 2016, South Africa was still amongst the lowest source of import for iron ores and concentrates in Russia, both in terms of value and volume. In this category, it seemed that South Africa was taking advantage and was benefiting from its BRICS relations, even though it was marginal compared to other sources. This was a positive step towards improved intra-BRICS trade goals of South Africa.

4.2.1.6. H2701: Coal; Briquettes, Ovoids and Similar Solid Fuels Manufactured from Coal

The coal; briquettes, ovoids and similar solid fuels manufactured from coal category had one import partner for potential expansion in BRICS, being Russia. The following depicts the findings for this category:

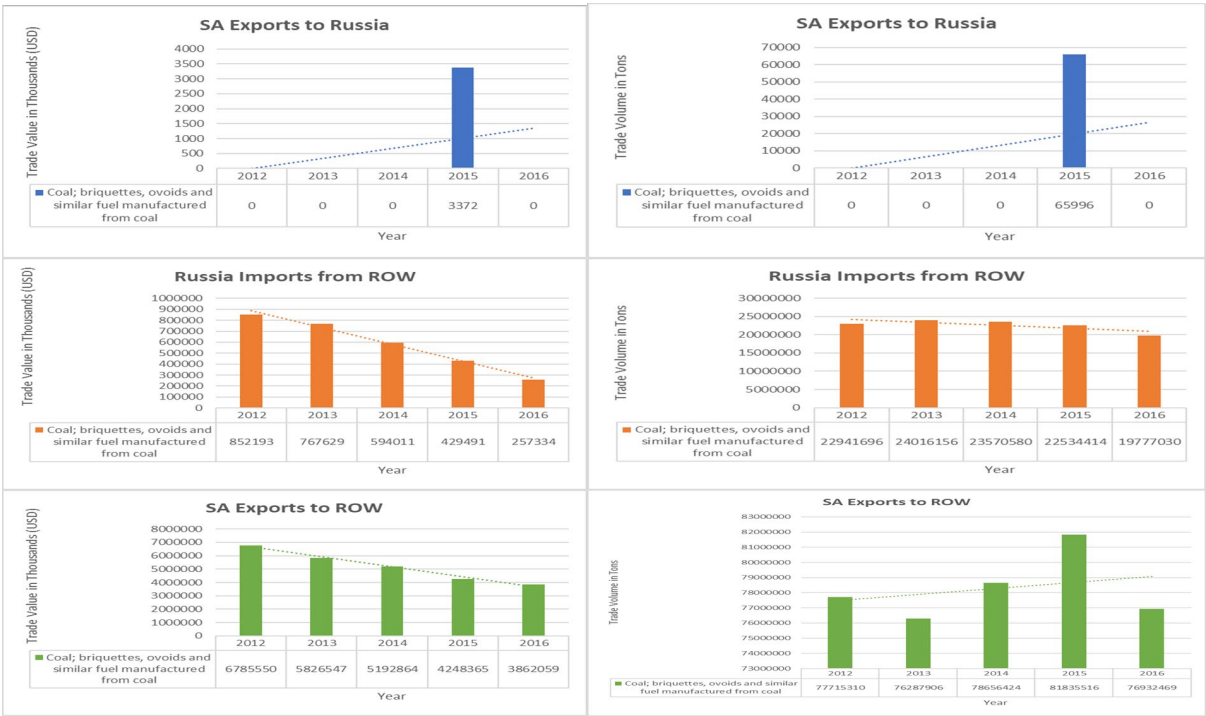


Figure 12: Growth Results: Coal; Briquettes, Ovoids and Similar Solid Fuels Manufactured from Coal. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, it is evident that in terms of value South Africa had increased its position of trade with the identified target BRICS partner of Russia from US$0 thousands in 2012 to US$3,3 million in 2015 for the coal; briquettes, ovoids and similar solid fuels manufactured from coal export category. The direction of the trendline was positive, indicating an increasing trading trend for the period under review. South African iron ores and concentrates also increased in volume over the period from 0 tons in 2012 to 65,996 tons in 2015. The general trend for volumes was positive and increasing. Therefore, both in terms of value and volume, iron ores and concentrates exports from South Africa to Russia had been increasing overall since the IDC study was conducted using 2012 data. It is to be noted however, that the growth was sporadic. Generally, there was no trade between these two countries except in 2015. This could be could be a new market for South Africa, and that would explain the nature of trade.

In assessing the overall demand for the coal; briquettes, ovoids and similar solid fuels manufactured from coal category, Russian imports for coal; briquettes, ovoids and similar solid fuels manufactured from coal showed a general decline over the period of 2012 to 2016 both in terms of value and volume. This indicated that even though South African exports of iron

ores and concentrates to Russia had increased over this period, overall Russian demand for this product was decreasing.

However, when assessing the entire export portfolio to the rest of the world of the coal; briquettes, ovoids and similar solid fuels manufactured from coal products for South Africa in volume terms, again the overall trend was increasing, yet in terms of value it was decreasing. This indicated that even though this product had been increasing in terms of exports to Russia, the rest of the world was buying this product more than before, but at reduced income to South Africa. Therefore, for this product it seemed South Africa was taking advantage of its revealed comparative advantage and was growing in this category of exports in the BRICS bloc.

To understand the significance of this increase in trade, the following results were found:

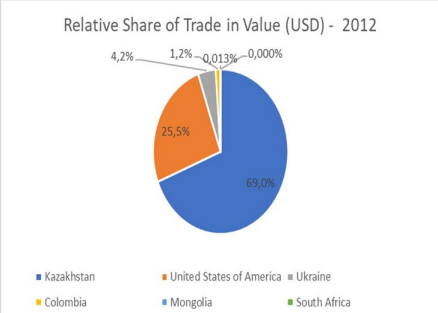
Table 6: Hypothesis Test Results – Coal; Briquettes, Ovoids and Similar Solid Fuels Manufactured from Coal

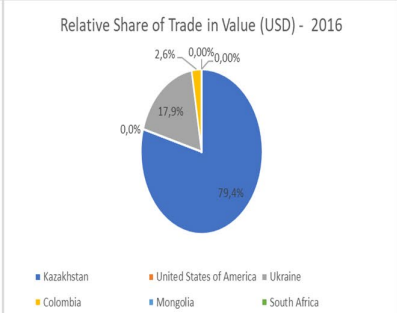
No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
6	2701	Coal; briquettes, ovoids and similar solid fuels manufactured from coal	0,391002	0,391002

Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

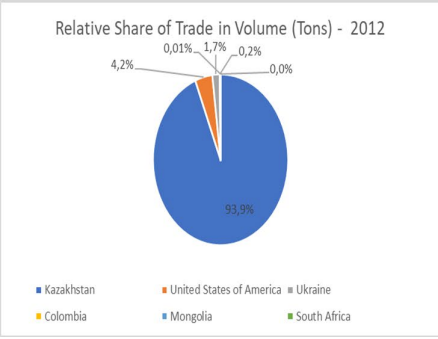
At the 5% level of significance, the two-sided t-test had a probability of 0.3910 for trade value position, therefore the null hypothesis failed to be rejected. There was no evidence of a statistically significant change in the position of trade in terms of value with Russia since 2012 for the coal; briquettes, ovoids and similar solid fuels manufactured from coal category. The two-sided t-test had a probability of 0.3910 for trade volumes, therefore that null hypothesis failed to be rejected as well. There was not enough statistically significant evidence of a change in the volume of coal; briquettes, ovoids and similar solid fuels manufactured from coal exports to Russia since 2012.

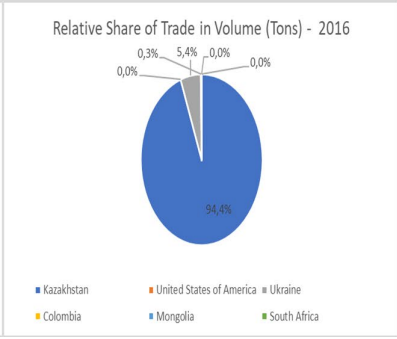
Zooming in on the trading position of South African coal; briquettes, ovoids and similar solid fuels manufactured from coal imported by Russia, in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
Kazakhstan	1	1
United States of America	2	7
Ukraine	3	2
Colombia	4	3
Mongolia	6	13
South Africa	29	29





Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
Kazakhstan	1	1
United States of America	2	10
Ukraine	3	2
Colombia	4	3
Mongolia	5	13
South Africa	29	29

Figure 13: Relative Share of Trade Results: Coal; Briquettes, Ovoids and Similar Solid Fuels Manufactured from Coal. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

In 2012, South Africa was among the lowest import sources of coal; briquettes, ovoids and similar solid fuels manufactured from coal in Russia, both in volume and in value terms. By 2016, South Africa was still amongst the lowest source of import for iron ores and concentrates in Russia, both in terms of value and volume. In this category, it seemed that South Africa was benefiting from its BRICS relations though marginally compared to other import sources.

4.2.1.7. H2712: Petroleum Jelly, Mineral Waxes and Similar Products

The petroleum jelly, mineral waxes and similar products category had one import partner for potential expansion in BRICS, being India. The following depicts the findings for this category:

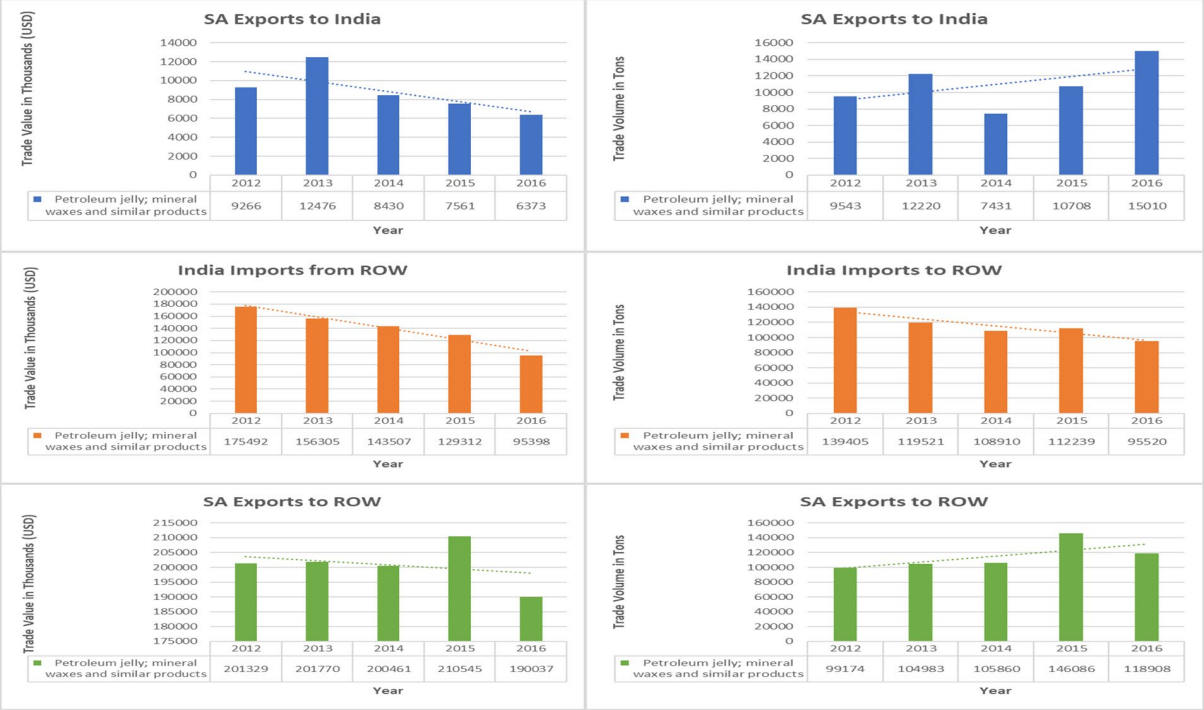


Figure 14: Growth Results: Petroleum Jelly, Mineral Waxes and Similar Products. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, it is evident that in terms of value South Africa had decreased its trading position with the identified target BRICS partner of India from US$9,2 million in 2012 to US$6,3 million in 2016 for the petroleum jelly, mineral waxes and similar products export category. The direction of the trendline was negative, indicating a decreasing trading status from 2012 to 2016. However, South African petroleum jelly, mineral waxes and similar products increased in volume over the same period from 9,543 tons in 2012 to 15,010 tons in 2016. The general trade volume trend was positive and increasing. Therefore, in terms of volume, petroleum jelly, mineral waxes and similar products exports from South Africa to India had been increasing overall since the IDC study was conducted using 2012 data. While for the same goods, the monetary value received by South Africa had dropped.

In assessing the overall demand for the petroleum jelly, mineral waxes and similar products category, Indian imports for petroleum jelly, mineral waxes and similar products showed a general decrease over the period of 2012 to 2016 both in terms of value and volume, regardless of South African performance. This indicated that even though South African exports of petroleum jelly, mineral waxes and similar products to India had increased over this period, Indian demand had dropped from other sources.

When assessing the entire export portfolio of petroleum jelly, mineral waxes and similar products for South Africa in volume terms, the overall trend was positive and increasing from 2012 to 2016. In terms of value, there was a declining trend. This confirmed that this product had been increasing in terms of exports in South Africa in general, even to the rest of the world not just the target BRICS partner, even though the monetary compensation was falling. This means that despite strong Indian demand for this product, South Africa was taking advantage of its revealed comparative advantage and was growing in this category of exports.

To understand the significance of this increase in trade, the following results were found:

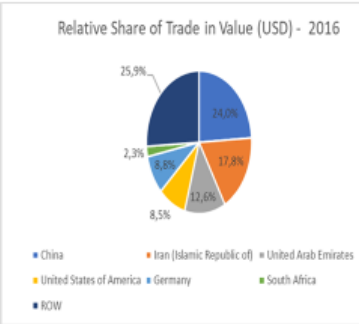
Table 7: Hypothesis Test Results – Petroleum Jelly, Mineral Waxes and Similar Products

No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
7	2712	Petroleum jelly, mineral waxes and similar products	0,020471	0,006675

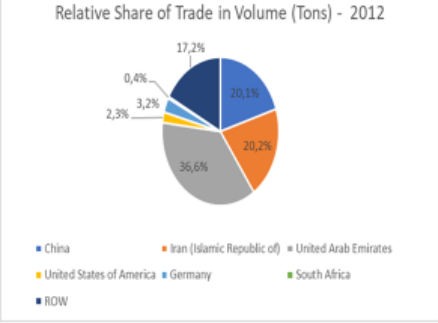
Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

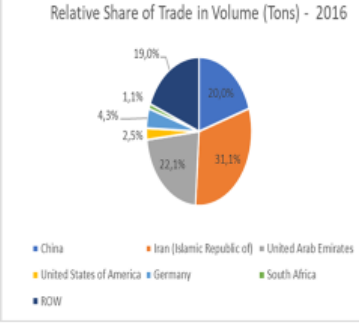
At the 5% level of significance, the two-sided t-test had a probability of 0.0205 for trade value position, therefore the null hypothesis was rejected. There was evidence of a change in the position of trade in terms of value with India since 2012 for the petroleum jelly, mineral waxes and similar products category. The two-sided t-test had a probability of 0.0067 for trade volumes, therefore that null hypothesis was rejected as well. There was evidence of a change in the volume of petroleum jelly, mineral waxes and similar products exports to India since 2012.

Zooming in on the trading position of South African petroleum jelly, mineral waxes and similar products imported by India, in 2012 compared to 2016 relative to other import sources, the following was found:



Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
China	2	1
Iran (Islamic Republic of)	3	2
United Arab Emirates	1	3
United States of America	5	5
Germany	4	4
South Africa	14	9





Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
China	3	3
Iran (Islamic Republic of)	2	1
United Arab Emirates	1	2
United States of America	8	7
Germany	5	5
South Africa	14	11

Figure 15: Relative Share of Trade Results: Petroleum Jelly, Mineral Waxes and Similar Products. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

In 2012, South Africa was among the lower import sources of petroleum jelly, mineral waxes and similar products in India, both in volume and in value terms. By 2016, South Africa was the still amongst the lowest sources of import for petroleum jelly, mineral waxes and similar products in India, both in terms of value and volume but a definite improvement could be noted. In this category, it seemed that South Africa was taking advantage and was benefiting from its BRICS relations. This is a positive step towards improved intra-BRICS trade goals of South Africa.

4.2.1.8. H2809: Diphosphorus Pentaoxide; Phosphoric Acid and Polyphosphoric Acids

The diphosphorus pentaoxide; phosphoric acid and polyphosphoric acids category had one import partner for potential expansion in BRICS, being Brazil. The following depicts the findings for this category:

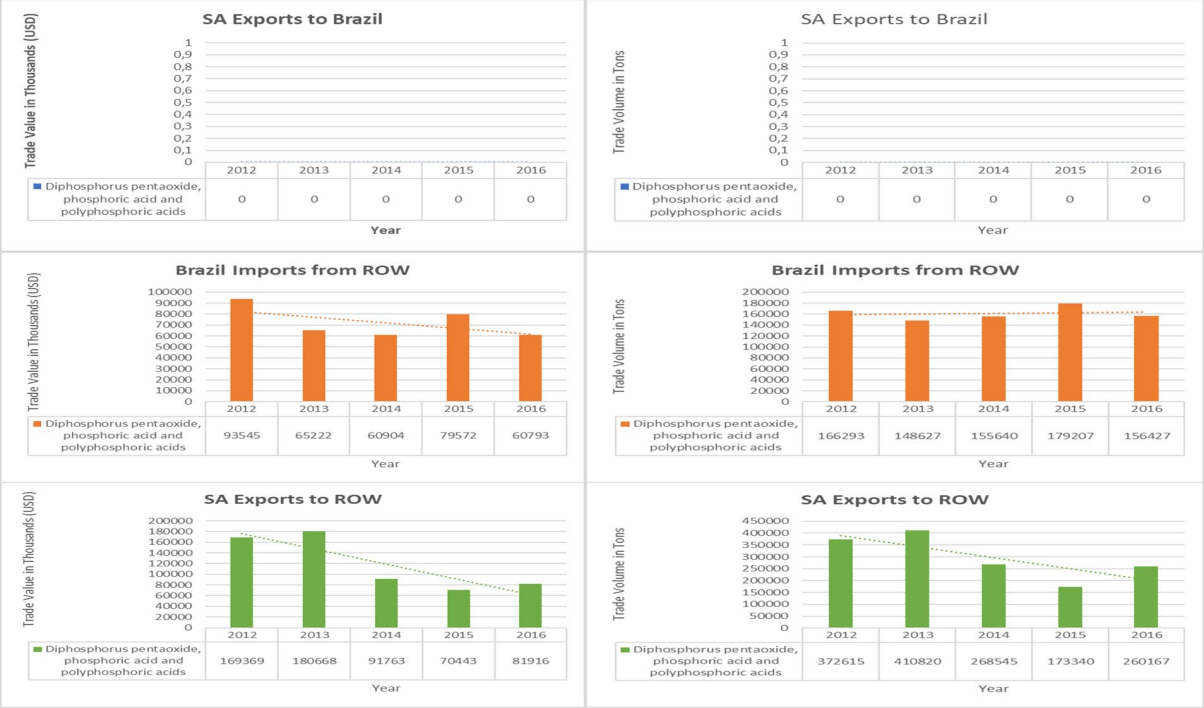


Figure 16: Growth Results: Diphosphorus Pentaoxide; Phosphoric Acid and Polyphosphoric Acids. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, it is evident that both in terms of value and volume South Africa had not moved regarding its trading position with the identified target BRICS partner of Brazil for the period under review for the diphosphorus pentaoxide; phosphoric acid and polyphosphoric acids export category. The direction of the trendline was therefore flat neither increasing nor decreasing as expected. South Africa was not exporting any products of this category to Brazil.

In assessing the overall demand for the diphosphorus pentaoxide; phosphoric acid and polyphosphoric acidscategory, Brazilian imports for diphosphorus pentaoxide; phosphoric acid and polyphosphoric acids showed a slight increase over the period of 2012 to 2016 both in terms of volume, but also showed a sharp decline in terms of the value of trade. This indicates that even though South African exports of diphosphorus pentaoxide; phosphoric acid and polyphosphoric acids to Brazil had not changed over this period, Brazilian demand had increased from other sources, although at cheaper rates.

However, when assessing the entire export portfolio of diphosphorus pentaoxide; phosphoric acid and polyphosphoric acids for South Africa in volume and value terms to the rest of the world, the overall trend was negative and declining for the period under review from 2012 to

2016. This indicates that this particular product had been declining in terms of exports in South Africa in general. This meant that despite strong Brazilian demand for this product, South Africa was not taking advantage of its revealed comparative advantage and was not growing in this category of exports.

To understand the significance of this results in trade, the following was found:

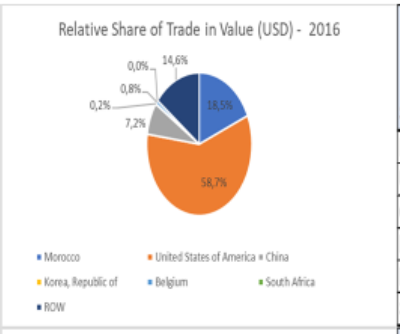
Table 8: Hypothesis Test Results – Diphosphorus Pentaoxide; Phosphoric Acid and Polyphosphoric Acids

No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
8	2809	Diphosphorus pentaoxide; phosphoric acid and polyphosphoric acids	1,0000	1,0000

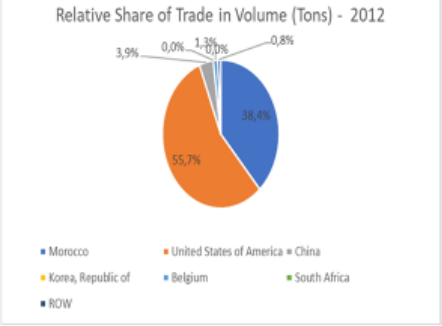
Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

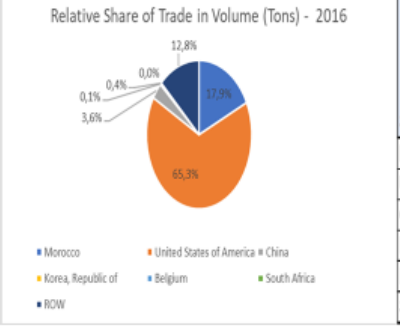
At the 5% level of significance, the two-sided t-test had a probability of 1.0000 for trade value position, therefore the null hypothesis failed to be rejected. There was no evidence of a change in the position of trade in terms of value with Brazil since 2012 for the diphosphorus pentaoxide; phosphoric acid and polyphosphoric acids category. The two-sided t-test had a probability of 1.0000 for trade volumes, therefore that null hypothesis also failed to be rejected. There was no evidence of a change in the volume of diphosphorus pentaoxide; phosphoric acid and polyphosphoric acids exports to Brazil since 2012.

Zooming in on the trading position of South African citrus fruits imported by Brazil, in 2012 compared to 2016 relative to other import sources, the following was found:



Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
Morocco	2	2
United States of America	1	1
China	3	4
Korea, Republic of	19	8
Belgium	4	6
South Africa	18	17





Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
Morocco	2	2
United States of America	1	1
China	3	4
Korea, Republic of	22	7
Belgium	4	6
South Africa	18	18

Figure 17: Relative Share of Trade Results: Diphosphorus Pentaoxide; Phosphoric Acid and Polyphosphoric Acids. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

For the period under review, South Africa has remained among the lowest import sources of diphosphorus pentaoxide; phosphoric acid and polyphosphoric acids in Brazil. In this category, it seemed that South Africa was not taking advantage nor benefiting from its BRICS relations.

4.2.1.9. H2901: Acyclic Hydrocarbons

The acyclic hydrocarbons category had two import partners for potential expansion in BRICS, being China and India. The following depicts the findings for this category:

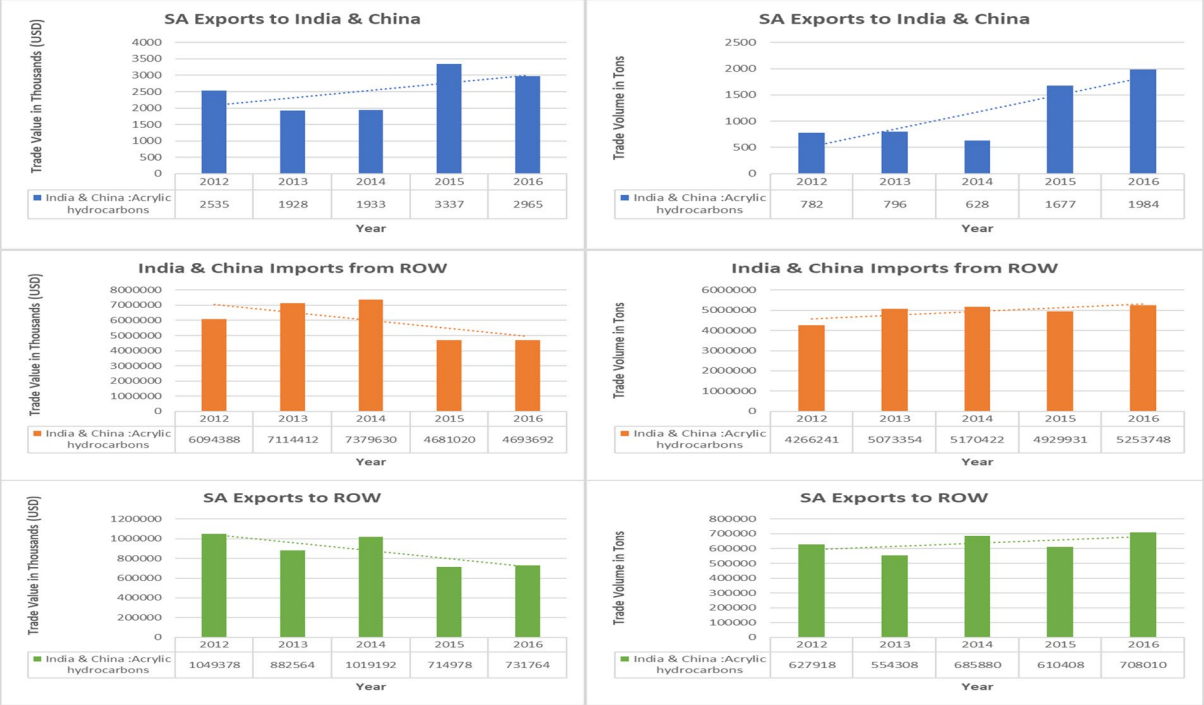


Figure 18: Growth Results: Acyclic Hydrocarbons. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, it is evident that in terms of value South Africa had increased its position of trade with the combined identified target BRICS partners of China and India from US$2,5million in 2012 to US$2,9million in 2016 for the acyclic hydrocarbons export category. The direction of the trendline was positive, indicating an increasing trading status from 2012 to 2016. South African acyclic hydrocarbons increased in volume over the period from 782 tons in 2012 to 1,984 tons in 2016. The general trade volume trend was positive and increasing. Therefore, both in terms of value and volume, acyclic hydrocarbons exports from South Africa to China and India combined had been increasing overall since the IDC study was conducted using 2012 data.

In assessing the overall demand for the acyclic hydrocarbons category for these two countries from the rest of the world, the combined Chinese and Indian imports for acyclic hydrocarbons showed a general increase over the period of 2012 to 2016 both counties in terms of volume, while there is a decrease in terms of value of trade.

However, when assessing the entire export portfolio of acyclic hydrocarbons for South Africa in volume terms, the overall trend is positive and increasing from 2012 to 2016. Overall exports

in terms of value are declining though, indicating declining received revenue for South Africa. This indicated that this product had been increasing in terms of exports in South Africa in general, even to the rest of the world not just the target BRICS partners. This meant that despite a strong combined Chinese and Indian demand for this product, South Africa was taking advantage of its revealed comparative advantage and was growing in this category of exports.

To understand the significance of this increase in trade, the following results were found:

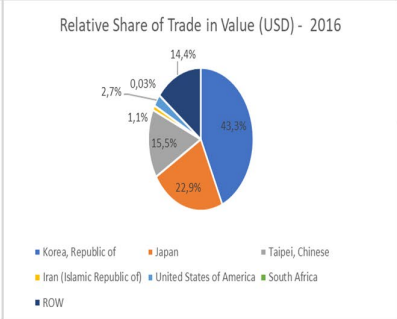
Table 9: Hypothesis Test Results – Acyclic Hydrocarbons

No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
9	2901	Acyclic hydrocarbons	0,014374687	0,05645674

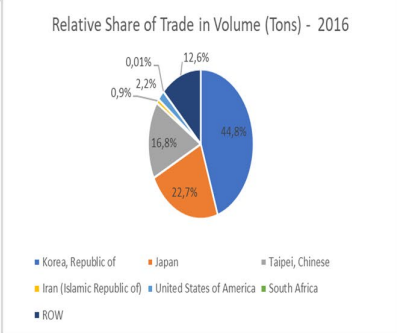
Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

At the 5% level of significance, the two-sided t-test had a probability of 0.0144 for trade value position, therefore the null hypothesis was rejected. There was evidence of a change in the position of trade in terms of value with China and India since 2012 for the acyclic hydrocarbon's category. The two-sided t-test had a probability of 0.0565 for trade volumes, therefore that null hypothesis was rejected as well. There was evidence of a change in the volume of acyclic hydrocarbons exports to China and India combined since 2012.

Zooming in on the trading position of South African acyclic hydrocarbons imported by China, in 2012 compared to 2016 relative to other import sources, the following was found:



Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
Korea, Republic of	1	1
Japan	2	2
Taipei, Chinese	3	3
Iran (Islamic Republic of)	4	11
United States of America	10	4
South Africa	23	26

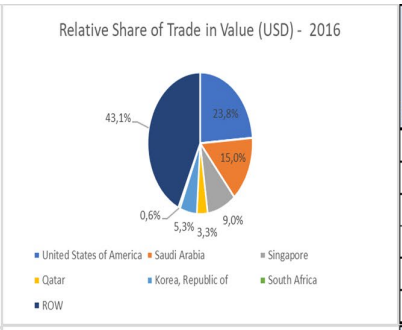


Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
Korea, Republic of	1	1
Japan	2	2
Taipei, Chinese	3	3
Iran (Islamic Republic of)	5	11
United States of America	10	4
South Africa	23	28

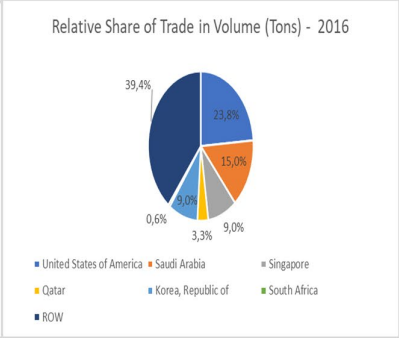
Figure 19: Relative Share of Trade Results: Acyclic Hydrocarbons for China. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

Throughout the period under review, South Africa was among the lowest import sources of acyclic hydrocarbons in China both in volume and in value terms. In this category, it seemed that South Africa was not taking advantage or benefiting from its BRICS relations.

Zooming in on the trading position of South African acyclic hydrocarbons imported by India, in 2012 compared to 2016 relative to other import sources, the following was found:



Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
United States of America	3	1
Saudi Arabia	2	2
Singapore	3	3
Qatar	4	9
Korea, Republic of	6	7
South Africa	16	21



Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
United States of America	3	1
Saudi Arabia	1	2
Singapore	2	3
Qatar	4	9
Korea, Republic of	6	7
South Africa	16	21

Figure 20: Relative Share of Trade Results: Acyclic Hydrocarbons for India. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

For the period under review, South Africa was among the lowest import sources of acyclic hydrocarbons in India, both in terms of value and volume. In this category, it seemed that South Africa was only marginally benefiting from its BRICS relations.

So, while as a combined category, acyclic hydrocarbons exports have grown to the combined target countries, South Africa was performing better in India than in China at the individual country level.

4.2.1.10. H2905: Acyclic Alcohols and their Derivatives

The acyclic alcohols and their derivatives category had two import partners for potential expansion in BRICS, being Brazil and Russia. The following depicts the findings for this category:

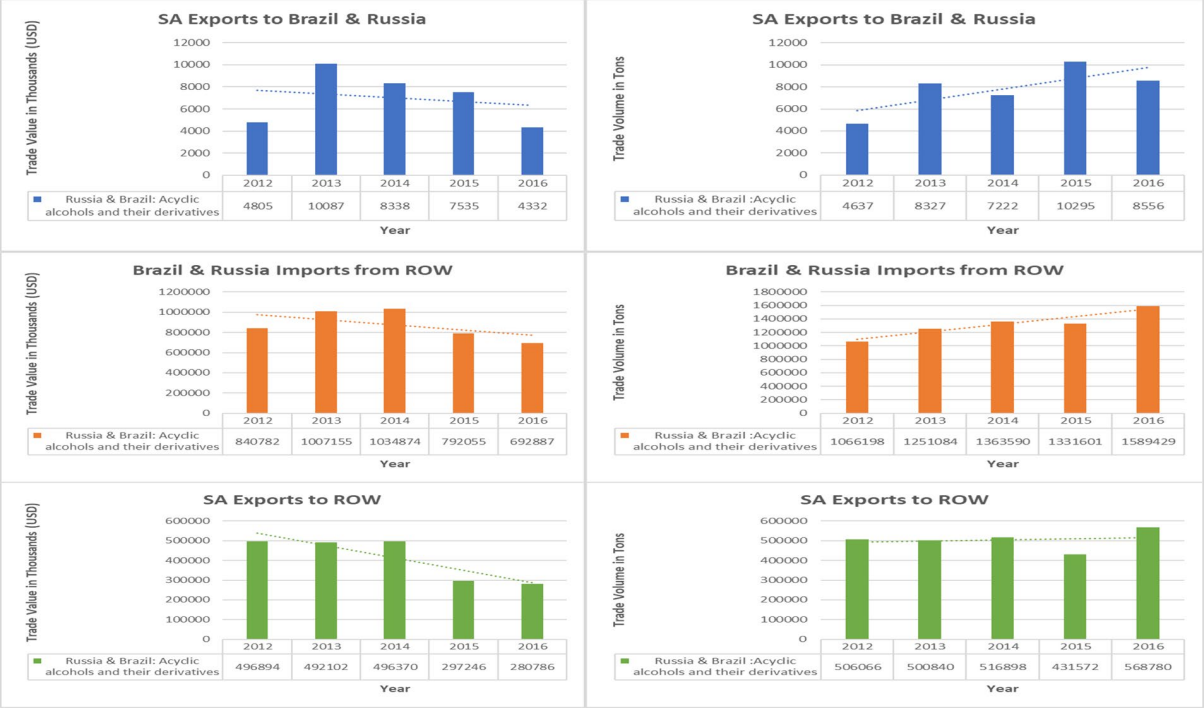


Figure 21: Growth Results: Acyclic Alcohols and their Derivatives. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, it is evident that in terms of value South Africa had decreased its trading position with the combined identified target BRICS partners of Brazil and Russia from US$4,8 million in 2012 to US$4,3 million in 2016 for the acyclic alcohols and their derivatives export category. The direction of the trendline for trade value was negative, indicating a decrease in trade from 2012 to 2016. South African acyclic alcohols and their derivatives increased in volume over the period from 4,637 tons in 2012 to 8,556 tons in 2016. The general trade volume trend was positive and increasing.

In assessing the overall demand for the acyclic alcohols and their derivatives category with the rest of the world, Brazilian and Russian imports for acyclic alcohols and their derivatives showed an increase over the period of 2012 to 2016 volume, however the value of those imports was showing a declining trend, which was similar to the imports from South Africa. This indicated that even though South African exports of acyclic alcohols and their derivatives to Brazil and Russia had increased over this period, combined demand from these countries had increased from other sources as well.

However, when assessing the entire export portfolio of acyclic alcohols and their derivatives for South Africa in volume terms, the overall trend was negative and decreasing from 2012 to

2016. This indicates that this product had been increasing in terms of exports in South Africa in general to the rest of the world, even though it had increased for the targeted BRICS partners. This meant that in terms of BRICS, South Africa was taking advantage of its revealed comparative advantage and was growing in this category of exports; while it was also pursuing opportunities in the rest of the world.

To understand the significance of this increase in trade, the following results were found:

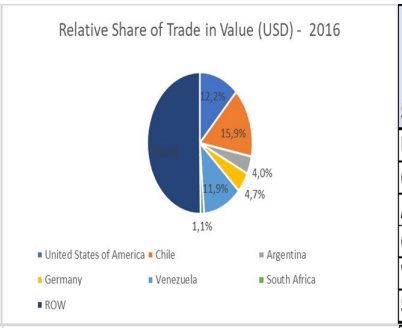
Table 10: Hypothesis Test Results – Acyclic Alcohols and their Derivatives

No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
10	2905	Acyclic alcohols and their derivatives	0,004850325	0,00030494

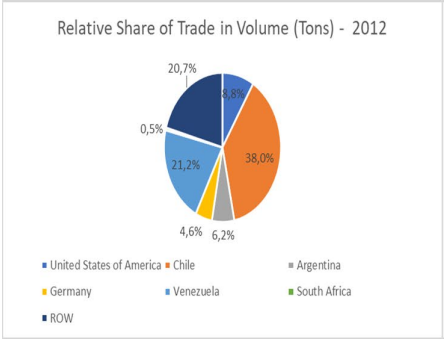
Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

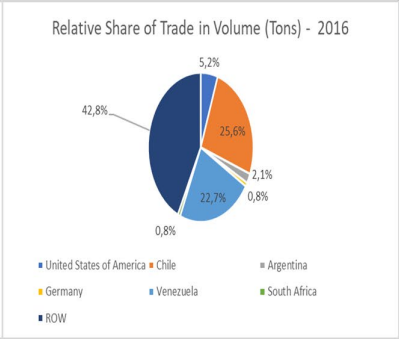
At the 5% level of significance, the two-sided t-test had a probability of 0.0049 for trade value position, therefore the null hypothesis was rejected. There was evidence of a change in the position of trade in terms of value with Brazil and Russia since 2012 for the acyclic alcohols and their derivatives category. The two-sided t-test had a probability of 0.0003 for trade volumes, therefore that null hypothesis was rejected as well. There was evidence of a change in the volume of acyclic alcohols and their derivatives exports to Brazil and Russia since 2012.

Zooming in to the trading position of South African acyclic alcohols and their derivatives imported by Brazil, in 2012 compared to 2016 relative to other import sources, the following was found:



Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
United States of America	2	4
Chile	1	2
Argentina	5	8
Germany	4	7
Venezuela	3	5
South Africa	12	14



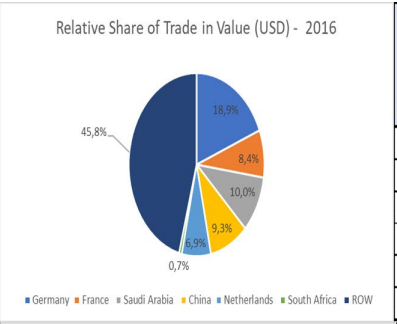


Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
United States of America	4	5
Chile	1	1
Argentina	5	6
Germany	6	10
Venezuela	2	3
South Africa	11	11

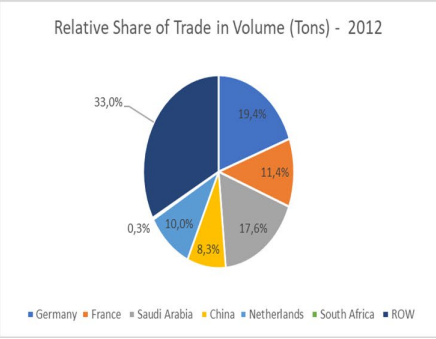
Figure 22: Relative Share of Trade Results: Acyclic Alcohols and their Derivatives for Brazil. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

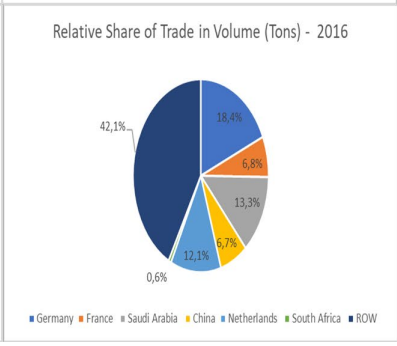
For the period under review, South Africa was among the lowest import sources of acyclic alcohols and their derivatives in Brazil, both in volume and in value terms, even though this trade was quite minor compared to other import sources. In this category for Brazil in particular, it seemed that South Africa was benefiting from its BRICS relations.

Zooming in on the trading position of South African fresh apples, pears and quinces imported by Russia, in 2012 compared to 2016 relative to other import sources, the following was found:



Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
Germany	1	1
France	3	5
Saudi Arabia	2	3
China	4	4
Netherlands	6	6
South Africa	26	21





Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
Germany	1	1
France	3	6
Saudi Arabia	2	2
China	5	7
Netherlands	4	3
South Africa	24	18

Figure 23: Relative Share of Trade Results: Acyclic Alcohols and their Derivatives for Russia. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

For the period under review, South Africa was among the lowest import sources of acyclic alcohols and their derivatives in Russia, both in volume and in value. In this category for Russia in particular, it appeared that South Africa was not taking advantage or benefiting from its BRICS relations.

Therefore, while as a combined category, acyclic alcohols and their derivatives exports had grown to the combined target countries, South Africa was performing better in Brazil than in Russia at the individual country level.

4.2.1.11. H7202: Ferro-alloys

The ferro-alloys category had one import partner for potential expansion in BRICS, being Russia. The following depicts the findings for this category:

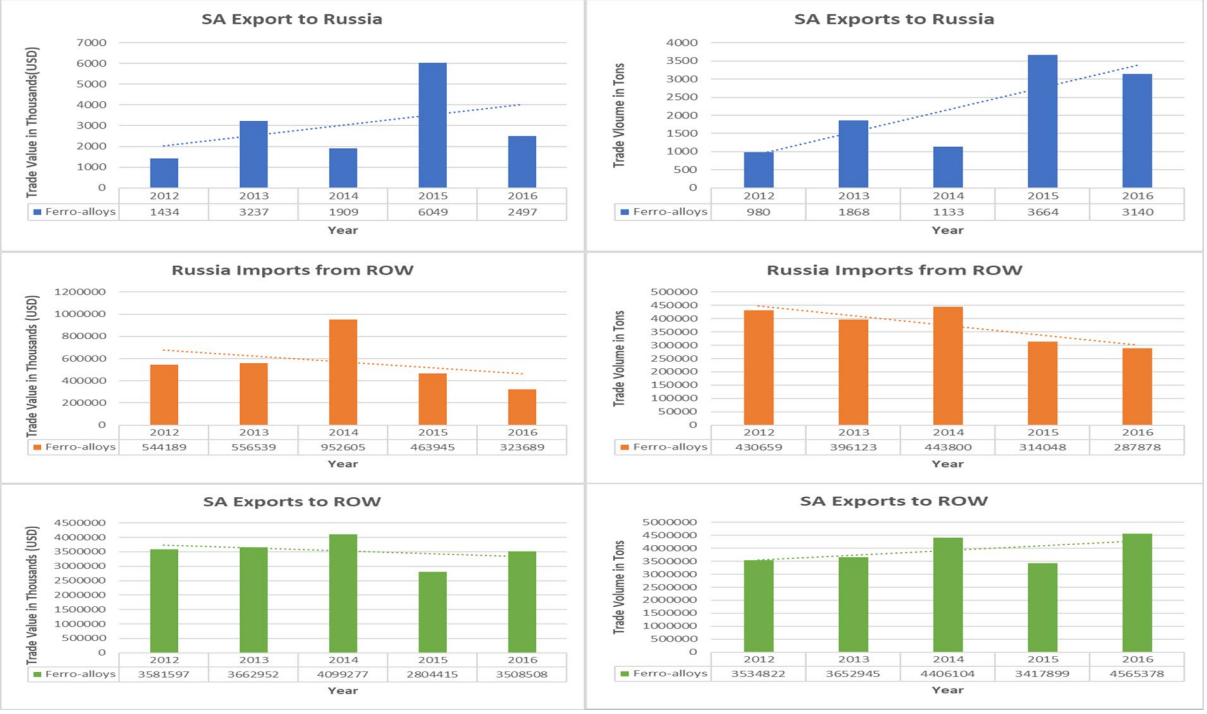


Figure 24: Growth Results: Ferro-alloys. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, it is evident that in terms of value South Africa had increased its trading position with the identified target BRICS partner of Russia from US$1,4million in 2012 to US$2,4 million in 2016 for the ferro-alloys export category. The direction of the trendline was positive, indicating an increasing trade value trend from 2012 to 2016. South African ferro-alloys increased in volume over the period from 980 tons in 2012 to 3,140 tons in 2016. The general trade volume trend was positive and increasing. Therefore, both in terms of value and volume, ferro-alloys exports from South Africa to Russia had been increasing overall since the IDC study was conducted using 2012 data.

In assessing the overall demand for the ferro-alloys category from the rest of the world, Russian imports for ferro-alloys showed a general decline over the period of 2012 to 2016 both in terms of value and volume. This indicated that even though South African exports of ferro-alloys to Russia had increased over this period, Russian demand had fallen from other sources.

However, when assessing the entire export portfolio of ferro-alloys for South Africa in volume terms, the overall trend was positive and increasing from 2012 to 2016. The trend for ferro-alloys in terms of value was falling though. This confirmed that this product had been

increasing in terms of exports in South Africa in general, even to the rest of the world not just the target BRICS partner. This meant that despite weak global Russian demand for this product, South Africa was taking advantage of its revealed comparative advantage and was growing in this category of exports.

To understand the significance of this increase in trade, the following results were found:

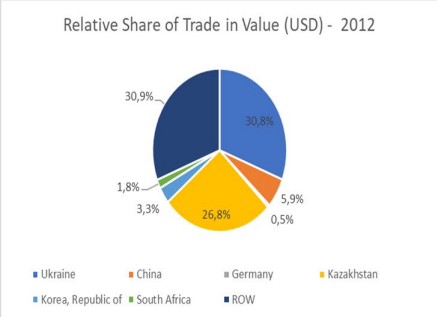
Table 11: Hypothesis Test Results – Ferro-alloys

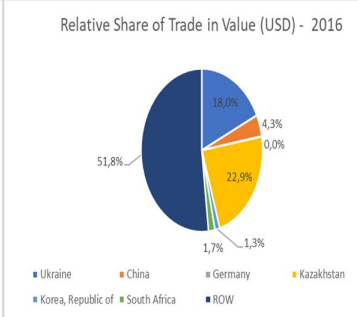
No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
11	7202	Ferro-alloys	0,036441397	0,029692205

Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

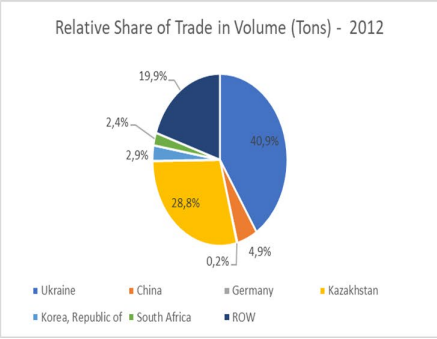
At the 5% level of significance, the two-sided t-test had a probability of 0.0364 for trade value position, therefore the null hypothesis was rejected. There was evidence of a change in the position of trade in terms of value with Russia since 2012 for the ferro-alloys category. The two-sided t-test had a probability of 0.0297 for trade volumes, therefore that null hypothesis was rejected as well. There was evidence of a change in the volume of ferro-alloys exports to Russia since 2012.

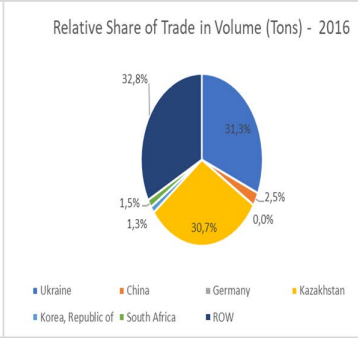
Zooming in on the trading position of South African ferro-alloys imported by Russia, in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
Ukraine	1	3
China	5	7
Germany	14	24
Kazakhstan	2	1
Korea, Republic of	7	9
South Africa	10	8





Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
Ukraine	1	1
China	4	5
Germany	13	25
Kazakhstan	2	2
Korea, Republic of	8	7
South Africa	9	6

Figure 25: Relative Share of Trade Results: Ferro-alloys. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

In 2012, South Africa was among the lower import sources of ferro-alloys in Russia, both in volume and in value terms. By 2016, South Africa was still amongst the lower sources of import for ferro-alloys in Russia, but there was a definite upward improvement, both in terms of value and volume. In this category, it seemed that South Africa was taking advantage and was benefiting from its BRICS relations. This was a positive step towards improved intra-BRICS trade goals of South Africa.

4.2.1.12. H7308: Structures (rods, angles, plates) of Iron and Steel (not elsewhere specified)

The structures of steel and iron category had four import partners for potential expansion in BRICS. The following depicts the findings for this category:

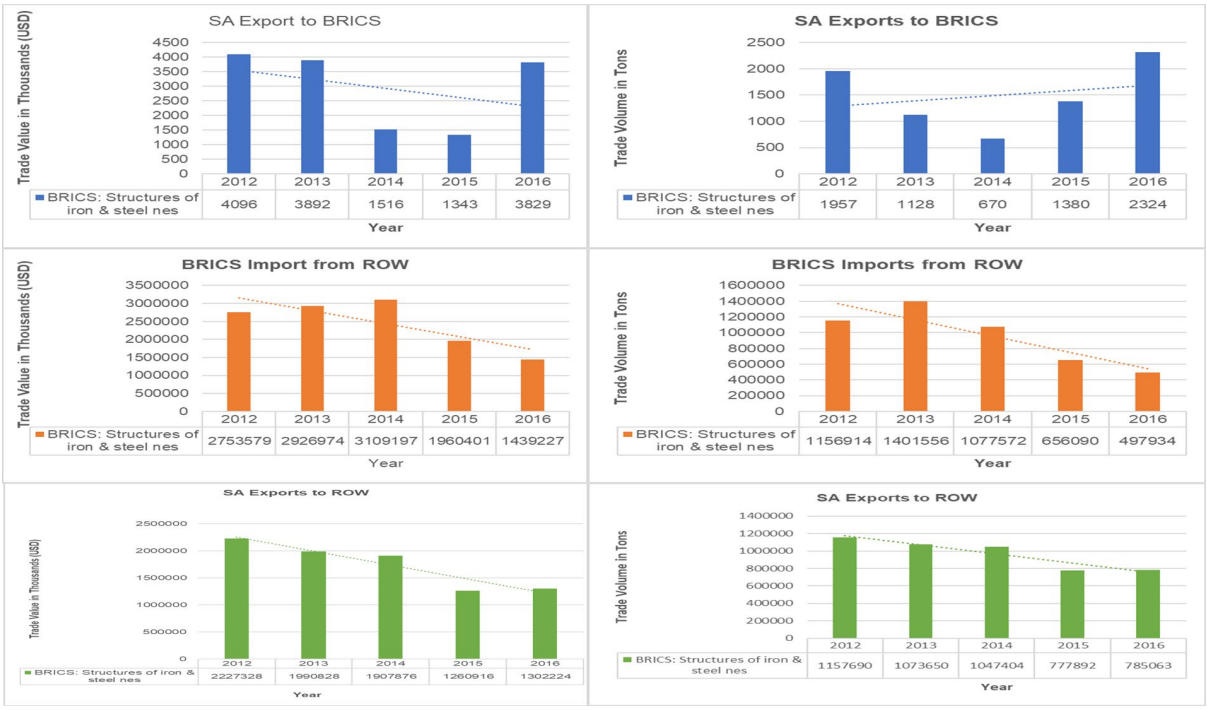


Figure 26: Growth Results: Structures (rods, angles, plates) of Iron and Steel (not elsewhere specified). Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, it is evident that in terms of value South Africa had decreased its trading position with the combined identified targeted BRICS partners of China, Russia, India and Brazil from US$4,1 million in 2012 to US$3,8 million in 2016 for the structures of steel and iron export category. The direction of the trendline was negative, indicating a decreasing trade value from 2012 to 2016. South African structures of steel and iron increased in volume though, over the period from 1,299 tons in 2012 to 1,670 tons in 2016. The general trend for trade volumes was positive and increasing. Therefore, in terms of volume, structures of steel and iron exports from South Africa to China had been increasing overall since the IDC study was conducted using 2012 data, while doing so at lower overall prices.

In assessing the overall demand for the structures of steel and iron category from the rest of the world, BRIC(S) imports for structures of steel and iron showed a general decline over the period of 2012 to 2016 both in terms of value and volume, regardless of South African performance. This indicated that even though South African exports of structures of steel and iron to the BRIC(S) partners had increased over this period, BRIC(S) demand had fallen from other sources.

However, when assessing the entire export portfolio of structures of steel and iron for South Africa in volume terms, the overall trend was negative and falling from 2012 to 2016. This confirmed that this product had been declining in terms of exports in South Africa in general, particularly to the rest of the world. South Africa was taking advantage of its revealed comparative advantage and was growing in this category of exports with its BRIC(S) partners.

To understand the significance of this increase in trade, the following results were found:

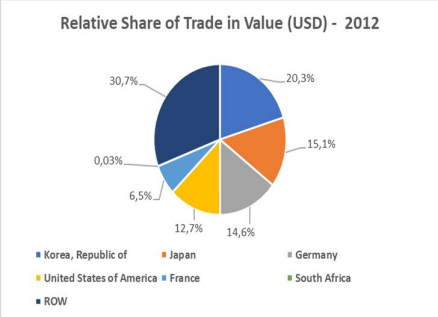
Table 12: Hypothesis Test Results – Structures (rods, angles, plates) of Iron and Steel (not elsewhere specified)

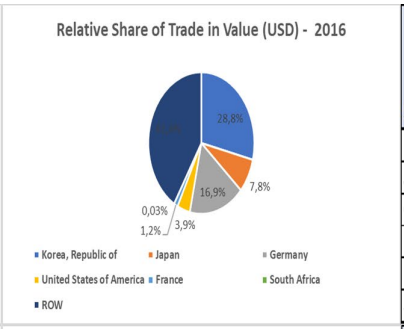
No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
12	7308	Structures (rods, angles, plates) of iron and steel (nes)	0,292972897	0,554686815

Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

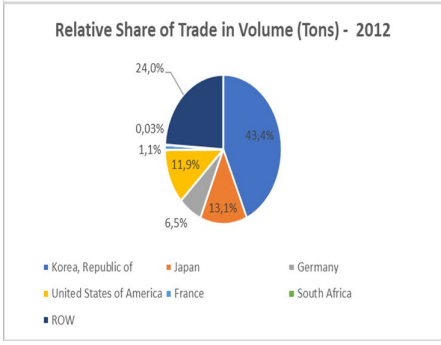
At the 5% level of significance, the two-sided t-test had a probability of 0.29297 for trade value position, therefore the null hypothesis failed to be rejected. There was no evidence of a statistically significant change in the position of trade in terms of value with BRICS since 2012 for the structures of steel and iron category. The two-sided t-test had a probability of 0.5547 for trade volumes, therefore that null hypothesis also failed to be rejected. There was no evidence of a statistically significant change in the volume of structures of steel and iron exports to the BRIC(S) since 2012.

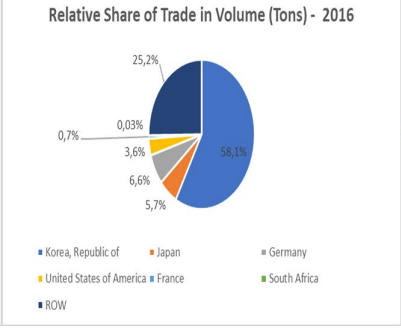
Zooming in on the trading position of South African structures of steel and iron exports imported by China, in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
Korea, Republic of	1	1
Japan	2	4
Germany	3	2
United States of America	4	7
France	6	17
South Africa	37	41



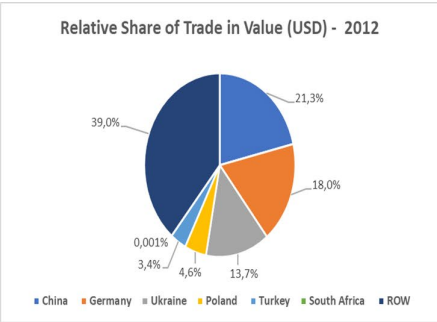


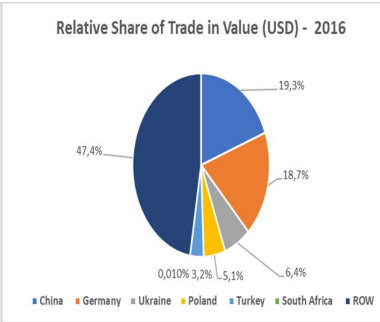
Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
Korea, Republic of	1	1
Japan	2	4
Germany	4	3
United States of America	3	5
France	12	16
South Africa	39	37

Figure 27: Relative Share of Trade Results: Structures (rods, angles, plates) of Iron and Steel (not elsewhere specified) for China. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

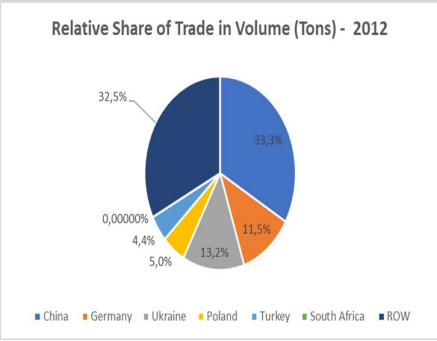
For the period under review, South Africa was among the lowest import sources of structures of steel and iron exports in China, both in volume and in value terms. In this category, it seemed that South Africa was not benefiting from its BRICS relations.

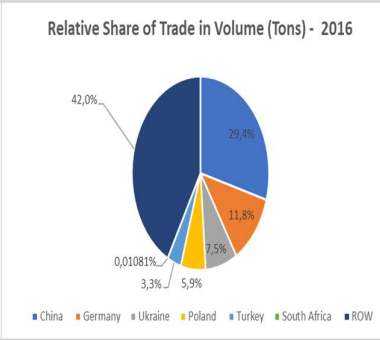
Zooming in on the trading position of South African structures of steel and iron exports imported by Russia, in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
China	1	1
Germany	2	2
Ukraine	3	5
Poland	6	6
Turkey	9	9
South Africa	56	51



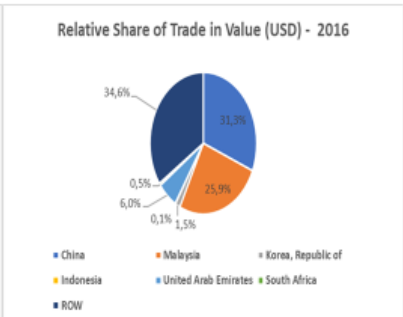


Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
China	1	1
Germany	2	3
Ukraine	3	4
Poland	5	5
Turkey	8	7
South Africa	63	47

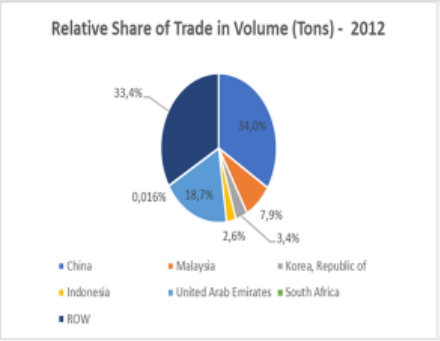
Figure 28: Relative Share of Trade Results: Structures (rods, angles, plates) of Iron and Steel (not elsewhere specified) for Russia. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

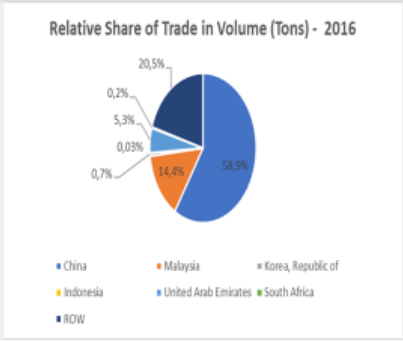
For the period under review, South Africa was among the lowest import sources of structures of steel and iron exports in Russia, both in volume and in value terms. In this category, it seemed that South Africa was not benefiting from its BRICS relations.

Zooming in on the trading position of South African structures of steel and iron exports imported by India, in 2012 compared to 2016 relative to other import sources, the following was found:



Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
China	1	1
Malaysia	2	2
Korea, Republic of	5	11
Indonesia	6	32
United Arab Emirates	3	4
South Africa	43	19



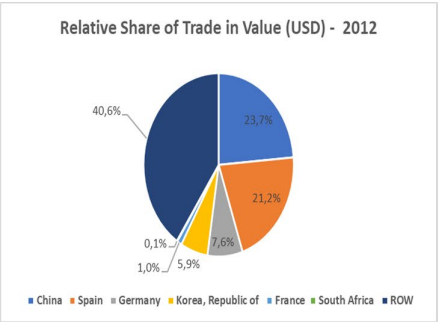


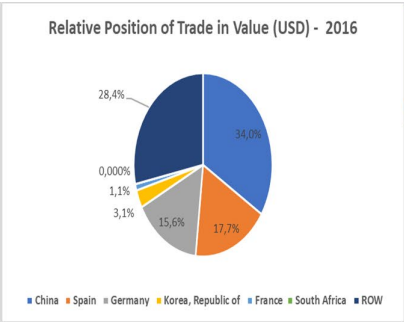
Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
China	1	1
Malaysia	3	2
Korea, Republic of	6	8
Indonesia	8	39
United Arab Emirates	2	4
South Africa	44	18

Figure 29: Relative Share of Trade Results: Structures (rods, angles, plates) of Iron and Steel (not elsewhere specified) for India. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

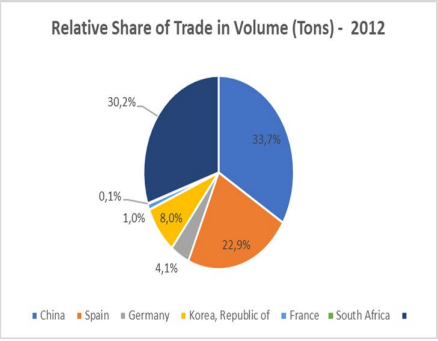
For the period under review, South Africa was among the lowest import sources of structures of steel and iron exports in India, both in volume and in value terms. In this category, it seemed that South Africa was benefiting from its BRICS relations, although trade levels were still relatively low.

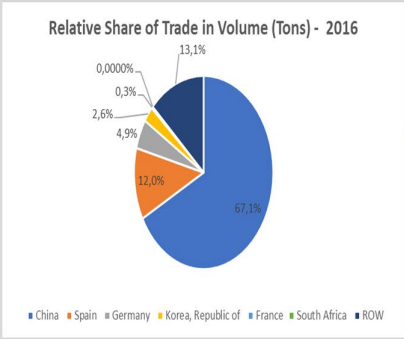
Zooming in on the trading position of South African structures of steel and iron exports imported by Brazil, in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
China	1	1
Spain	2	2
Germany	3	3
Korea, Republic of	4	6
France	18	12
South Africa	35	47





Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
China	1	1
Spain	2	2
Germany	6	3
Korea, Republic of	3	4
France	16	15
South Africa	29	50

Figure 30: Relative Share of Trade Results: Structures (rods, angles, plates) of Iron and Steel (not elsewhere specified) for Brazil. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

For the period under review, South Africa was among the lowest import sources of structures of steel and iron exports in Brazil, both in volume and in value terms. In this category, it seemed that South Africa was not benefiting from its BRICS relations.

Therefore, while as a combined category, structures of steel and iron exports had grown to the combined target countries, South Africa was performing better in India than in any of the other BRICS countries at the individual country level.

4.2.1.13. H7606: Aluminium Plates, Sheets and Strips, of a Thickness Exceeding 0.2mm

The aluminium plates, sheets and strips, of a thickness exceeding 0.2mm category had two import partners for potential expansion in BRICS, being India and Russia. The following depicts the findings for this category:

Figure 31: Growth Results: Aluminium Plates, Sheets and Strips, of a Thickness Exceeding 0.2mm. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, it is evident that in terms of value South Africa had decreased its trading position with the combined identified target BRICS partners of India and Russia from US$7,5 million in 2012 to US$4,4 million in 2016 for the aluminium plates, sheets and strips, of a thickness exceeding 0.2mm export category. The direction of the trendline was negative, indicating a decreasing trading status from 2012 to 2016. South African aluminium plates, sheets and strips, of a thickness exceeding 0.2mm exports also decreased in volume over the period from 2,080 tons in 2012 to 1,578 tons in 2016. The general trend for trade volumes was negative and decreasing since 2012.

In assessing the overall demand for the aluminium plates, sheets and strips, of a thickness exceeding 0.2mm category with the rest of the world, Indian and Russian imports for aluminium plates, sheets and strips, of a thickness exceeding 0.2mm showed a slight decreasing trend in terms of value, but an increase over the period of 2012 to 2016 in terms of volume. This indicated that combined demand from these countries has increased from other sources, at cheaper prices.

However, when assessing the entire export portfolio of aluminium plates, sheets and strips, of a thickness exceeding 0.2mm for South Africa in volume and value terms, the overall trend was negative and decreasing from 2012 to 2016. This indicates that this product had been decreasing in terms of exports in South Africa in general to the rest of the world, as well as to the targeted BRICS partners. For this category, South Africa was not taking advantage of its revealed comparative advantage, as the industry seems to be shrinking.

To understand the significance of this decrease in trade, the following results were found:

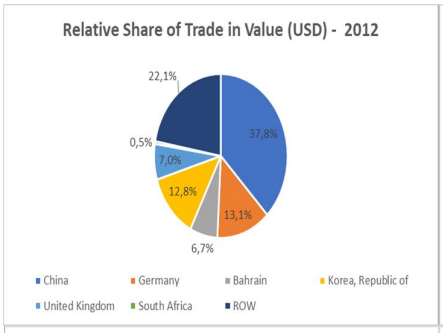
Table 13: Hypothesis Test Results – Aluminium Plates, Sheets and Strips, of a Thickness Exceeding 0.2mm

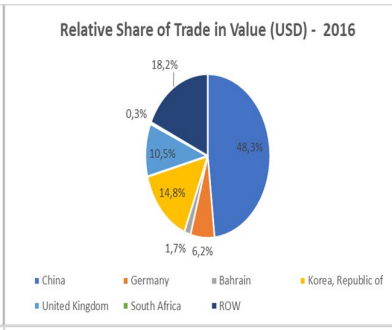
No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
13	7606	Aluminium plates, sheets and strips, of a thickness exceeding 0.2mm	0,176752359	0,152091519

Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

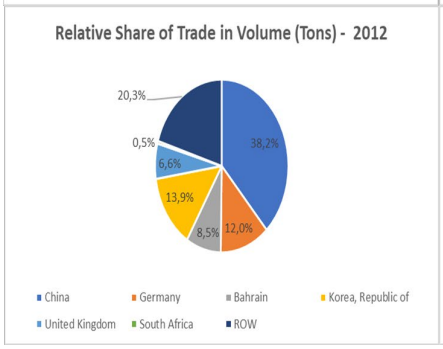
At the 5% level of significance, the two-sided t-test had a probability of 0.1768 for trade value position, therefore the null hypothesis failed to be rejected. There was no evidence of a statistically significant change in the position of trade in terms of value with India and Russia since 2012 for the aluminium plates, sheets and strips, of a thickness exceeding 0.2mm category. The two-sided t-test had a probability of 0.1521 for trade volumes, therefore that null hypothesis failed to be rejected as well. There was no evidence of a statistically significant change in the volume of aluminium plates, sheets and strips, of a thickness exceeding 0.2mm exports to India and Russia since 2012.

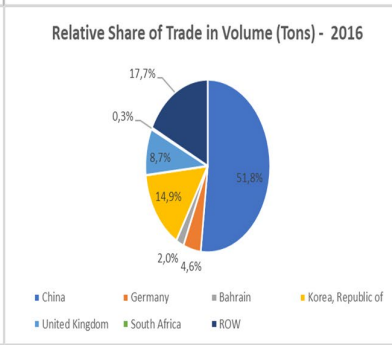
Zooming in on the trading position of South African aluminium plates, sheets and strips, of a thickness exceeding 0.2mm imported by India, in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
China	1	1
Germany	2	4
Bahrain	5	9
Korea, Republic of	3	2
United Kingdom	4	3
South Africa	17	18



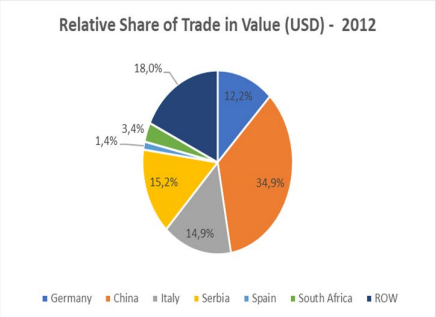


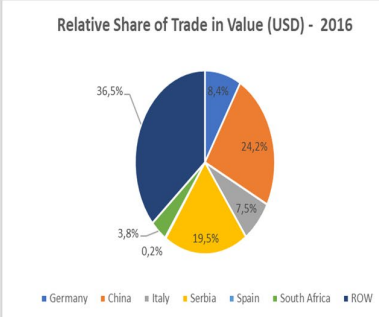
Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
China	1	1
Germany	3	5
Bahrain	4	8
Korea, Republic of	2	2
United Kingdom	5	3
South Africa	17	18

Figure 32: Relative Share of Trade Results: Aluminium Plates, Sheets and Strips, of a Thickness Exceeding 0.2mm for India. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

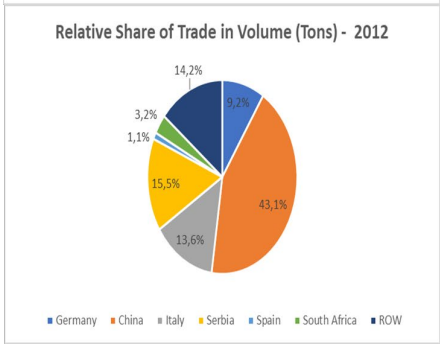
For the period under review, South Africa was among the lowest import sources of aluminium plates, sheets and strips, of a thickness exceeding 0.2mm in India, both in volume and in value terms as trade was almost negligible.

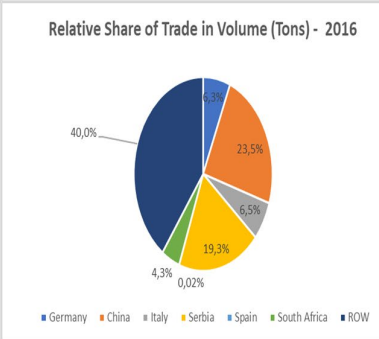
Zooming in on the trading position of South African of aluminium plates, sheets and strips, of a thickness exceeding 0.2mm imported by Russia, in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
Germany	4	4
China	1	1
Italy	3	5
Serbia	2	2
Spain	11	23
South Africa	5	7





Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
China	1	1
Germany	3	5
Bahrain	4	8
Korea, Republic of	2	2
United Kingdom	5	3
South Africa	17	18

Figure 33: Relative Share of Trade Results: Aluminium Plates, Sheets and Strips, of a Thickness Exceeding 0.2mm for Russia. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

For the period under review, South Africa was among the lower import sources of acyclic alcohols and their derivatives in Russia, both in volume and in value. By 2016 there was a moderate improvement in trade. In this category it seemed that South Africa was moderately benefiting from its BRICS relations.

Therefore, while as a combined category, aluminium plates, sheets and strips, of a thickness exceeding 0.2mm exports have grown to the combined target countries, South Africa was performing better in India than in Russia at the individual country level.

4.2.1.14. H8474: Machinery for Sorting/ Screening/Washing; Agglomerating/Shaping Mineral Products

The machinery for sorting/ screening/washing; agglomerating/shaping mineral products category had four import partners for potential expansion in BRICS. The following depicts the findings for this category:

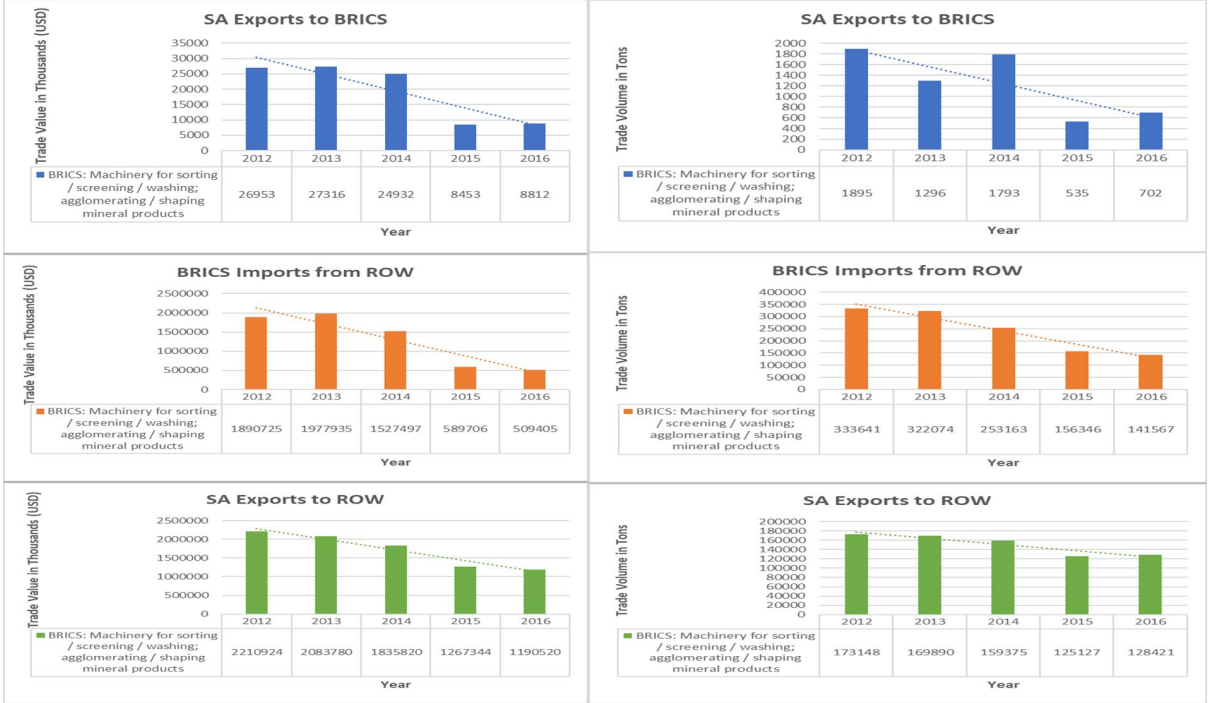


Figure 34: Growth Results: Machinery for Sorting/ Screening/Washing; Agglomerating/Shaping Mineral Products. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, it is evident that in terms of value South Africa had decreased its trading position with the combined identified targeted BRICS partners of China, Russia, India and Brazil from US$26,9 million in 2012 to US$8,8 million in 2016 for the machinery for sorting/ screening/washing; agglomerating/shaping mineral products export category. The direction of the trendline was negative, indicating a decreasing trading status from 2012 to 2016. South African machinery for sorting/ screening/washing; agglomerating/shaping mineral products also fell in volume over the period from 1,895 tons in 2012 to 702 tons in 2016. The general trade volume trend was also negative and decreasing. Therefore, both in terms of volume and value, machinery for sorting/ screening/washing; agglomerating/shaping mineral products exports from South Africa to BRICS had been declining sharply overall since the IDC study was conducted using 2012 data.

In assessing the overall demand for the machinery for sorting/ screening/washing; agglomerating/shaping mineral products category from the rest of the world, BRIC(S) imports for machinery for sorting/ screening/washing; agglomerating/shaping mineral products showed a general decline over the period of 2012 to 2016 both in terms of value and volume. This indicated that BRIC(S) demand for this product had fallen from other sources as well.

However, when assessing the entire export portfolio of machinery for sorting/ screening/washing; agglomerating/shaping mineral products for South Africa in volume and value terms, the overall trend was negative and falling from 2012 to 2016. This confirmed that this product had been declining in terms of exports in South Africa in general, even to the rest of the world. South Africa was therefore not taking advantage of its revealed comparative advantage nor growing in this category of exports with its BRIC(S) partners.

To understand the significance of this decrease in trade, the following results were found:

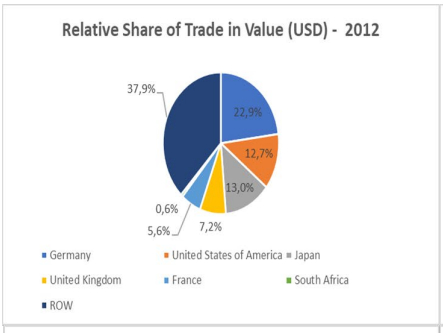
Table 14: Hypothesis Test Results – Machinery for Sorting/ Screening/Washing; Agglomerating/Shaping Mineral Products

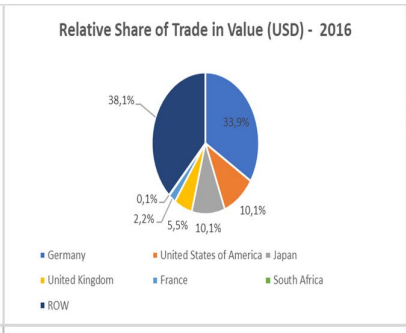
No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
14	8474	Machinery for sorting/ screening/washing; agglomerating/shaping mineral products	0,152925079	0,143888299

Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

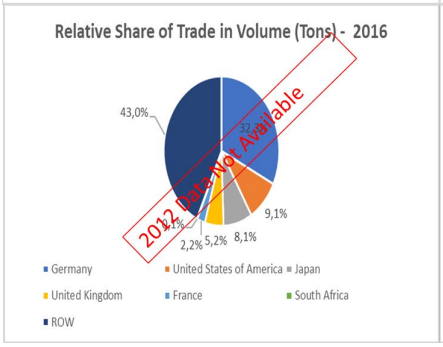
At the 5% level of significance, the two-sided t-test had a probability of 0.1529 for trade value position, therefore the null hypothesis failed to be rejected. There was no evidence of a statistically significant change in the position of trade in terms of value with BRICS since 2012 for the machinery for sorting/ screening/washing; agglomerating/shaping mineral products category. The two-sided t-test had a probability of 0.1239 for trade volumes, therefore that null hypothesis also fails to be rejected. There was no evidence of a statistically significant change in the volume of machinery for sorting/ screening/washing; agglomerating/shaping mineral products exports to the BRIC(S) since 2012.

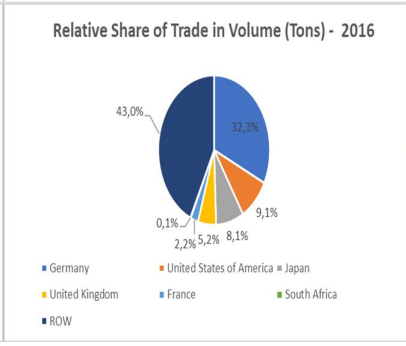
Zooming in on the trading position of South African machinery for sorting/ screening/washing; agglomerating/shaping mineral products exports imported by China, in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
Germany	1	1
United States of America	3	2
Japan	2	3
United Kingdom	4	5
France	5	14
South Africa	23	29



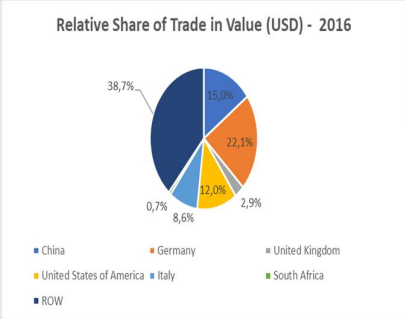


Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
Germany		1
United States of America		2
Japan		4
United Kingdom		6
France		11
South Africa		28

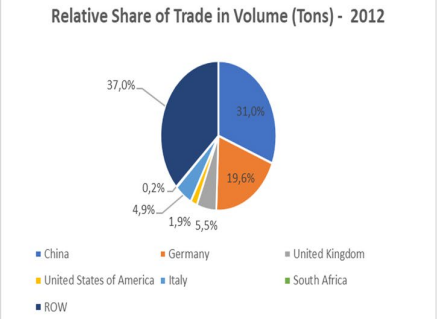
Figure 35: Relative Share of Trade Results: Machinery for Sorting/ Screening/Washing; Agglomerating/Shaping Mineral Products for China. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

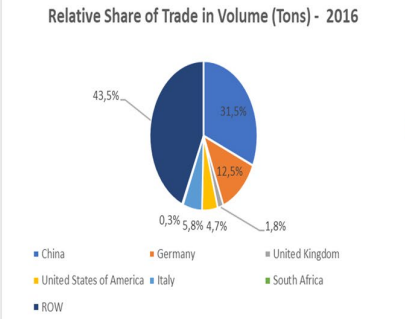
For the period under review, South Africa was among the lowest import sources of structures of steel and iron exports in China, both in volume and in value terms. In this category, it seemed that South Africa was not benefiting from its BRICS relations.

Zooming in on the trading position of South African machinery for sorting/ screening/washing; agglomerating/shaping mineral exports imported by Russia, in 2012 compared to 2016 relative to other import sources, the following was found:



Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
China	2	2
Germany	1	1
United Kingdom	5	9
United States of America	7	3
Italy	3	5
South Africa	28	20



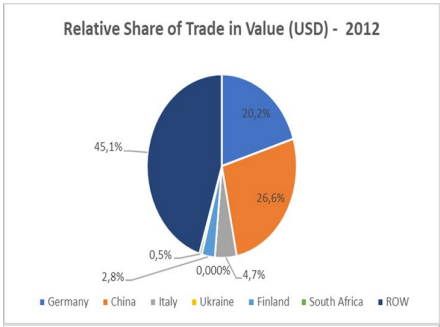


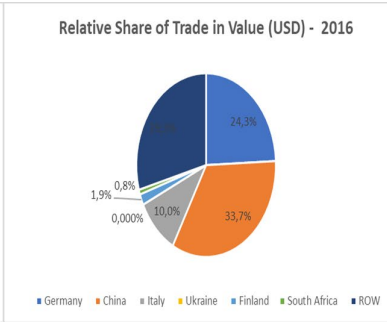
Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
China	1	1
Germany	2	2
United Kingdom	4	14
United States of America	9	7
Italy	6	5
South Africa	31	27

Figure 36: Relative Share of Trade Results: Machinery for Sorting/ Screening/Washing; Agglomerating/Shaping Mineral Products for Russia. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

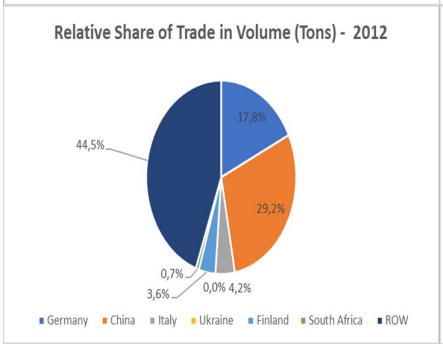
For the period under review, South Africa was among the lowest import sources of structures of machinery for sorting/ screening/washing; agglomerating/shaping mineral exports in Russia, both in volume and in value terms. In this category, it seemed that South Africa was not benefiting from its BRICS relations.

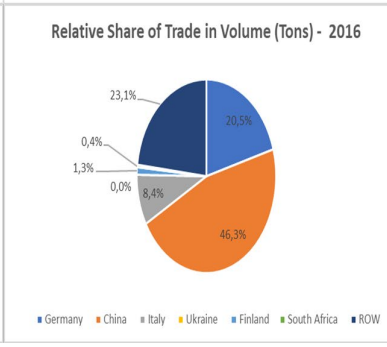
Zooming in on the trading position of South African machinery for sorting/ screening/washing; agglomerating/shaping mineral exports imported by India, in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
Germany	2	2
China	1	1
Italy	4	3
Ukraine	102	99
Finland	7	12
South Africa	21	25



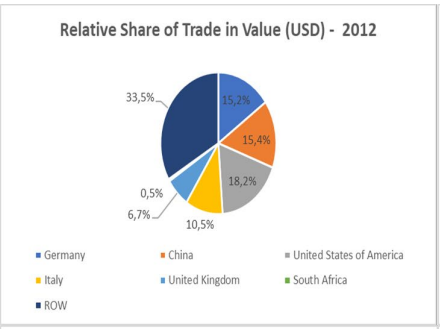


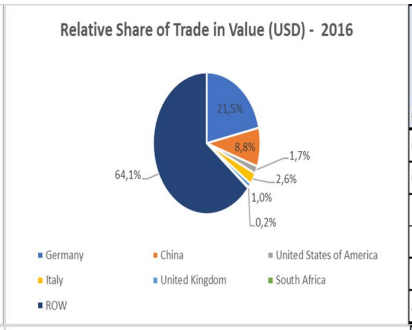
Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
Germany	2	2
China	1	1
Italy	5	3
Ukraine	102	101
Finland	7	9
South Africa	20	20

Figure 37: Relative Share of Trade Results: Machinery for Sorting/ Screening/Washing; Agglomerating/Shaping Mineral Products for India. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

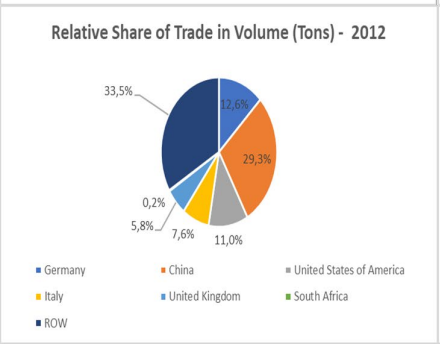
For the period under review, South Africa was among the lowest import sources of structures of machinery for sorting/ screening/washing; agglomerating/shaping mineral in India, both in volume and in value terms. In this category, it seemed that South Africa was benefiting from its BRICS relations, although trade levels were still relatively low.

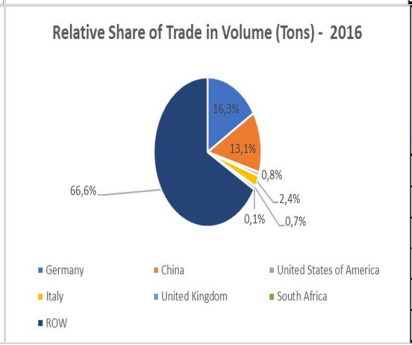
Zooming in on the trading position of South African structures of machinery for sorting/ screening/washing; agglomerating/shaping mineral exports imported by Brazil, in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
Germany	3	2
China	2	4
United States of America	1	8
Italy	4	6
United Kingdom	5	11
South Africa	24	18





Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
Germany	2	3
China	1	4
United States of America	3	11
Italy	4	6
United Kingdom	5	12
South Africa	26	19

Figure 38: Relative Share of Trade Results: Machinery for Sorting/ Screening/Washing; Agglomerating/Shaping Mineral Products for Brazil. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

For the period under review, South Africa was among the lowest import sources of structures of machinery for sorting/ screening/washing; agglomerating/shaping mineral exports in Brazil, both in volume and in value terms. In this category, it seemed that South Africa was not benefiting from its BRICS relations.

4.2.1.15. H8704: Trucks, Motor vehicles for the transportation of goods

The trucks, motor vehicles for the transportation of goods category had two import partners for potential expansion in BRICS, being China and Brazil. The following depicts the findings for this category:

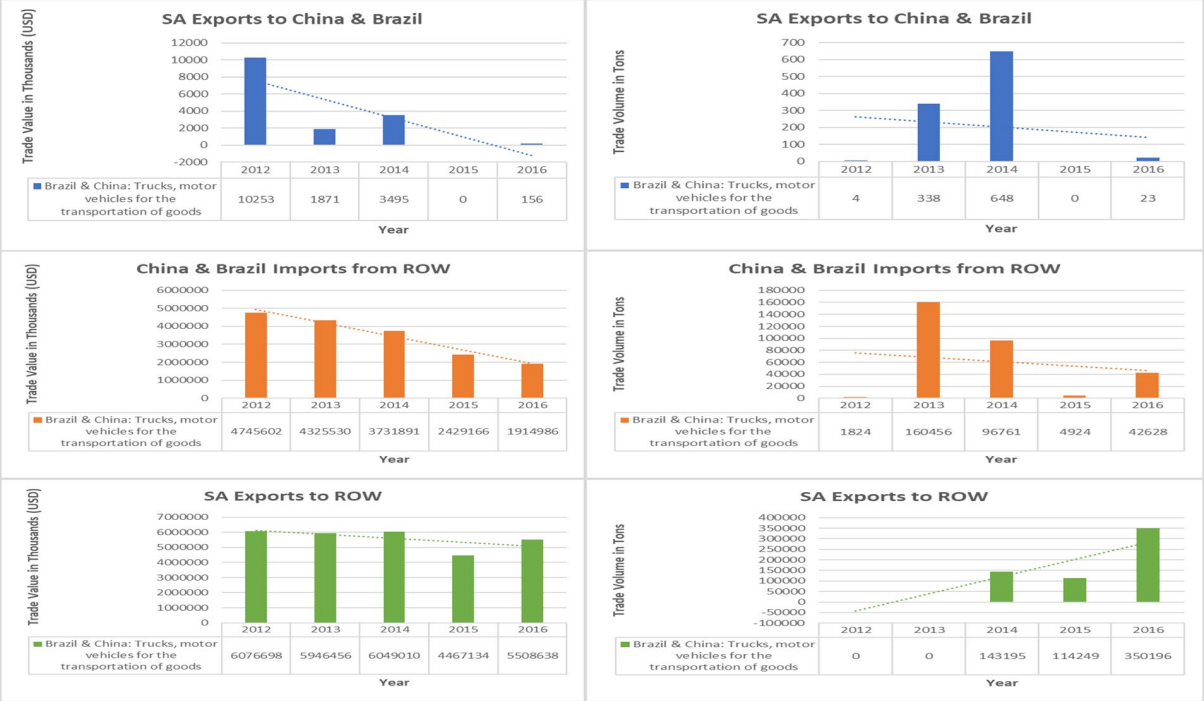


Figure 39: Growth Results: Trucks, Motor vehicles for the transportation of goods. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, it is evident that in terms of value South Africa had decreased its trading position with the combined identified target BRICS partners of China and Brazil from US$10,2 million in 2012 to US$156 thousands in 2016 for the trucks, motor vehicles for the transportation of goods export category. The direction of the trendline was negative, indicating a decreasing trade status from 2012 to 2016. South African trucks, motor vehicles for the transportation of goods exports had also declined in terms of volume over the period to just 23 tons in 2016. The general trade volume trend was negative and decreasing. Overall, this category had therefore declined since 2012.

In assessing the overall demand for the trucks, motor vehicles for the transportation of goods category with the rest of the world, Chinese and Brazilian imports for trucks, motor vehicles for the transportation of goods showed a decreasing trend in terms of both value and volume over the period under review.

However, when assessing the entire export portfolio of trucks, motor vehicles for the transportation of goods for South Africa in value terms, the overall trend was negative and decreasing from 2012 to 2016. This indicates that this product had been decreasing in terms of exports in South Africa in general to the rest of the world, as well as to the targeted BRICS

partners. For this category, South Africa is not taking advantage of its revealed comparative advantage, as the industry seems to be shrinking. The results for trade volume appeared distorted, because the data available for analysis was not complete. Therefore, it was not used in this analysis.

To understand the significance of this decrease in trade, the following results are found:

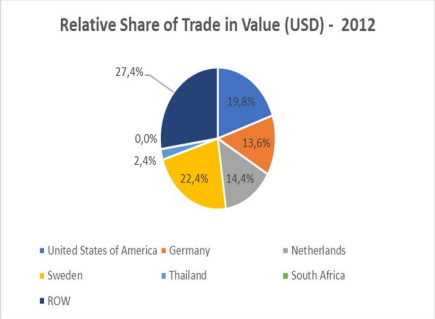
Table 15: Hypothesis Test Results – Trucks, motor vehicles for the transportation of goods

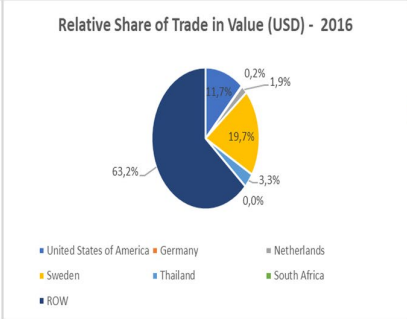
No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
15	8704	Trucks, motor vehicles for the transportation of goods	0,276532064	0,554937052

Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

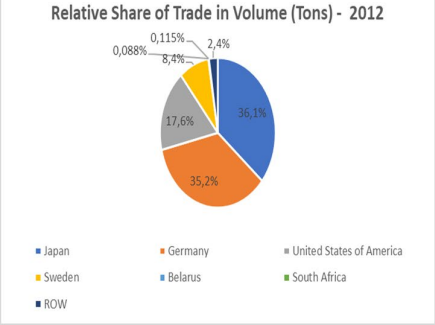
At the 5% level of significance, the two-sided t-test had a probability of 0.2765 for trade value position, therefore the null hypothesis failed to be rejected. There was no evidence of a statistically significant change in the position of trade in terms of value with China and Brazil since 2012 for the trucks, motor vehicles for the transportation of goods category. The two-sided t-test had a probability of 0.5549 for trade volumes, therefore that null hypothesis failed to be rejected. There was no evidence of a change in the volume of trucks, motor vehicles for the transportation of goods exports to China and Brazil since 2012.

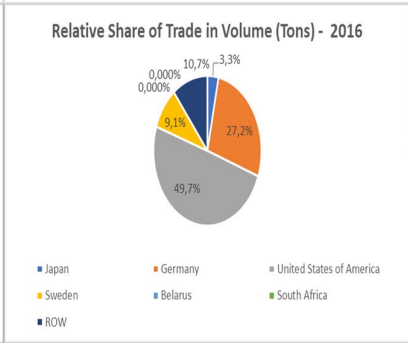
Zooming in on the trading position of South African trucks, motor vehicles for the transportation of goods imported by China, in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
United States of America	2	4
Germany	3	12
Netherlands	4	10
Sweden	1	2
Thailand	8	9
South Africa	37	39



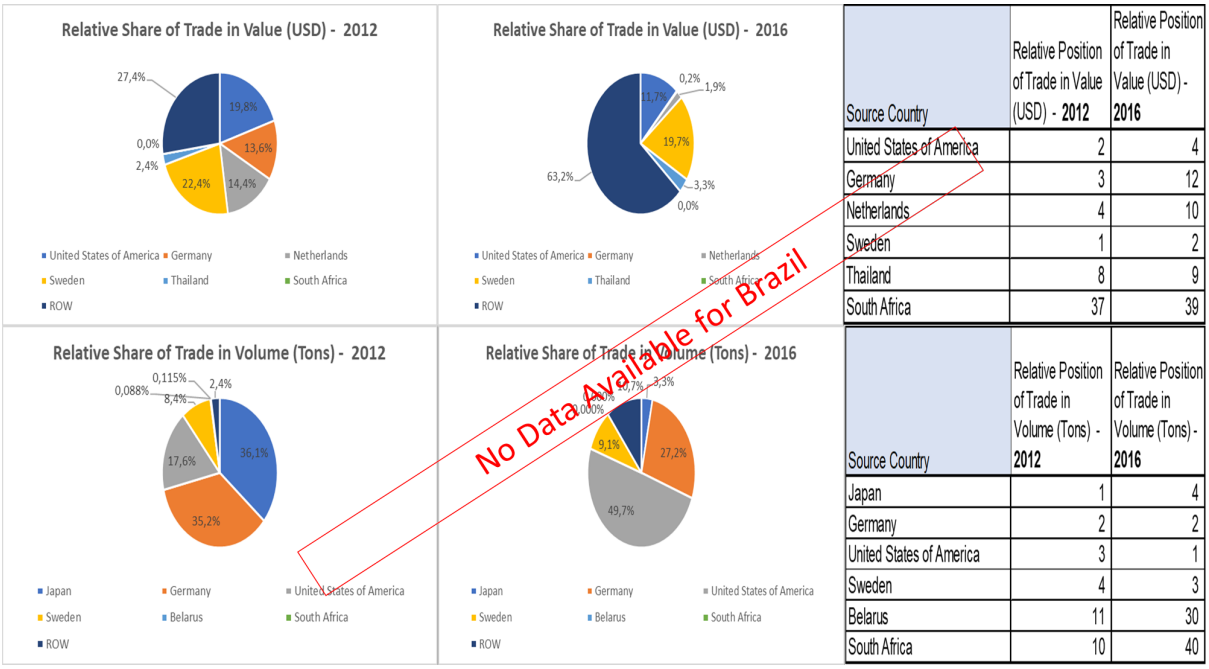


Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
Japan	1	4
Germany	2	2
United States of America	3	1
Sweden	4	3
Belarus	11	30
South Africa	10	40

Figure 40: Relative Share of Trade Results: Trucks, motor vehicles for the transportation of goods for China. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

For the period under review, South Africa was among the lowest import sources of trucks, motor vehicles for the transportation of goods in China, both in volume and in value terms as trade was almost negligible.

Zooming in on the trading position of South African of trucks, motor vehicles for the transportation of goods imported by Brazil, in 2012 compared to 2016 relative to other import sources, the following was found:



Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
United States of America	2	4
Germany	3	12
Netherlands	4	10
Sweden	1	2
Thailand	8	9
South Africa	37	39

Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
Japan	1	4
Germany	2	2
United States of America	3	1
Sweden	4	3
Belarus	11	30
South Africa	10	40

Figure 41: Relative Share of Trade Results: Trucks, motor vehicles for the transportation of goods for Brazil. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

No data available for Brazil.

Therefore, as a combined category trucks, motor vehicles for the transportation of goods exports have declined to the combined target countries. The data available for this category does not indicate that this category was performing well for South Africa as a whole.

4.2.1.16. H2008: Preserved Fruits not elsewhere specified (n.e.s)

The preserved fruits category had one import partner for potential expansion in BRICS, being China. The following depicts the findings for this category:

Figure 42: Growth Results: Preserved Fruits. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, it is evident that in terms of value South Africa had increased its trading position with the identified target BRICS partner of China from US$3 million in 2012 to US$13 million in 2016 for the preserved fruits export category. The direction of the trendline was positive, indicating an increasing trade status from 2012 to 2016. South African preserved fruits increased in volume over the period from 1,964 tons in 2012 to 9,867 tons in 2016. The general trend for trade volumes was also positive and increasing. Therefore, both in terms of value and volume, preserved fruits exports from South Africa to China had been increasing overall since the IDC study was conducted using 2012 data.

In assessing the overall demand for the preserved fruits category, Chinese imports for preserved fruits showed a general increase over the period of 2012 to 2016 both in terms of value and volume. This indicated that even though South African exports of preserved fruits to China had increased over this period, Chinese demand had increased from other sources as well.

However, when assessing the entire export portfolio of preserved fruits for South Africa in volume terms, the overall trend was positive and increasing from 2012 to 2016. This confirms that this product had been increasing in terms of exports in South Africa in general, even to the

rest of the world not just the target BRICS partner. While the results of the value of trade indicate that these exports were exported at progressively cheaper rates. This meant that despite strong Chinese demand for this product, South Africa was taking advantage of its revealed comparative advantage and was growing in this category of exports.

To understand the significance of this increase in trade, the following results were found:

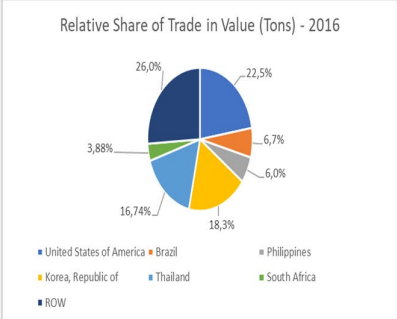
Table 16: Hypothesis Test Results – Preserved Fruits not elsewhere specified (nes)

No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
16	2008	Preserved fruits not elsewhere specified (nes)	0,026051428	0,044245823

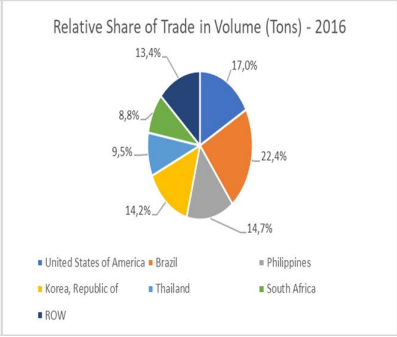
Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

At the 5% level of significance, the two-sided t-test had a probability of 0.0261 for trade value position, therefore the null hypothesis was rejected. There was evidence of a change in the position of trade in terms of value with China since 2012 for the preserved fruits category. The two-sided t-test had a probability of 0.0442 for trade volumes, therefore that null hypothesis was rejected as well. There was evidence of a change in the volume of preserved fruits exports China since 2012.

Zooming in on the trading position of South African preserved fruits imported by China, in 2012 compared to 2016 relative to other import sources, the following was found:



Source Country	Relative Position of Trade in Value - 2012	Relative Position of Trade in Value - 2016
United States of America	1	1
Brazil	5	5
Philippines	3	6
Korea, Republic of	2	2
Thailand	4	3
South Africa	7	8



Source Country	Relative Position of Trade in Volume - 2012	Relative Position of Trade in Volume - 2016
United States of America	1	2
Brazil	2	1
Philippines	3	3
Korea, Republic of	4	4
Thailand	5	5
South Africa	6	6

Figure 43: Relative Share of Trade Results: Preserved Fruits. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

For the period under review, South Africa was among the top import sources of preserved fruits in China, both in volume and in value terms. In this category, it seemed that South Africa was taking advantage and was benefiting from its BRICS relations.

4.2.1.17. H2914: Ketones and Quinones, & their Derivatives

The ketones and quinones, & their derivatives category had one import partner for potential expansion in BRICS, being Brazil. The following depicts the findings for this category:

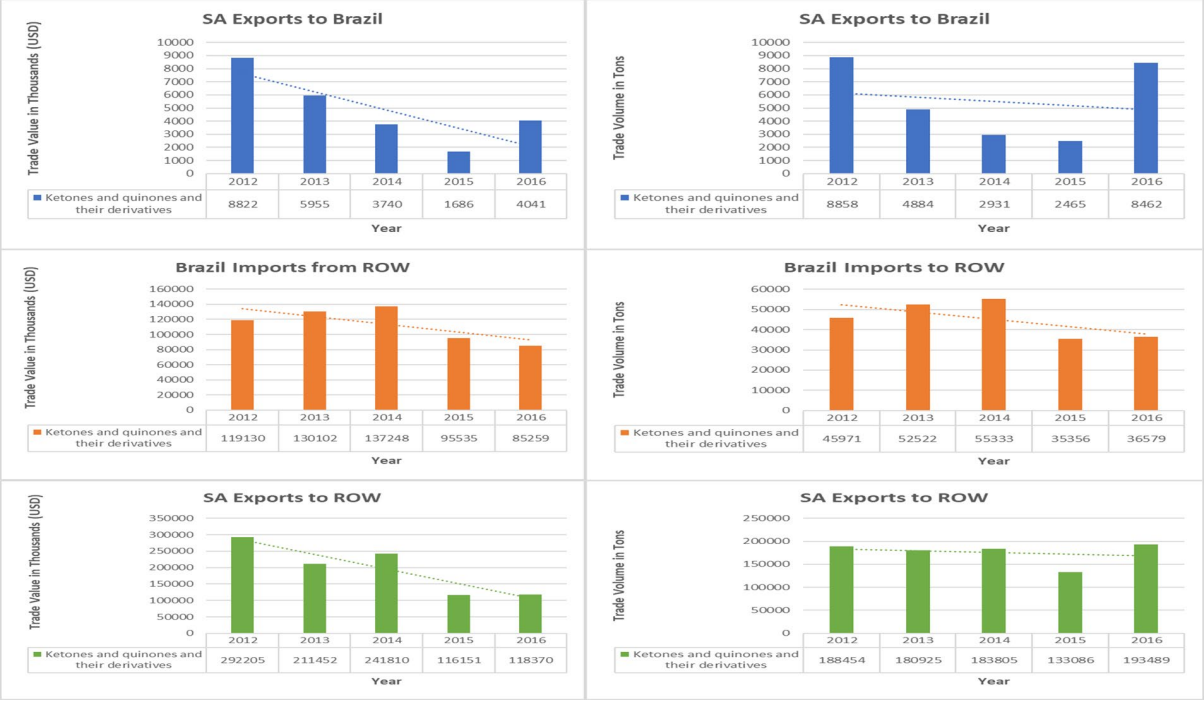


Figure 44: Growth Results: Ketones and Quinones, & their Derivatives. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, it is evident that in terms of value South Africa had decreased its trading position with the identified target BRICS partner of Brazil from US$8,8 million in 2012 to US$4,1 million in 2016 for the ketones and quinones, & their derivatives export category. The direction of the trendline was negative, indicating decreasing trading trend from 2012 to 2016. South African ketones and quinones, & their derivatives on average decreased in volume over the period and picked up in 2016 at 8,426 tons. The general trend for trade volumes was negative and declining. Therefore, both in terms of value and volume, ketones and quinones, & their derivatives exports from South Africa to Brazil had been falling overall since the IDC study was conducted using 2012 data.

In assessing the overall demand for the ketones and quinones, & their derivatives category from the rest of the world, Brazilian imports for ketones and quinones, & their derivatives showed a general decline over the period of 2012 to 2016 both in terms of value and volume.

However, when assessing the entire export portfolio of ketones and quinones, & their derivatives for South Africa in volume terms, the overall trend was negative and decreasing

from 2012 to 2016. For this category, it appears that South Africa was not taking advantage of its revealed comparative advantage and was not growing in this category of exports.

To understand the significance of this decrease in trade, the following results were found:

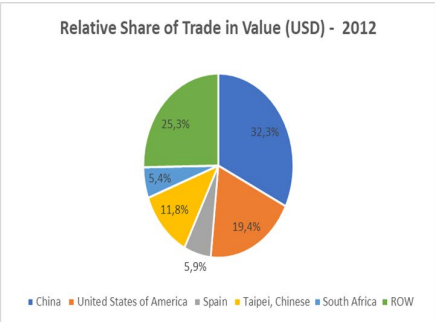
Table 17: Hypothesis Test Results – Ketones and Quinones, & their Derivatives

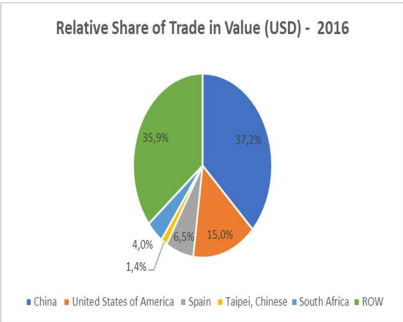
No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
17	2914	Ketones and quinones, & their derivatives	0,051243471	0,03754648

Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

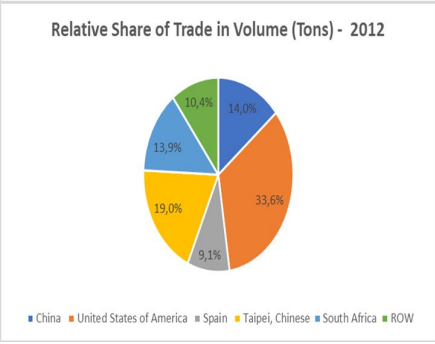
At the 5% level of significance, the two-sided t-test has a probability of 0.0512 for trade value position, therefore the null hypothesis is rejected. There is evidence of a change in the position of trade in terms of value with Brazil since 2012 for the ketones and quinones, & their derivatives category. The two-sided t-test has a probability of 0.03755 for trade volumes, therefore that null hypothesis is rejected as well. There is evidence of a change in the volume of ketones and quinones, & their derivatives exports to Brazil since 2012.

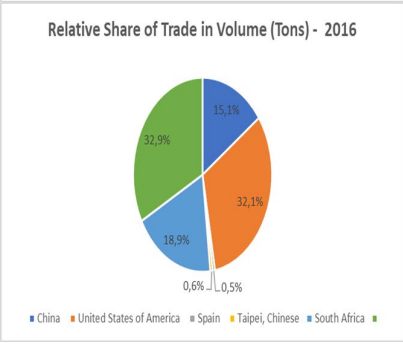
Zooming in to the trading position of South African ketones and quinones, & their derivatives imported by Brazil, in 2012 compared to 2016 relative to other import sources, the following is found:





Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
China	1	1
United States of America	2	2
Spain	4	4
Taipei, Chinese	3	13
South Africa	5	6





Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
China	3	3
United States of America	1	1
Spain	5	13
Taipei, Chinese	2	12
South Africa	4	2

Figure 45: Relative Share of Trade Results: Ketones and Quinones, & their Derivatives. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

For the period under review, South Africa was among the top import sources of ketones and quinones, & their derivatives in Brazil, both in volume and in value terms. In this category, it seems that South Africa was taking advantage and was benefiting from its BRICS relations.

4.2.1.18. H2610: Chromium Ores and Concentrates

The chromium ores and concentrates category had one import partner for potential expansion in BRICS, being Russia. The following depicts the findings for this category:

Figure 46: Growth Results: Chromium Ores and Concentrates. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, it is evident that in terms of value South Africa had decreased its trading position with the identified target BRICS partner of Russia from US$7,3 million in 2012 to US$3,3 million in 2016 for the chromium ores and concentrates export category. The direction of the trendline was negative, indicating a decreasing trading status from 2012 to 2016. The general trend for trade volumes was positive and increasing. Therefore, in terms of value chromium ores and concentrates exports from South Africa to Russia had been declining overall since the IDC study was conducted using 2012 data.

In assessing the overall demand for the chromium ores and concentrates category, Russian imports for chromium ores and concentrates showed a general decline over the period of 2012 to 2016 both in terms of value and volume. This indicated that Russian demand had decreased from other sources as well.

However, when assessing the entire export portfolio of chromium ores and concentrates for South Africa in volume terms, the overall trend was negative and decreasing from 2012 to 2016. This meant that South Africa was not taking advantage of its revealed comparative advantage and was not growing in this category of exports.

To understand the significance of this change in trade, the following results are found:

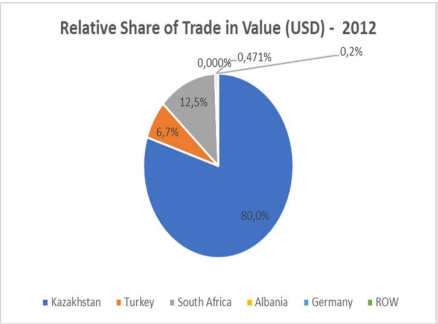
Table 18: Hypothesis Test Results – Chromium Ores and Concentrates

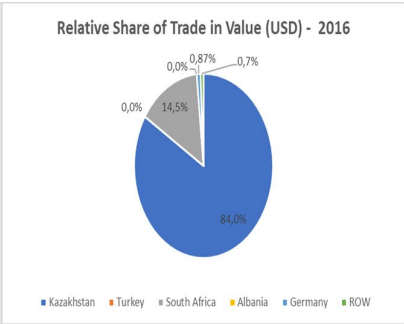
No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
18	2610	Chromium ores and concentrates	0,026051428	0,008549734

Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

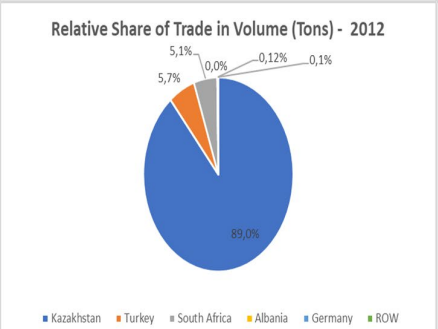
At the 5% level of significance, the two-sided t-test had a probability of 0.0261 for trade value position, therefore the null hypothesis was rejected. There is evidence of a change in the position of trade in terms of value with Russia since 2012 for the chromium ores and concentrates category. The two-sided t-test had a probability of 0.0085 for trade volumes, therefore that null hypothesis was rejected as well. There is evidence of a change in the volume of chromium ores and concentrates exports to Russia since 2012.

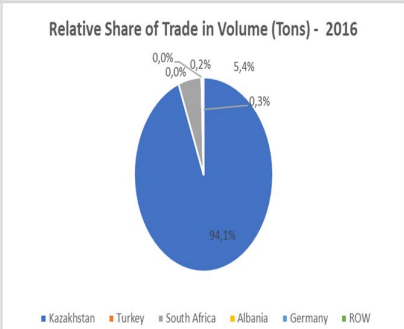
Zooming in to the trading position of South African chromium ores and concentrates imported by China, in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value (USD) - **2012**	Relative Position of Trade in Value (USD) - **2016**
Kazakhstan	1	1
Turkey	3	8
South Africa	2	2
Albania	13	15
Germany	4	3





Source Country	Relative Position of Trade in Volume (Tons) - **2012**	Relative Position of Trade in Volume (Tons) - **2016**
Kazakhstan	1	1
Turkey	2	8
South Africa	3	2
Albania	13	15
Germany	4	4

Figure 47: Relative Share of Trade Results: Chromium Ores and Concentrates. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

For the period under review, South Africa was among the top import sources of preserved fruits in Russia, both in volume and in value terms. In this category, it seemed that South Africa was taking advantage and was benefiting from its BRICS relations.

4.2.1.19. H2614: Titanium Ores and Concentrates

The titanium ores and concentrates category had one import partner for potential expansion in BRICS, being China. The following depicts the findings for this category:

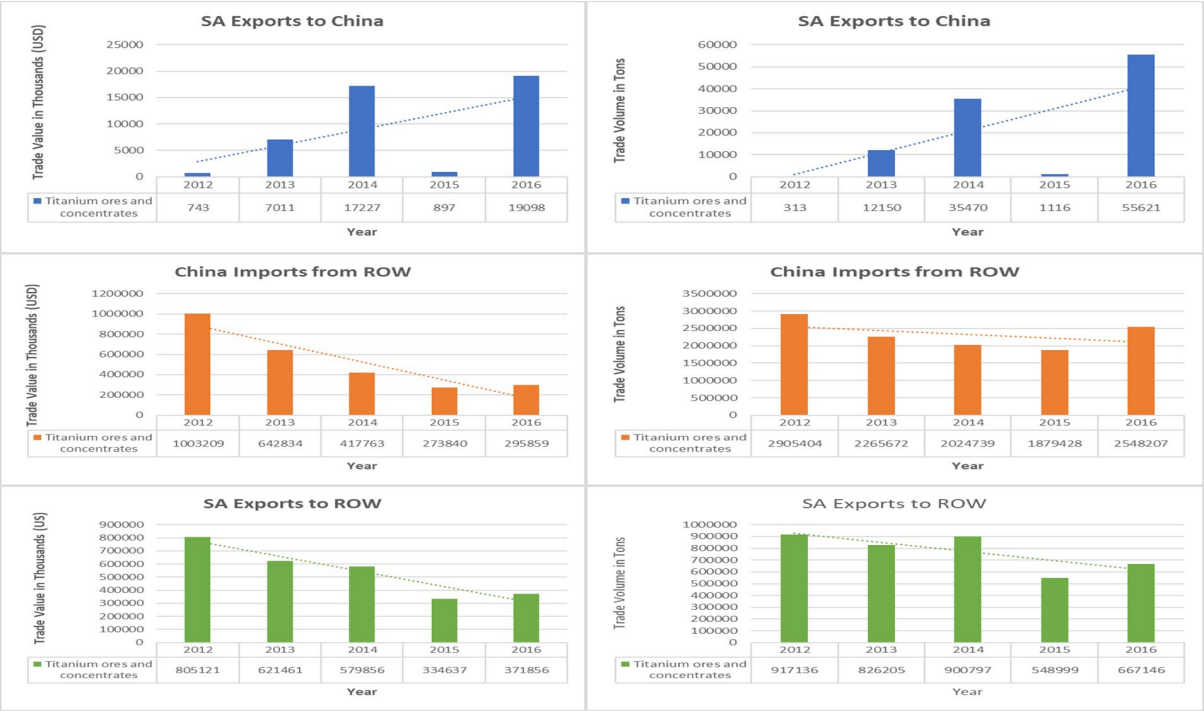


Figure 48: Growth Results: Titanium Ores and Concentrates. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, in terms of value South Africa increased its trading position with the identified target BRICS partner of China from US$743 thousands in 2012 to US$19 million in 2016 for the titanium ores and concentrates export category. The direction of the trendline was positive, indicating an increasing trade from 2012 to 2016. South African titanium ores and concentrates increased in volume over the period from 313 tons in 2012 to 55,621 tons in 2016. The general trend for trade volumes was positive and increasing. Therefore, both in terms of value and volume, titanium ores and concentrates exports from South Africa to China had been increasing overall since the IDC study was conducted using 2012 data.

In assessing the overall demand for the titanium ores and concentrates category, Chinese imports for titanium ores and concentrates showed a general decline over the period of 2012 to 2016 both in terms of value and volume, regardless of South African performance. This indicated that even though South African exports of titanium ores and concentrates to China had increased over this period, Chinese demand had dropped from other sources.

However, when assessing the entire export portfolio of titanium ores and concentrates for South Africa in volume terms, the overall trend was negative and decreasing from 2012 to 2016. This meant that despite strong Chinese demand for this product, South Africa was not taking advantage of its revealed comparative advantage and was not growing in this category of exports.

To understand the significance of this decrease in trade, the following results are found:

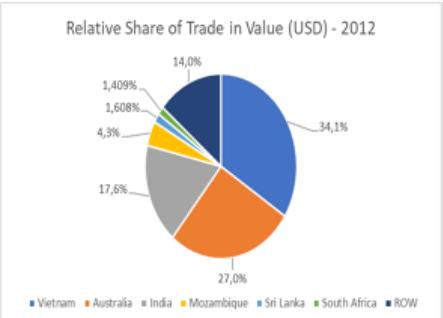
Table 19: Hypothesis Test Results – Titanium Ores and Concentrates

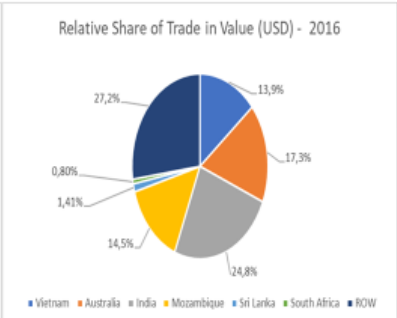
No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
19	2614	Titanium ores and concentrates	0,085097967	0,122148712

Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

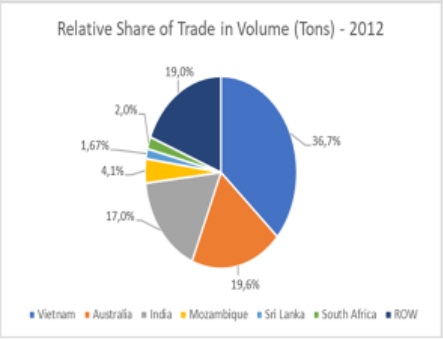
At the 5% level of significance, the two-sided t-test had a probability of 0.0851 for trade value position, therefore the null hypothesis failed to be rejected. There was no evidence of a statistically significant change in the position of trade in terms of value with China since 2012 for the titanium ores and concentrates category. The two-sided t-test had a probability of 0.1221 for trade volumes, therefore that null hypothesis also failed to be rejected. There was no evidence of a statistically significant change in the volume of titanium ores and concentrates exports China since 2012.

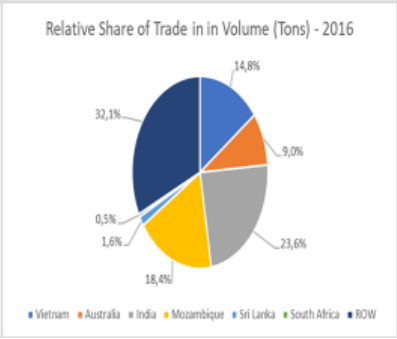
Zooming in on the trading position of South African titanium ores and concentrates imported by China, in 2012 compared to 2016 relative to other import sources, the following was found:





Source Country	Relative Position of Trade in Value - 2012	Relative Position of Trade in Value - 2016
Vietnam	1	4
Australia	2	2
India	3	1
Mozambique	4	3
Sri Lanka	7	10
South Africa	8	13





Source Country	Relative Position of Trade in Volume - 2012	Relative Position of Trade in Volume - 2016
Vietnam	1	3
Australia	2	5
India	3	1
Mozambique	5	2
Sri Lanka	10	10
South Africa	9	13

Figure 49: Relative Share of Trade Results: Titanium Ores and Concentrates. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

In 2012, South Africa was among the top import sources of titanium ores and concentrates in China, both in volume and in value terms. By 2016, South Africa was the among the lowest source of import for titanium ores and concentrates in China, both in terms of value and volume. In this category, it seemed that South Africa was not taking advantage and was not benefiting from its BRICS relations.

4.2.1.20. H0806: Grapes, fresh or dried

The fresh or dried grapes category had one import partner for potential expansion in BRICS, being China. The following depicts the findings for this category:

Figure 50: Growth Results: Fresh or dried grapes. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

From the above figure, the fresh or dried grapes export category was declining for the period under review. The direction of the trendline for trade value was negative. South African fresh or dried grapes had also been falling in terms of volumes over the same period to 2,417 tons by 2016 after picking up impressively in 2013. The general trade volume trend was also negative and decreasing. Therefore, both in terms of value and volume, fresh or dried grapes exports from South Africa to China had been falling overall since the IDC study was conducted using 2012 data.

In assessing the overall demand for the fresh or dried grapes category, Chinese imports for fresh or dried grapes showed a general increase over the period of 2012 to 2016 both in terms of value and volume. This indicated that even though South African exports were falling, Chinese demand had increased from other sources.

However, when assessing the entire export portfolio of fresh or dried grapes for South Africa in volume terms, the overall trend was positive and increasing from 2012 to 2016. This confirmed that this product had been increasing in terms of exports in South Africa in general, to the rest of the world. This meant that despite weak Chinese demand for this product, South

Africa was taking advantage of its revealed comparative advantage and was growing in this category of exports.

To understand the significance of this decrease in trade, the following results were found:

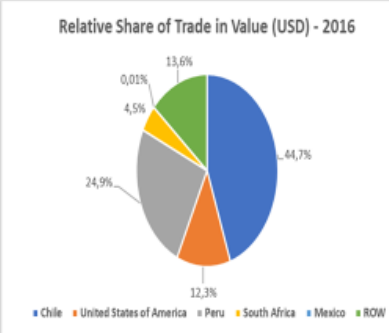
Table 20: Hypothesis Test Results – Grapes, fresh or dried

No.	HS4	Description	Trade Value T Test Results	Trade Volume T Test Results
20	0806	Grapes, fresh or dried	0,058608746	0,073769598

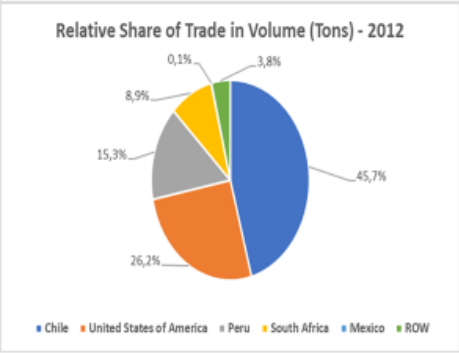
Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

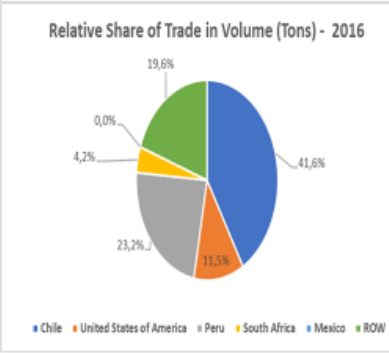
At the 5% level of significance, the two-sided t-test had a probability of 0.0586 for trade value position, therefore the null hypothesis failed to be rejected. There was no evidence of a statistically significant change in the position of trade in terms of value with China since 2012 for the fresh or dried grapes category. The two-sided t-test has a probability of 0.0738 for trade volumes, therefore that null hypothesis failed to be rejected as well. There was no evidence of a statistically significant change in the volume of fresh or dried grapes exports China since 2012.

Zooming in on the trading position of South African fresh or dried grapes imported by China, in 2012 compared to 2016 relative to other import sources, the following was found:



Source Country	Relative Position of Trade in Value - 2012	Relative Position of Trade in Value - 2016
Chile	1	1
United States of America	2	4
Peru	3	2
South Africa	4	5
Mexico	10	15





Source Country	Relative Position of Trade in Volume - 2012	Relative Position of Trade in Volume - 2016
Chile	1	1
United States of America	2	4
Peru	3	2
South Africa	4	6
Mexico	10	

Figure 51: Relative Share of Trade Results: Fresh or dried grapes. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

For the period under review, South Africa was among the top import sources of fresh or dried grapes in China, both in volume and in value terms. In this category, it seemed that South Africa was taking advantage and was benefiting from its BRICS relations. This was a positive step towards improved intra-BRICS trade goals of South Africa.

4.2.2. South African High RCA export performance to BRICS Grouping

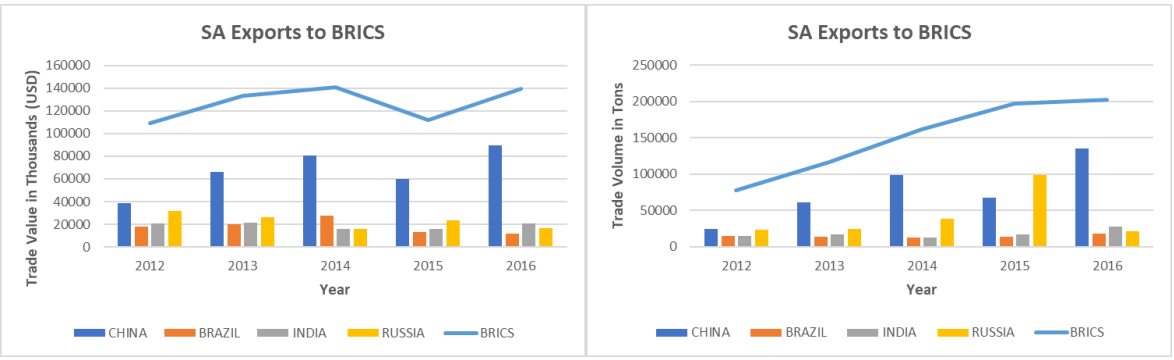


Figure 52: Growth Results: Consolidated BRICS Grouping. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

At the aggregated BRICS bloc level, there was clear evidence of a growth in the high RCA exports that South Africa exported to the partner countries. This was evident both in terms of volume and in dollar value. The exports with a high RCA had grown at the aggregate level from USD109 405 in 2012 to USD139 067 in 2016 in export value. This was an increase of USD29 662 which equated to about 27% growth in the period. The volume of exports had also grown from 77 921 tons in 2012 to 202 597 tons in 2016. This was an average increase of roughly 160% in export volume for the period. From the graph, trade with China in terms of value and volume was the most dominant throughout the period under review.

To understand the significance of this increase in trade, the following results were found:

Table 21: Hypothesis Test Results – Consolidated BRICS Grouping

No.	Region/Partner	Trade Value T Test Results	Trade Volume T Test Results
1	Brazil	0,685543	0,985488
2	Russia	0,37717	0,14671
3	India	0,910581	0,19448
4	China	0,000755	0,024658
5	**BRICS Grouping**	**0,001911**	**0,008623**

Source: Own. Compiled from International Trade Centre (TradeMap) Data (Years:2008-2016).

As a grouping, the p value results for trade value were 0.001911 which was below the 5% level of significance. This inferred that the null hypothesis could be rejected. There was overwhelming evidence of a change in the position of trade in terms of value with the BRICS partners since 2012 for the consolidated group of exports under review. The two-sided t-test had a probability of 0.008623 for trade volumes, therefore that null hypothesis was rejected as well. There was evidence of a change in the volume of exports with a high RCA exported by South Africa to its BRICS partners since 2012. Interestingly, at country level, there was not enough evidence of a statistically significant change in trade value or trade volume for all the BRICS partners except China.

4.3. Correlation and regression results

As a group, correlation between the grouped variables was established by correlating trade values and trade volumes for the 2012 year, which served as a base year, thereafter, individual

analyses could be done at the individual series level, to draw inferences about each category of exports.

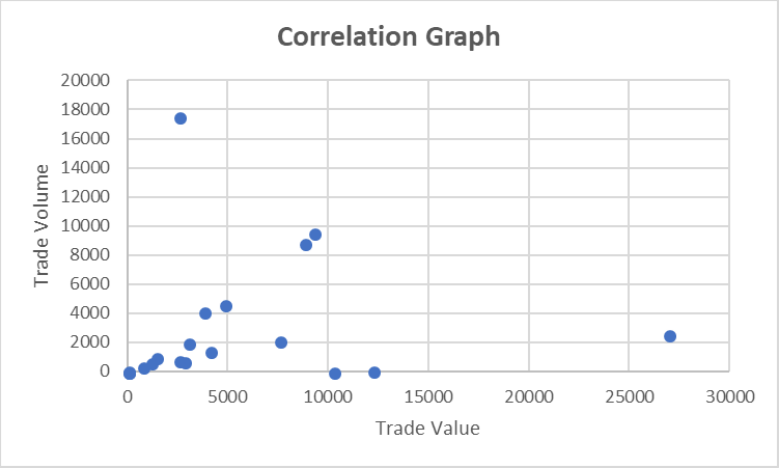


Figure 53: Correlation Results: Independent vs Dependent Variables Association. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

The graph showed that trade volumes could be reliably used to explain trade value. The two variables were positively correlated, with a calculated correlation co-efficient of 0,996 which was almost perfectly correlated. The relationship between trade value and trade volume clearly existed, and the strength was proven by the closeness of the correlation coefficient to the value of one (1).

The following table captured the key results from the analysis.

Table 22: Regression Analysis Results

Category	Cross-Correlation Coefficient	Adjusted R-square	P-value	Durbin-Watson statistic
Citrus fruit, fresh or dried	0,996452719	0,992918022	0,000253481	1,504428018
Apples, pears and quinces, fresh	0,997928977	0,994482992	0,000113104	2,006660849
Fruit and vegetable juices, unfermented	0,985761921	0,962302087	0,002035079	1,220843138
Wine of fresh grapes	0,909105815	0,768631177	0,032443406	1,089285888
Iron ores and concentrates; including roasted iron pyrites	0,9706816	0,92296369	0,005999638	2,158630341
Coal; briquettes, ovoids and similar fuel manufactured from coal	1	1	2,10985E-48	2,5

Petroleum jelly; mineral waxes and similar products	-0,161245166	-0,298666662	0,79558943	1,691362604
Diphosphorus pentaoxide, phosphoric acid and polyphosphoric acids	Could not be determined	Could not be determined	Could not be determined	Could not be determined
Acrylic hydrocarbons	0,85552152	0,642556094	0,064475608	2,525756056
Acyclic alcohols and their derivatives	0,351346562	-0,168740791	0,56203386	1,278493156
Ferro-alloys	0,80089871	0,521918325	0,103402161	2,178525702
Structures of iron & steel nes	0,735955147	0,388839971	0,156262146	1,358661445
Aluminium plates, sheets and strips, of a thickness exceeding 0.2mm	0,958833391	0,892481963	0,009964406	1,071258318
Machinery for sorting / screening / washing; agglomerating / shaping mineral products	0,905900421	0,760874097	0,034157686	2,586590594
Trucks, motor vehicles for the transportation of goods	0,985266615	0,961000404	0,00214203	1,772055036
Preserved fruits n.e.s	0,989092433	0,971071789	0,001365255	2,26444511
Ketones and quinones and their derivatives	0,701982389	0,323705699	0,186320325	0,422952566
Chromium ores and concentrates	0,589493151	0,130002899	0,295511401	0,938774963
Titanium ores and concentrates	0,970945602	0,923647151	0,005919021	1,514226419
Grapes, fresh or dried	0,998127857	0,995012292	9,72121E-05	1,642658231

Since the export data was of time-series nature, the correlation between variable was established by cross-correlation for each export category for the period under review. Significant correlations were established in all the datasets, except for the petroleum jelly; mineral waxes and similar products; acyclic alcohols and their derivatives; and diphosphorus pentaoxide, phosphoric acid and polyphosphoric acids, which could not be established owing to its zero-trade status. This meant that, except for these three categories, there was a significant relationship between trade volumes and trade values.

When assessing the r-square coefficient, all categories had a high score, indicating the reliability of the results, except for the three categories already established not to have an association plus three more. The additional three were – structures of iron & steel nes; ketones and quinones and their derivatives; and chromium ores and concentrates. Therefore, the regression models failed to capture a significant association between trade volume and trade values for these categories. The p-value served to identify those categories where the relationship between trade volume and trade value could be adequately described by the regression models in order to enable meaningful inferences and predictions of future behaviour

in those categories. The results indicated that in addition to the categories that had exhibited weak associations between trade values and trade volumes, three more categories could not be reliably predicted by the models. These were coal; briquettes, ovoids and similar fuel manufactured from coal; ferro-alloys and grapes, fresh or dried. For the remaining categories, assessment of residuals provided adequate evidence of normality, thereby showing the validity of the models in explaining the variables. As an additional step, an assessment to determine the existence of autocorrelation between the residuals was performed using the Durbin-Watson test on the residuals. This was done to assess if those categories that were not adequately explained by the ordinary least squares' regression method exhibited signs of autocorrelation, which would mean that a linear regression model was not suitable to explain the relationship between the two variables, and an alternative model would be required. The results displayed the following findings, the Durbin-Watson test score was below 1, which was not normal, for the ketones and quinones and their derivatives; and chromium ores and concentrates categories. This meant these categories definitely exhibited signs of autocorrelation in their datasets, and the use of the ordinary least squares' regression method was not appropriate to adequately explain the relationship between the variables owing to the pre-association of the data in the categories. This meant that for these categories, values observed for each time period were somewhat related to the next time period and the one preceding it.

4.4. Chapter Summary

This chapter presented the findings of the quantitative analysis for this research. The findings indicate an increasing trend of trade for eight categories of export products; a declining trend of trade for eleven categories of export products; plus, there was no change in one category. The findings also displayed evidence of growth at the aggregated BRICS level, particularly with China. The results of the tests performed on the data indicated that there was a strong correlation between the dependent and independent variables, but for some of the datasets time stationarity did not apply, therefore the linear regression model was not appropriate to explain the variation in the data, and a more complex model should rather be investigated. The following chapter highlights the conclusions and recommendations from these findings.

5. Chapter 5: Discussion, Conclusions and Recommendations

5.1. Introduction

This chapter presents the findings of the quantitative analysis for this research. The discussion of the findings is presented for each BRICS partner country. The findings from the literature review are also briefly summarised. The findings from the primary data analysis are also presented, and a conclusion on the findings of the research. Finally, recommendations as well as recommendations for future research are briefly discussed.

5.2. Findings from the study

5.2.1. SA trade with China

5.2.1.1. Categories with growth in trade between SA and China

The findings indicated three categories of exports that grew in trade with China, namely citrus fruits; preserved fruits not elsewhere specified (n.e.s) and titanium ores and concentrates. The findings for these categories of exports displayed sufficient evidence of statistically significant growth for the period under review. All the categories were primary products, raw materials and minerals. The growth of these export categories to China was consistent with the products currently demanded by China from South Africa which were primary products and minerals. Onyekwena, Taiwo and Unenze (2014) also found in their study that South Africa had become a natural trading partner for China, due to China's high demand for primary products and raw materials.

The research findings indicated that the South African citrus fruits industry experienced a period of growth from 2012 to 2016, as worldwide exports in this industry grew. Worldwide Chinese demand for the citrus fruits' category also increased from 2012 to 2016, in particular for South African products, as South Africa became the main source of citrus fruits imports. The demand for South African preserved fruits plus titanium ores and concentrates in China and in the rest of the world also increased over the period. South Africa was amongst the top sources of imports for preserved fruits in China. This industry was growing in South Africa in terms of volumes of trade, but falling in terms of value of trade. Apart from China, South

African preserved fruits were selling more units for lower prices in terms of the US Dollar to world markets. This was a disappointing development, that could be explained by exchange rate volatility. Worldwide demand for titanium ores and concentrates, including Chinese worldwide demand had also dropped, and the share of import demand for the South African good in China had also dropped, even though for the period under review actual titanium exports from South Africa to China grew.

The implication for these findings was therefore that even though China continued to have high trade intensities and complementarity with South Africa, export demand was diversifying away from minerals to agricultural products. However, agricultural product categories fall under the low-skills employment sector. According to Ncube and Cheteni (2015) low skill industries in South Africa face increased import penetration from China and are in danger of declining in the long-run due to the increase of South Africa's trade openness with the BRICS. The implications for sustainable employment creation in South Africa due to the growth in these export categories would therefore have to be investigated further.

5.2.1.2. Categories with no growth in trade between SA and China

The findings indicated that there were five categories of exports that have not grown in trade with China, namely acyclic hydrocarbons; structures (rods, angles, plates) of iron and steel (not elsewhere specified); the machinery for sorting/ screening/ washing; agglomerating/shaping mineral products; trucks, motor vehicles for the transportation of goods; and grapes, fresh or dried categories. The findings did not display sufficient evidence of statistically significant growth for the period under review, plus all the categories showed a downward trend. The decline in the fresh or dried grapes; structures (rods, angles, plates) of iron and steel (not elsewhere specified) and acyclic hydrocarbons was not consistent with the expected results, because these categories form part of the highly demanded products from China being primary products and raw materials, as indicated by Onyekwena, Taiwo and Unenze, (2014). The decline of the machinery for sorting/ screening/ washing; agglomerating/shaping mineral products and the trucks, motor vehicles for the transportation of goods categories however, was not surprising. This was in line with other studies, China is dominant in selling consumer goods to the other BRICS but does not demand these from the other countries (IDC, 2014) and (Onyekwena, Taiwo and Unenze, 2014).

The research also indicated that except for the fresh or dries grapes category, global demand for all the South African export categories involved declined over the period under review. Global Chinese demand increased for the structures (rods, angles, plates) of iron and steel (not elsewhere specified); and fresh or dries grapes. This implied that China was diversifying away from South Africa in these categories. Global Chinese demand dropped for acyclic hydrocarbons; machinery for sorting/ screening/ washing; agglomerating/shaping mineral products; and trucks, motor vehicles for the transportation of goods, and unsurprisingly, the South African share of imports relative to other world sources was very low. This would imply that these South African industries were struggling to compete globally, which is concerning because these industries are important in terms of the employment creation goals of the country, since they fall under manufacturing. The implications for employment in the decreasing incidence of trade with China for these categories would have to be investigated further, as these impact on employment and export diversification efforts Matthee, Idsardi and Krugell (2015).

5.2.2. SA trade with Russia

5.2.2.1. Categories with growth in trade between SA and Russia

In Russia, there were three categories of exports that grew in trade, namely iron ores and concentrates; coal, briquettes, ovoids and similar solid fuels manufactured from coal; and ferro-alloys. There was sufficient statistically significant evidence found that iron ores and concentrates and ferro-alloys grew as export categories to Russia in South Africa from 2012. Although the absolute values of trade showed a growth in the export category of coal; briquettes, ovoids and similar solid fuels manufactured from coal to Russia since 2012, this growth was not deemed statistically significant. This would make sense, since the growth was accounted for by trade indicators for one calendar year of 2015, implying that there was generally no trade in this category between these two countries. All the categories form part of minerals and beneficiated products, but also fall within the manufacturing sector which is a medium and high technology sector. Matthee, Idsardi and Krugell (2015), had also found in their study that South African exports in South Africa were diversifying towards medium and high technology results. These findings were therefore encouraging in terms of South Africa's export diversification efforts and attempts to increase the country's human capital factor. Also,

according to the IDC (2014), the export basket to Russia contained higher value items, hence these findings were aligned to expectation.

But the research indicated that worldwide demand for South African iron ores and concentrates declined during the period under review. Even though demand for South African iron ores and concentrates in Russia increased, overall the global demand for this category in Russia was also dropping, and the share of imports claimed by South Africa was miniscule compared to other sources for the period under review. This implied that the overall global market was shrinking for South Africa; which has negative consequences for employment creation, industry development and economic growth efforts. The worldwide demand for South African coal; briquettes, ovoids and similar solid fuels manufactured from coal increased between 2012 and 2016, the challenge was that this demand was at lower levels of monetary value, which also dropped. Global demand was increasing for South Africa but at lower prices, while global demand from Russia in this category was dropping for the period under review. Recorded data only revealed trade for one period of 2015 between the two countries. It was unsurprising that the share of imports in Russia claimed by South Africa was extremely low compared to other import sources. Overall this category does require more efforts to stimulate meaningful growth, otherwise it could decline even further in the long-run. South African ferro-alloys were also faced with diminishing global demand. For the period under review, increasing volumes of ferro-alloys were exported globally from South Africa for declining levels of monetary value. Russian demand from world sources was also falling in this category, but even though South Africa's share of trade with Russia was low, there was a definite improvement between 2012 and 2016.

According to currently available studies, trade with Russia had been negligible (IDC, 2014), therefore the marginal growth experienced in trade is a step in the positive direction for improved market penetration for South Africa. In the study by the IDC (2014), iron ore concentrates were found to account for almost one-third of the South African export basket, so the decline in world demand was a concern. Again, the coal; briquettes, ovoids and similar solid fuels manufactured from coal export category was in line with the expected dominant export category for South Africa. Although it was still concerning that these categories were primary sector and mineral products, a good performance in these categories was in line with the literature that point to these categories being a dominant export type for South Africa (IDC, 2014; and Matthee, Idsardi and Krugell, 2015).

5.2.2.2. Categories with no growth in trade between SA and Russia

In Russia, there were six categories of exports that formed part of the group that did not grow in trade, namely fruit and vegetable juices, unfermented; acyclic alcohols and their derivatives products; structures of steel and iron category; aluminium plates, sheets and strips, of a thickness exceeding 0.2mm; and machinery for sorting/ screening/washing; agglomerating/shaping mineral products and chromium ores and concentrates categories. Except for acyclic alcohols and their derivatives products, which recorded zero trade throughout the period, all the other categories showed a decline in trade. The decline of all the products was concerning, but not surprising because trade with Russia was negligible (IDC, 2014).

The research also indicated that except for the chromium ores and concentrates category, global demand for all the other South African export categories dropped. But Russia also decreased global demand of imports from world sources for all the categories, not just with South Africa. Not surprisingly, the South African share of trade in Russia was low over the period under review. It appeared as though these South African industries were struggling to compete globally.

In conclusion, the decline of the trade in these categories was concerning, but not surprising. The available literature on trade between South Africa and Russia supported low levels of trade between the two countries. Improving trade conditions between the two countries had been suggested in numerous previous studies. The decline indicated that very little success has been achieved by the South African government in this endeavour.

5.2.3. SA trade with Brazil

5.2.3.1. Categories with growth in trade between SA and Brazil

There were two categories of exports that grew in Brazil namely, structures of steel and iron category and the trucks, motor vehicles for the transportation of goods category. Both these categories fell in the class of goods that were higher value products. Even though structures of steel and

iron could also be classified as primary, it also formed part of the manufacturing sector which was the desired secondary sector. This was consistent with expectation, as the South African basket of goods exported to Brazil was of higher value products (IDC,2014).

According to the research results, global demand for South African structures of steel and iron was found to be steadily declining for the period under review. Brazilian imports of structures of steel and iron were also found to be steadily declining from world sources, and even though the demand for the South African exports increased, this was only in terms of value not volumes which were declining. In addition, the relative share of imports claimed by South Africa in Brazil for this product was shrinking from 2012. This could imply that the South African good was becoming progressively more expensive for Brazil to import, and that Brazil was diversifying to other import sources. The increase in trade for the trucks, motor vehicles for the transportation of goods category was only marginal. But, the South African industry as a whole was experiencing growth and an increase in global export demand. Demand from world sources in Brazil was found to be declining. The share of imports that South Africa had in Brazil could not be determined because data was not available for this category.

Overall, the trade between South Africa and Brazil was small, even though the export categories had enjoyed marginal amounts of increases in trade during the period under review. This performance was consistent with the available trade performance analyses. The IDC (2014), also found that South African trade with Brazil was negligible.

5.2.3.2. Categories with no growth in trade between SA and Brazil

The findings indicated six categories of exports that did not grow in trade with Brazil, namely fresh apples, pears and quinces; wine of fresh grapes; diphosphorus pentaoxide: phosphoric acid and polyphosphoric acids; acyclic alcohols and their derivatives; machinery for sorting/ screening/washing; agglomerating/shaping mineral products; and ketones and quinones, & their derivatives. The categories for fresh apples, pears and quinces; and diphosphorus pentaoxide: phosphoric acid and polyphosphoric acids, showed zero trade for the period under review, while the remaining four categories declined in trade between South Africa and Brazil. The findings were consistent with literature, and not surprising because trade with Brazil was

not large, and without concerted efforts was expected to decline in some categories (IDC, 2014).

All the South African export categories in this group experienced a drop in global demand. Brazil also decreased global demand for all the export categories, but imported more volumes for the fresh apples, pears and quinces; wine of fresh grapes; diphosphorus pentaoxide: phosphoric acid and polyphosphoric acids; acyclic alcohols and their derivatives categories. It appeared as though for these export categories Brazil was diversifying away from South Africa to cheaper import sources. Not surprisingly, the share of South African trade in terms of imports in Brazil was very low. The results could be explained by variations in exchange rate and its volatility thereof. Due to low trade activity with Brazil, these results were not surprising and were consistent with currently available literature (IDC, 2014). Overall, trade with Brazil was negligible (IDC, 2014) as highlighted in the literature reviewed.

5.2.4. SA trade with India

5.2.4.1. Categories that increased in trade between SA and India

The results found that there were three growth categories in India, firstly, the fresh apples, pears and quinces exports, acyclic hydrocarbons; and structures of steel and iron exports. Fresh apples, pears and quinces formed part of the primary agricultural sector, while the acyclic hydrocarbons; and structures of steel and iron categories formed part of the higher value secondary sector of manufacturing. This was desirable because of the possible spill-over effects in the economy, and the type of employment these industries were able to create which was more sustainable and higher skill intensive.

From the findings, the South African industry for apples, pears and quinces exports was facing a steady decline in global demand. In India global demand increased but the share of imports claimed by South Africa was very small compared to the other leading sources of imports even though it marginally increased over the period. The South African acyclic hydrocarbons industry was also facing declining trade in terms of value, but more volumes were being exported for these declining prices. Overall, demand from other world sources had also

increased in India in terms of volumes, but had dropped in terms of trade value, and South Africa was not performing well as an import source for this product.

South African structures of steel and iron performed well in India over this period, but it still was one of the lowest sources of imports for India. Overall, the global demand in India for this product fell over this period, and global demand for South Africa also fell over the period. It appeared as though this industry was facing a shrinking global market.

In conclusion, even though there was an increase in the trade of all these goods between South Africa and India, the South African share of trade in India was very low, but this could be explained by the differences in the relative sizes of these economies. In that context, South Africa was a smaller economy, even though they are complementary in terms of trade structure. The growth in these categories supported literature that stated that there was a good trading relationship in terms of trade intensities and complementarities with India (Onyekwena, Taiwo and Unenze, 2014).

5.2.4.2. Categories with no growth in trade between SA and India

India had three individual categories that declined namely, petroleum jelly, mineral waxes and similar products; aluminium plates, sheets and strips, of a thickness exceeding 0.2mm; machinery for sorting/ screening/washing; agglomerating/shaping mineral products. These products showed a decline in trade between South Africa and India.

From the results, South Africa experienced diminished global demand for all the above-mentioned categories of exports. The import demand from other world sources in India for these export categories declined in the period under review, not just with South Africa. The share of trade for South Africa in terms of Indian imports was also relatively low. Since these export categories all formed part of the manufacturing sector, these results were a cause for concern. The decline in trade with India was disappointing, given the country's trade structure that was complementary to South Africa. Efforts required in order to improve trade relations and the impact of the decline on the South African market would have to be investigated further.

5.2.5. SA trade with BRICS Grouping

At the aggregated BRICS bloc level, there was evidence of a growth in the high RCA exports that South Africa exported to the partner countries. This was evident both in terms of volume and in dollar value. At the country level, trade with Brazil, India and Russia did not show statistically significant growth for the period under review, while exports to China grew the most. There was statistically significant evidence that there was a growth from 2012 to 2016, at both value and volume terms in China. The growth of these export categories to China was consistent with the currently available literature which pointed to China as South Africa's largest trading partner within the BRICS (Mhaka and Jeke, 2018). These findings were also in line with the high trade intensity findings from the study by Onyekwena, Taiwo and Unenze, (2014) and Singh (2016).

5.3. Findings from the literature review

Findings from the literature indicated that since inception, the BRICS bloc of economies had continued to developed and grow. The group was now a legitimate force in global governance, making substantive contributions and enhancements in the trajectory of global leadership, promoting the plight of the South; and taking charge of their future with institutions that make an impact, such as the BRICS New Development Bank, the Contingency Arrangement and actively providing foreign aid to their peers without oppressive conditions. The group had been accredited with contributing to the destabilisation of unipolarity. The literature indicated that since joining the group, South Africa's role in global affairs has also been solidified.

This research was grounded on the foundations of the principles of comparative advantages theories. The literature distinguished between traditional theories of comparative advantage and new theories of trade. Traditional theories included the mercantilist theory, which was believed to be the earliest identifiable theory; to David Hume's theory of price adjustment; Adam Smith's theory of absolute advantages; the Ricardian theory of comparative advantages and the Heckscher-Ohlin theory of relative factor intensities, which were still mostly applied in practice. These theories were based on the assumptions of perfect competition and constant returns to scale, in a world where the goods were all homogenous. New trade theories include differed in that they assumed imperfect competition, heterogeneous goods and scale economies. These included the intra-industry trade theory, the Krugman model, the Linder

theory and the gravity model of trade, and were vastly applied in practice to evaluate various factors affecting trade.

Empirically, trade had also been linked to large reductions in trade costs that had been facilitated by various factors such as increased trade openness, increased regional trade agreements and trade reforms. Direct foreign investment was also amongst the top factors identified to have an important role in the dissemination of information and increases in productivity which may ultimately lead to increased levels of GDP.

The trade relationship between South Africa and the BRICS was dominated by trade with China (Onyekwena, Taiwo and Unenze, 2014; Mhaka and Jeke, 2018). Trade with the other BRICS partners was not found to be as dominant, although South Africa and India were identified to have high trade complementarities (Onyekwena, Taiwo and Unenze, 2014). All the BRICS were found to be relatively open in their economies (Ncube and Cheteni, 2015; Shayanewako, 2018). In the quest for export development, South Africa was diversifying to higher value goods in terms of export structure, even though the composition of exports was still largely comprised of primary goods.

Lastly, trade studies examining the trade patterns and relations between South Africa and each BRICS member state were found to be underexplored, as instead studies focused on China and South Africa. There was also a gap in the literature on South African trade performance regarding individual export and import categories.

5.4. Findings from the primary data

The findings of this research revealed a strong positive relation between trade values and trade volumes, where trade volume was the independent variable, and trade value was the dependent variable, with a correlation coefficient of 0.996. To determine the nature of the relationship between the variables, the data was analysed using the ordinary least squares regression method, for each individual category of exports. This was consistent with expected literature as in their research, Mhaka and Jeke (2018), also found that trade value and volume could be associated variables, with a linear relationship that could be adequately explained by the OLS methods.

The regression analysis for this analysis also produced a statistically significant positive relationship between trade volume and trade value, but the results indicated lack of reliability

for the ketones and quinones, and their derivatives category; chromium ores and concentrates category; as well as the diphosphorus pentaoxide, phosphoric acid and polyphosphoric acids category which was expected given the lack of correlations established. Overall, the results confirmed the reliability of the linear regression model, and the R-squared values generally indicated up to 99% of the relationship between these two variables was explained by the model for 17 of the categories. The residual analysis of the data produced a p-value of less than 5% which was statistically significant for eight of the categories. This meant that for the remaining categories, alternative regression models should be investigated to in order to ascertain if they explained the relationship between variables, as they could be a better fit to the data. To further assess and validate the existence of autocorrelation in the dataset, the Durbin-Watson test revealed that only two of the datasets actually exhibited signs of autocorrelation, being ketones and quinones and their derivatives; and chromium ores and concentrates categories. This meant that there could be autoregression in the data, meaning that the stationarity of time was not valid for these two categories. Since the diphosphorus pentaoxide, phosphoric acid and polyphosphoric acids had zero trade, the analysis on this category could not be conducted.

5.5. Conclusions

The purpose of this research was to analyse the performance of 20 product categories with a high RCA for South Africa to the BRICS bloc to determine if these product categories had experienced growth between 2012 and 2016. This research was focused on the BRICS partnership as an economic bloc and therefore the study area for this research comprised of all the BRICS economies. The exports under investigation were from the geographic area of South Africa, while the export destinations of those exports defined the remaining geographic study area. The population for this research comprised of the 37 product categories with a revealed comparative advantage for South Africa within the BRICS bloc in 2012, that the country could potentially export in greater quantities, or for the first time, to other BRICS markets (IDC, 2014). Non-probability convenience sampling was used to select a sample comprised of all the 20 product categories that had a revealed comparative advantage which was much higher than that of the leading import sources in the BRICS bloc for South Africa in 2012.

To understand the impact of trade volumes on the trade values and therefore assess growth, the ordinary least squares regression method was applied. The results revealed a strong positive relationship between the flows of volume and the strength of trade. This indicated that the

higher the volumes exported, the higher trade values were expected to be between for a trade commodity. The results computed from this model were in line with the theoretical findings.

The analysis of growth levels in terms of value and volume for the 20 export categories that had a revealed comparative advantage which was much higher than that of the leading import sources in the BRICS bloc for South Africa in 2012, indicated that eight of the categories had experienced significant growth in trade values and volumes, while eleven had experienced a significant decline in trade. One category of exports did not experience any trade for the period, and thus remained unchanged. The objectives of the research were addressed in the aggregation of the performance of the exports. The research found that the exports with a high RCA had experienced significant growth at the aggregated level from USD109 405 in 2012 to USD139 067 in 2016 in export value. This was an increase of USD29 662 which equated to about 27% growth in the period. The research also found that the volume of exports had also experienced significant growth from 77 921 tons in 2012 to 202 597 tons in 2016, equating to an average increase of roughly 160% in export volume for the period.

The results further indicated that trade at country level was significantly higher with China than the other BRICS partners. These results were in line with empirical findings. Furthermore, the results also indicated that for most of the categories where South African exports struggled with declining demand in a target country, there was also a decline in the global demand for that South African products. Those results have a number of implications, either the South African industries for those categories were undergoing shrinkage; or those industries were facing tougher global competition from other cheaper import sources. This meant the South African government should put measures in place targeted at assisting those industries in order to sustain employment levels. Plus, the industries where exports had grown should be targeted to enhance levels of growth and boost employment creation, leading to a higher GDP level.

5.6. Recommendations

Part of the recommendations formulated from the findings and conclusions of this research is a further analysis on the export categories that experienced a decline in trade, to understand the underlying causes for the decline and determine if these can be curbed through further engagement and dialog at the national trade agreement level or if the reductions are caused by factors internal to the particular industries or firms and determine possible resolutions. Another

recommendation is for an in-depth analysis into the relationships and agreements between South African and the international organisations that are the key customers in both the sectors that are doing well; to determine trends, methods and processes that other South African organisations wishing to enter into exporting can replicate or apply in order to succeed in those markets. It is also recommended that the effects of the reduction in trade on the employment figures be analysed for the export categories which decreased in trade. The fourth recommendation involves in-depth product analyses to determine the potential for innovation and product diversification, that will enable the production of higher value-added products from most of the primary products exported.

5.7. Area(s) for further Research

The research was conducted for data periods up to 2016 due to limitations imposed by institutional research ethical clearance authorisation requirements which was attained two years before the study was actually completed. The analysis of periods after 2016 (2017 & 2018), as well as growth trend forecasts for 2019 onwards are recommended as areas of further research.

Further analyses can also be done to determine the BRICS partners that South African policymakers should focus on in terms of developing further relations, by analysing categories where there has been a decrease in exports and explore the underlying causes, in order to improve the situation for South African exporters.

Another recommendation for further study is to investigate the effects of the growth in the eight export categories on employment opportunities, so that the contribution to employment in the economy is quantified. This will also enable the quantification of the effects on income per capita levels, the GDP contribution as well as welfare benefits to the South African economy.

5.8. Chapter Summary

This chapter focused on the discussion of the results of the research. The results were discussed for all the country groupings and finally for the BRICS as a consolidated bloc. While there was growth in some of the categories per country, each country was experiencing a significant level of reduction in trade as well. It appeared as though there were categories where the BRICS

partners were diversifying their demand away from South Africa to other sources, as for these categories the South African market share was declining. As expected, the most significant trade for South Africa in the BRICS was with China. This was consistent with the literature reviewed on the subject. The chapter also highlighted the recommendations and limitations of the study, as well as the recommendations for further research.

Appendix 1: Individual country results for combined categories

1. Products with a high RCA in South Africa for 2012

The following is the full list of the products identified to have a higher revealed comparative advantage for South Africa within the BRICS bloc. The table displays the calculated value of the revealed comparative advantage for South Africa as well as that of the leading sources of imports for the BRICS. The table also indicates the number of BRICS partners where there is potential to expand trade or enter into new trade relationships.

Table A.1: Products whose RCA index value for South Africa exceeds that of BRICS' leading sources of imports in 2012

No.	HS4	Description	SA	EU	USA	Japan	South Korea	Africa (Excl. SA)	No. of Partners
1	0805	Citrus fruit, fresh or dried	15.09	1.37	0.99	0.01	0.01	2.68	1
2	0808	Apples, pears and quinces, fresh	9.71	1.33	1.42	0.17	0.24	0.01	2
3	2009	Fruit and vegetable juices, unfermented	2.82	1.33	0.93	0.01	0.05	0.35	1
4	2204	Wine of fresh grapes	5.24	2.13	0.45	0.00	0.00	0.04	1
5	2601	Iron ores and concentrates; including roasted iron pyrites	11.48	0.08	0.13	0.00	0.00	0.28	1
6	2701	Coal; briquettes, ovoids and similar solid fuels manufactured from coal	11.05	0.12	1.19	0.00	0.00	0.02	1
7	2712	Petroleum jelly, mineral waxes and similar products	8.80	0.80	1.14	0.41	0.21	1.81	1
8	2809	Diphosphorus pentaoxide; phosphoric acid and polyphosphoric acids	14.72	0.37	1.14	0.13	0.18	14.25	1
9	2901	Acyclic hydrocarbons	3.84	1.20	0.89	1.35	3.43	0.11	2
10	2905	Acyclic alcohols and their derivatives	1.63	0.70	0.88	0.54	0.94	0.70	2
11	7202	Ferro-alloys	31.70	0.46	0.12	0.45	0.69	0.18	1
12	7308	Structures (rods, angles, plates) of iron and steel (nes)	2.18	1.41	0.42	0.21	1.65	0.20	4
13	7606	Aluminium plates, sheets and strips, of a thickness exceeding 0.2mm	4.21	1.37	1.45	0.88	1.47	0.08	2
14	8474	Machinery for sorting/ screening/ishing; agglomerating/shaping mineral products	4.11	1.71	1.09	0.33	0.27	0.10	4
15	8704	Trucks, motor vehicles for the transportation of goods	3.30	1.15	1.61	2.18	0.74	0.07	2
16	2008	Preserved fruits not elsewhere specified (nes)	3.57	0.95	1.10	0.04	0.15	0.41	1
17	2914	Ketones and quinones, & their derivatives	7.14	1.25	1.29	1.20	0.66	0.01	1
18	2610	Chromium ores and concentrates	90.56	0.11	0.03	0.00	0.00	0.52	1
19	2614	Titanium ores and concentrates	83.33	0.23	0.14	0.00	0.21	7.69	1
20	0806	Grapes, fresh or dried	11.65	0.83	1.77	0.01	0.01	0.97	1

Source: IDC

2. Individual export category results

a. H0808: Apples, pears and quinces, fresh

Figure A.1: Growth Results: Apples, pears and quinces, fresh for India. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

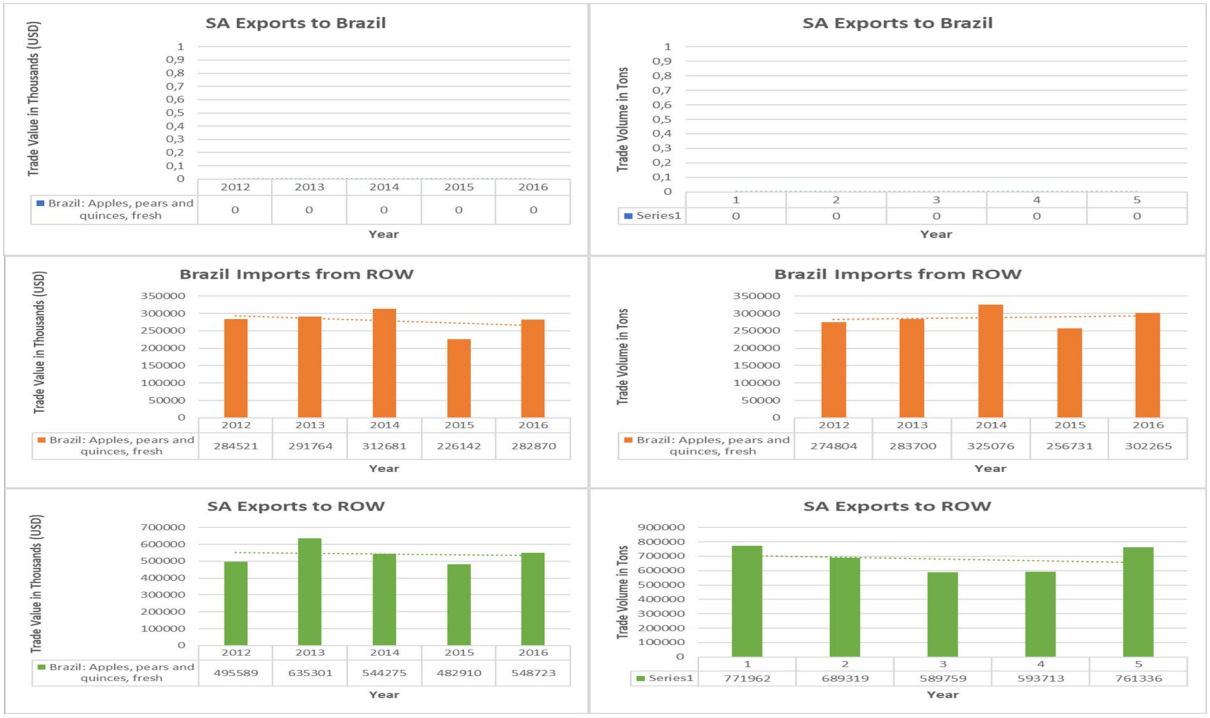


Figure A.2: Growth Results: Apples, pears and quinces, fresh for Brazil. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

b. H2901: Acyclic Hydrocarbons

Figure A.3: Growth Results: Acyclic hydrocarbons for India. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

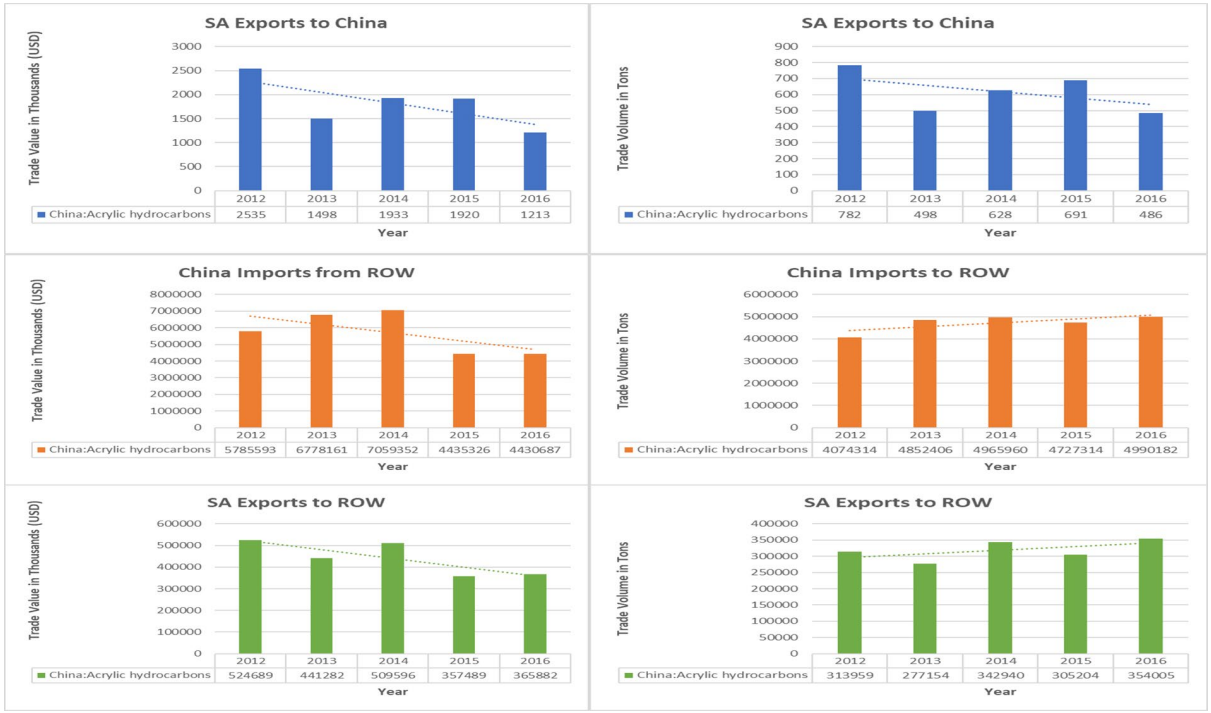


Figure A.4: Growth Results: Acyclic hydrocarbons for China. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

c. H7308: Structures (rods, angles, plates) of Iron and Steel (not elsewhere specified)

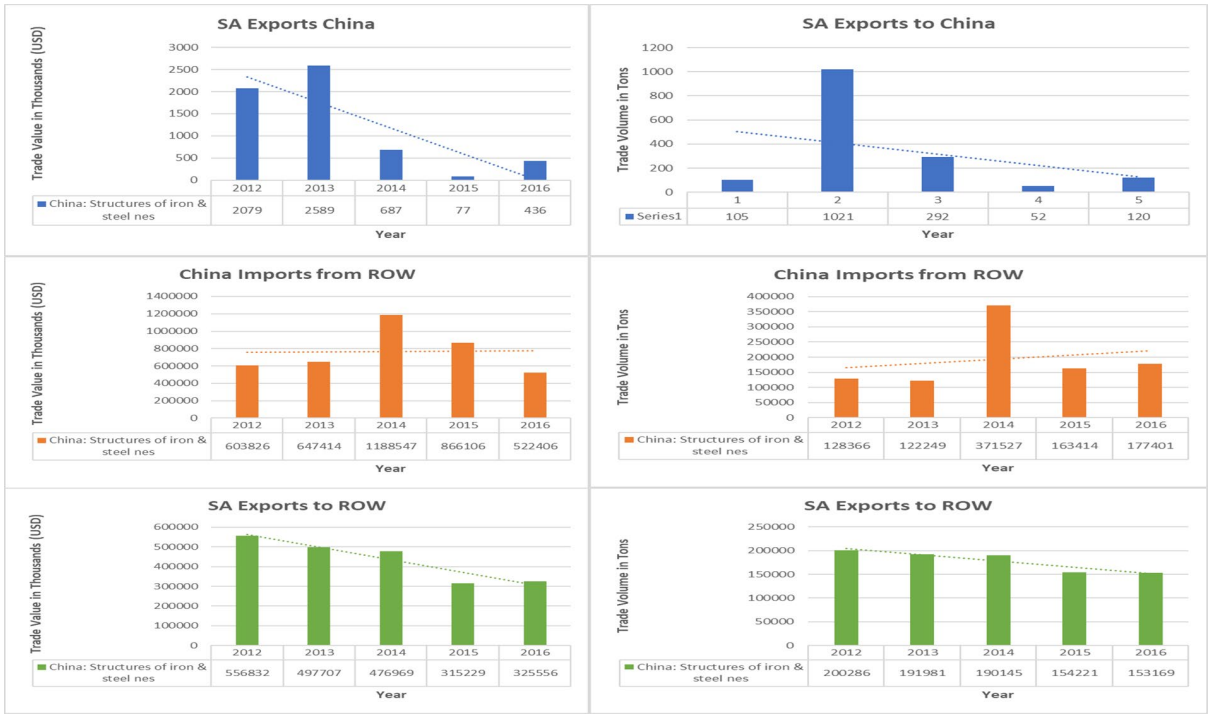


Figure A.5: Growth Results: Structures (rods, angles, plates) of iron and steel (nes) for China. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

Figure A.6: Growth Results: Structures (rods, angles, plates) of iron and steel (nes) for India. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

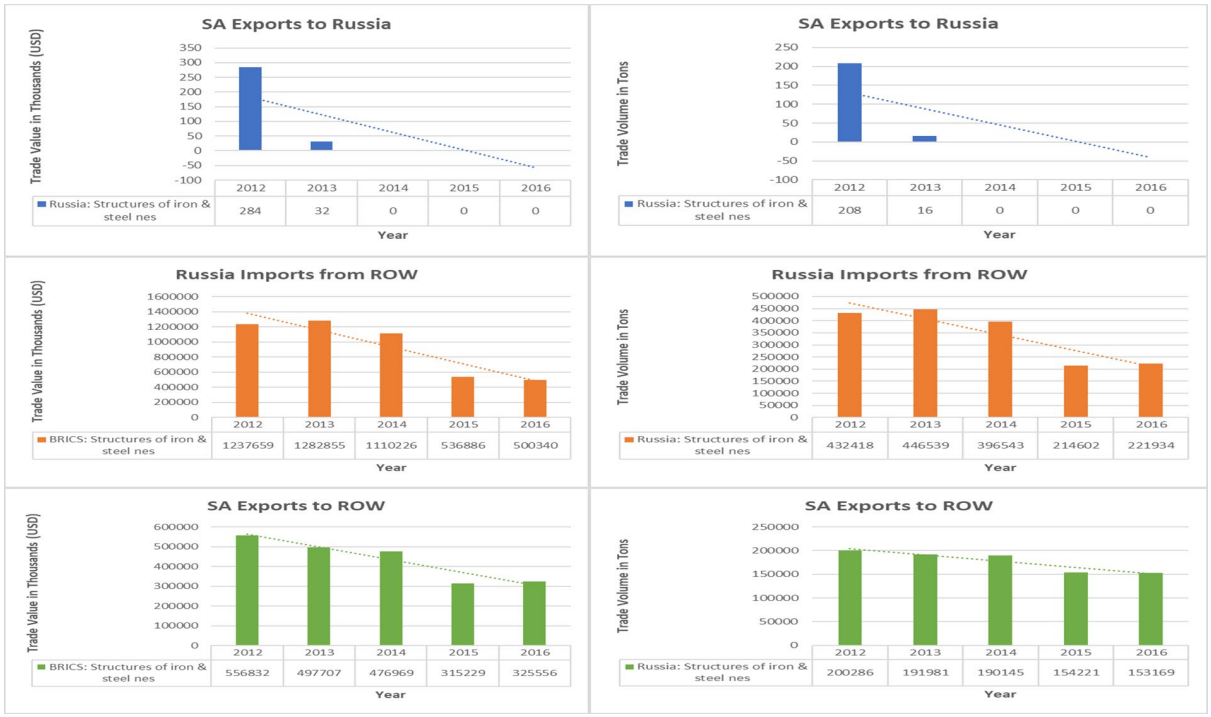


Figure A.7: Growth Results: Structures (rods, angles, plates) of iron and steel (nes) for Russia. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

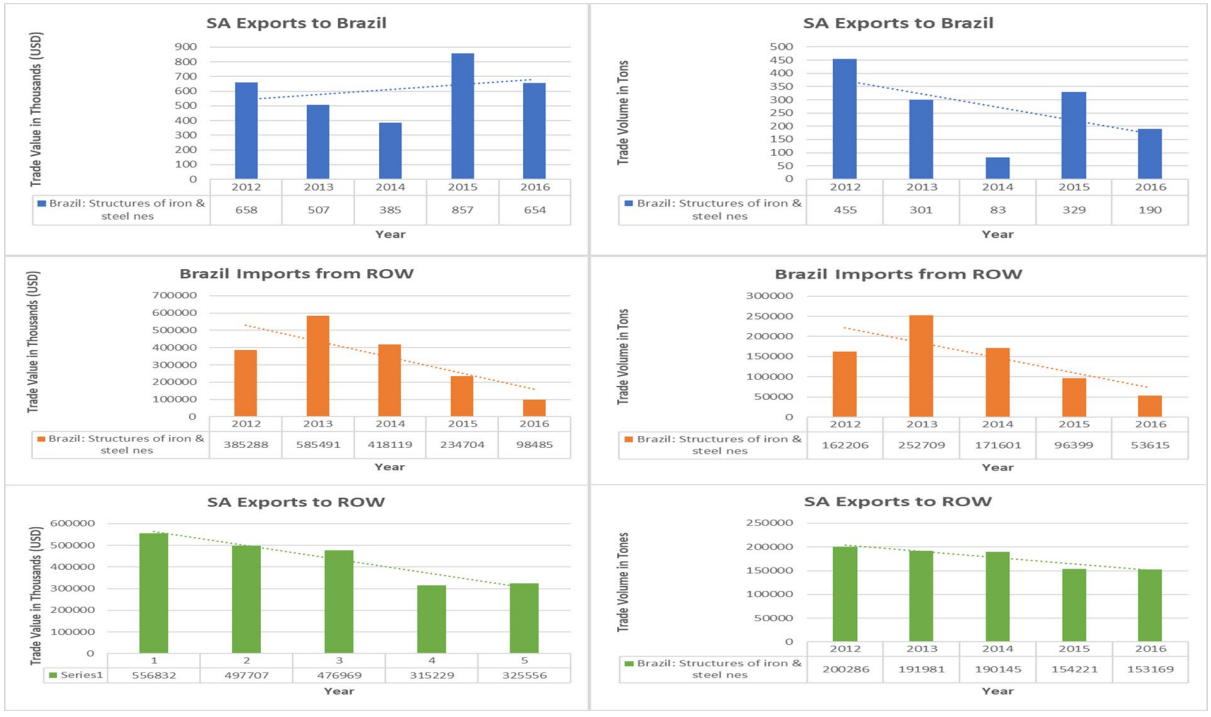


Figure A.8: Growth Results: Structures (rods, angles, plates) of iron and steel (nes) for Brazil. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

d. H8474: Machinery for Sorting/ Screening; Agglomerating/Shaping Mineral Products

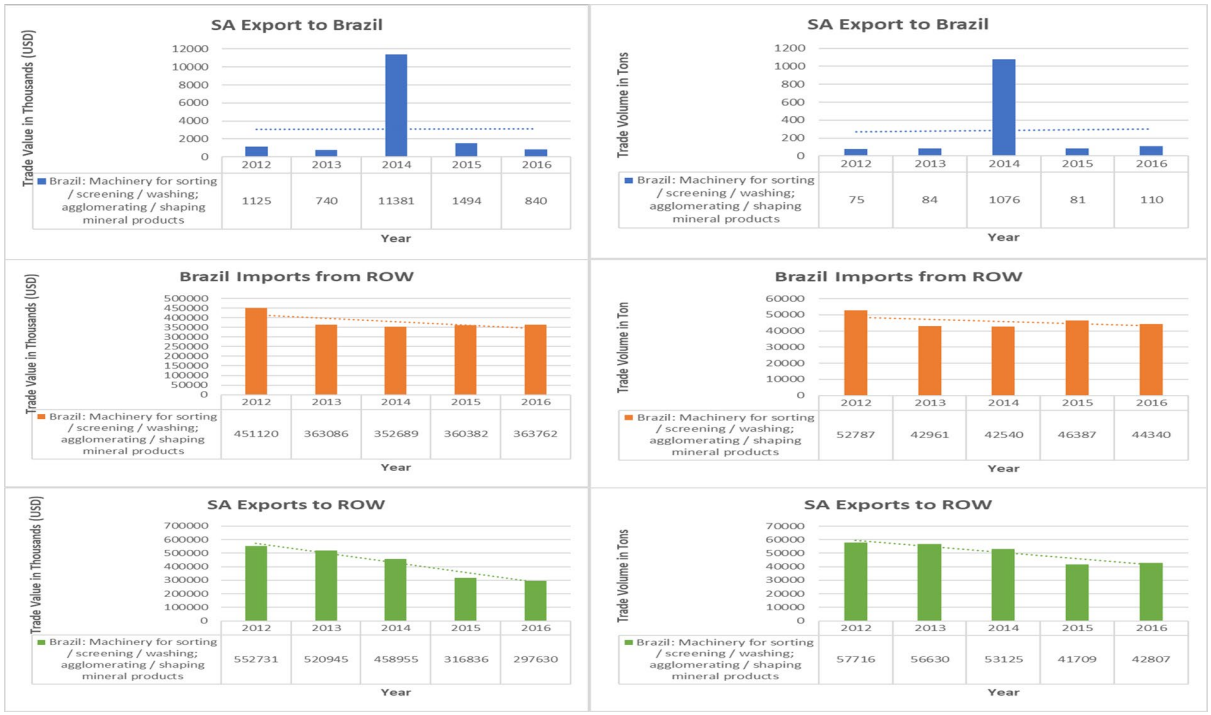


Figure A.9: Growth Results: Machinery for sorting/ screening/ishing; agglomerating/shaping mineral products for Brazil. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

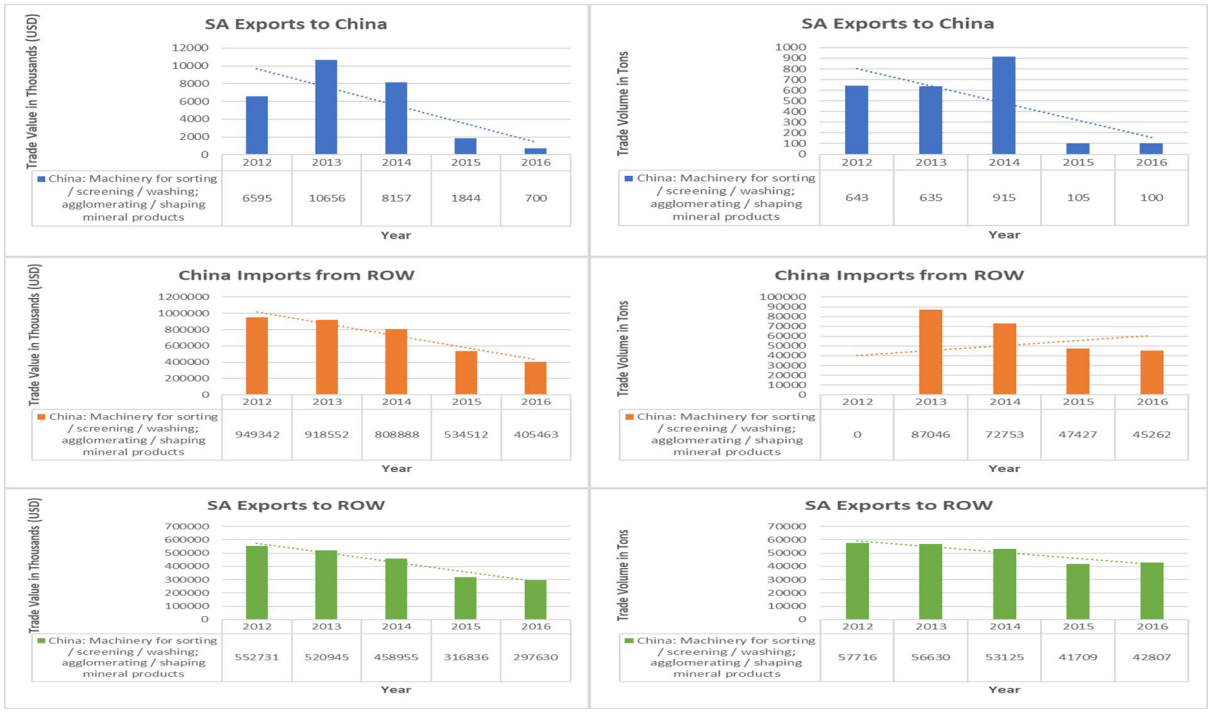


Figure A.10: Growth Results:Machinery for sorting/ screening/ishing; agglomerating/shaping mineral products for China. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

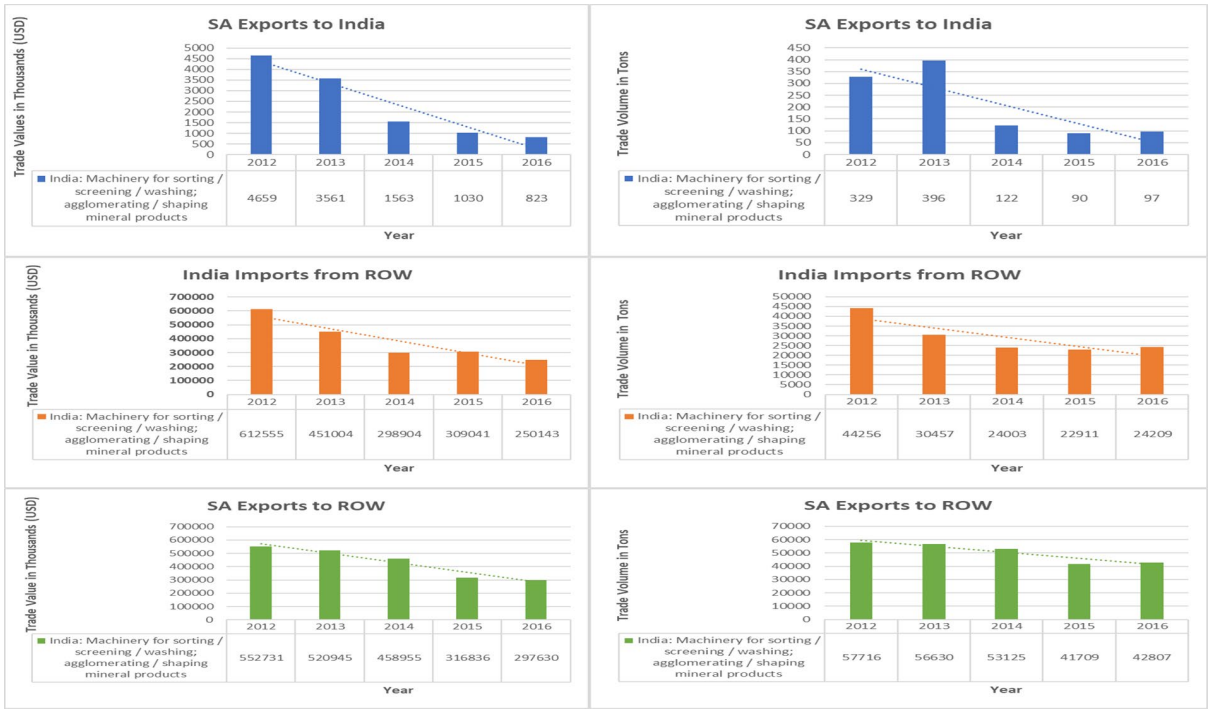


Figure A.11: Growth Results:Machinery for sorting/ screening/ishing; agglomerating/shaping mineral products for India. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

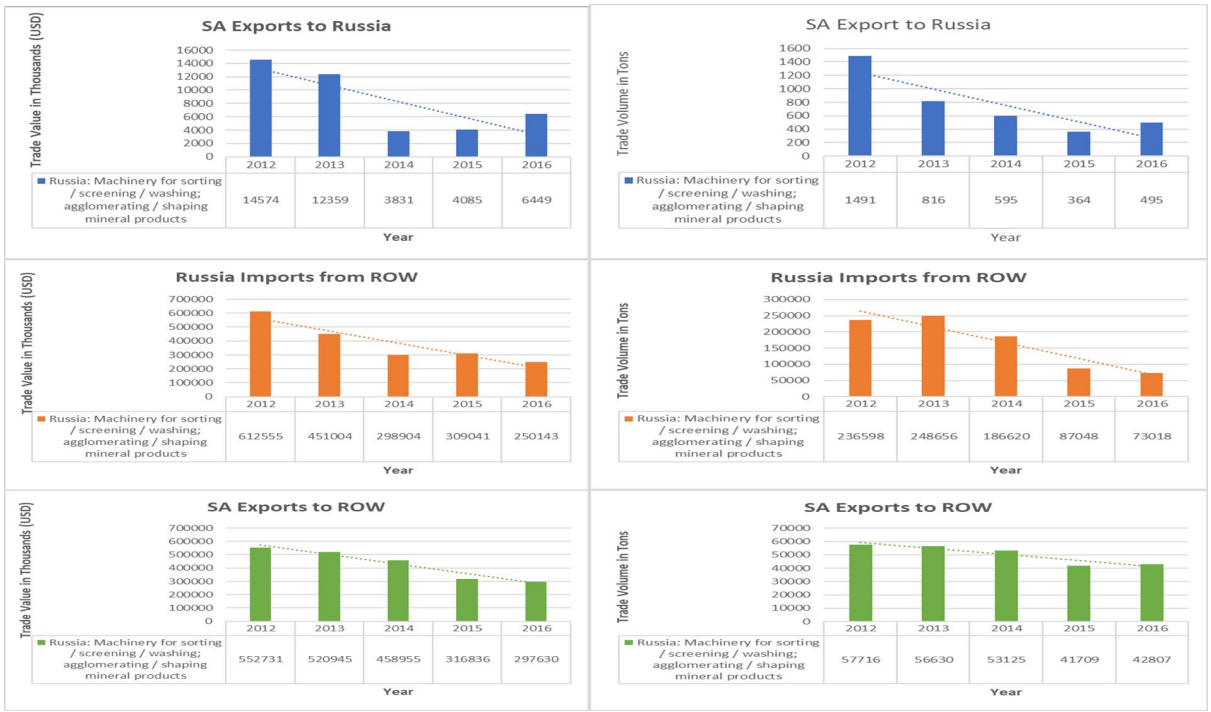


Figure A.12: Growth Results:Machinery for sorting/ screening/ishing; agglomerating/shaping mineral products for Russia. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

e. H8704: Trucks, Motor vehicles for the transportation of goods

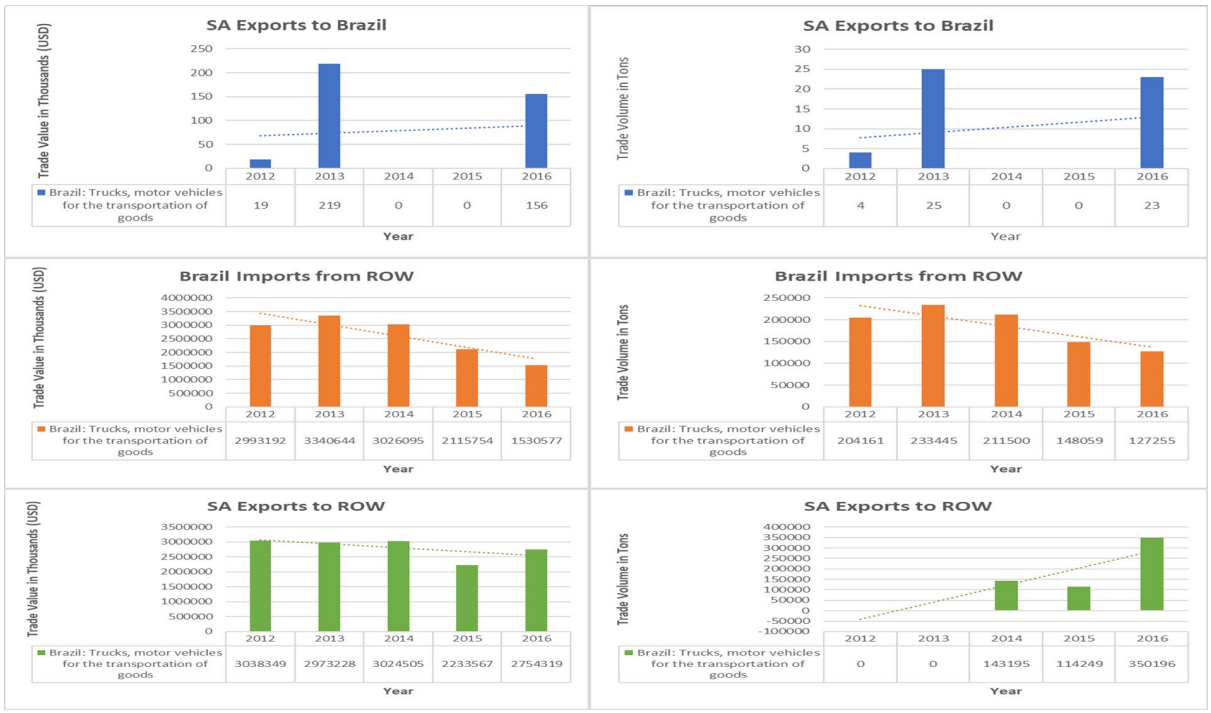


Figure A.13: Growth Results:Trucks, motor vehicles for the transportation of goods for Brazil. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

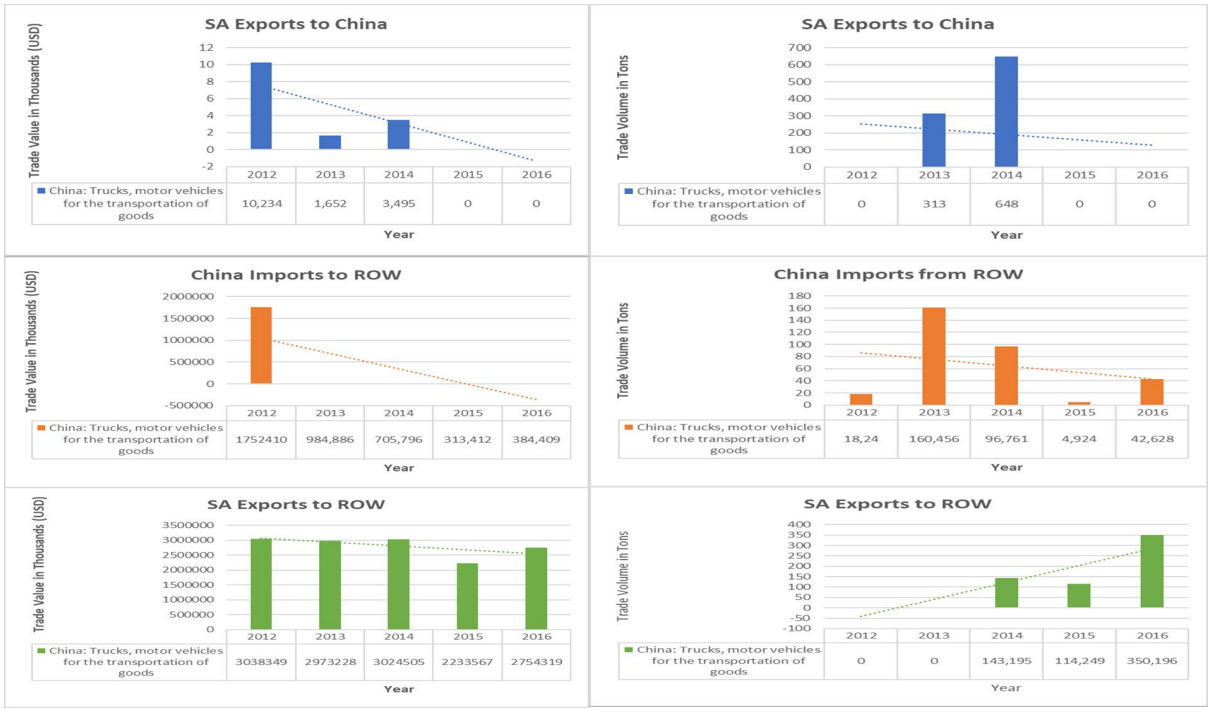


Figure A.14: Growth Results:Trucks, motor vehicles for the transportation of goods for China. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

f. H7606: Aluminium Plates, Sheets and Strips, of a Thickness Exceeding 0.2mm

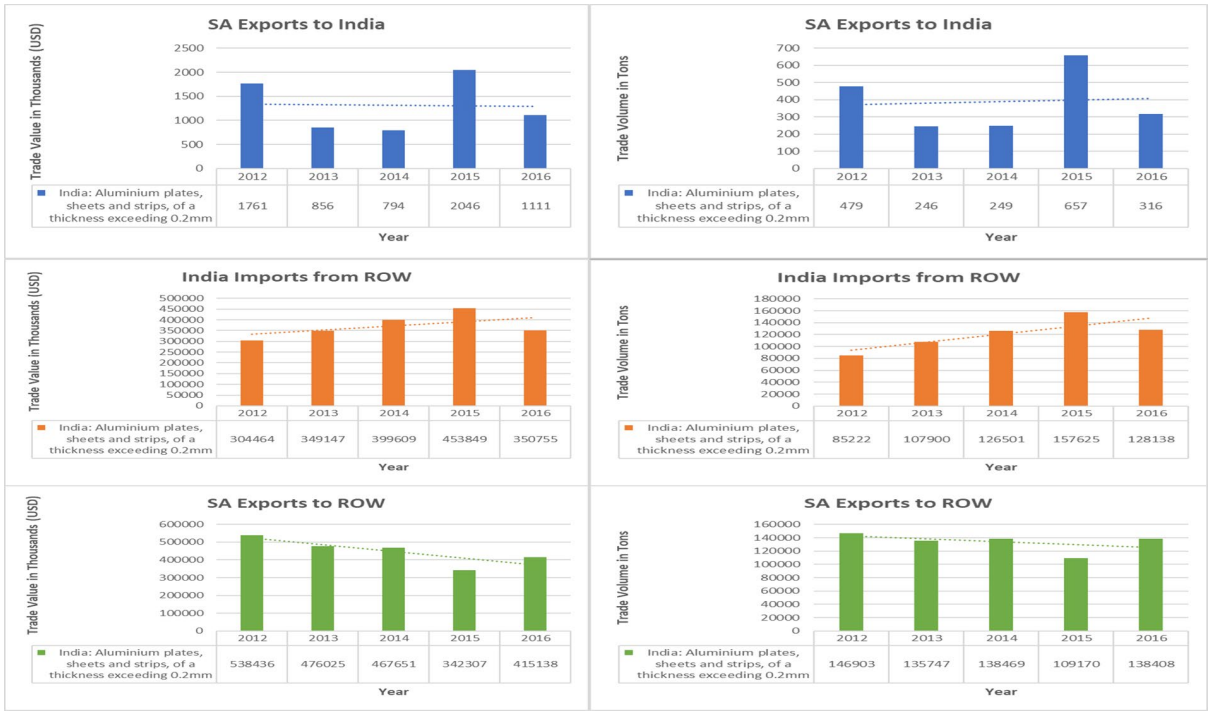


Figure A.15: Growth Results:Aluminium plates, sheets and strips, of a thickness exceeding 0.2mm for India. Source - Own. Compiled from International Trade Centre (TradeMap) Data(Years:2012-2016).

g. H2905: Acyclic Alcohols and their Derivatives

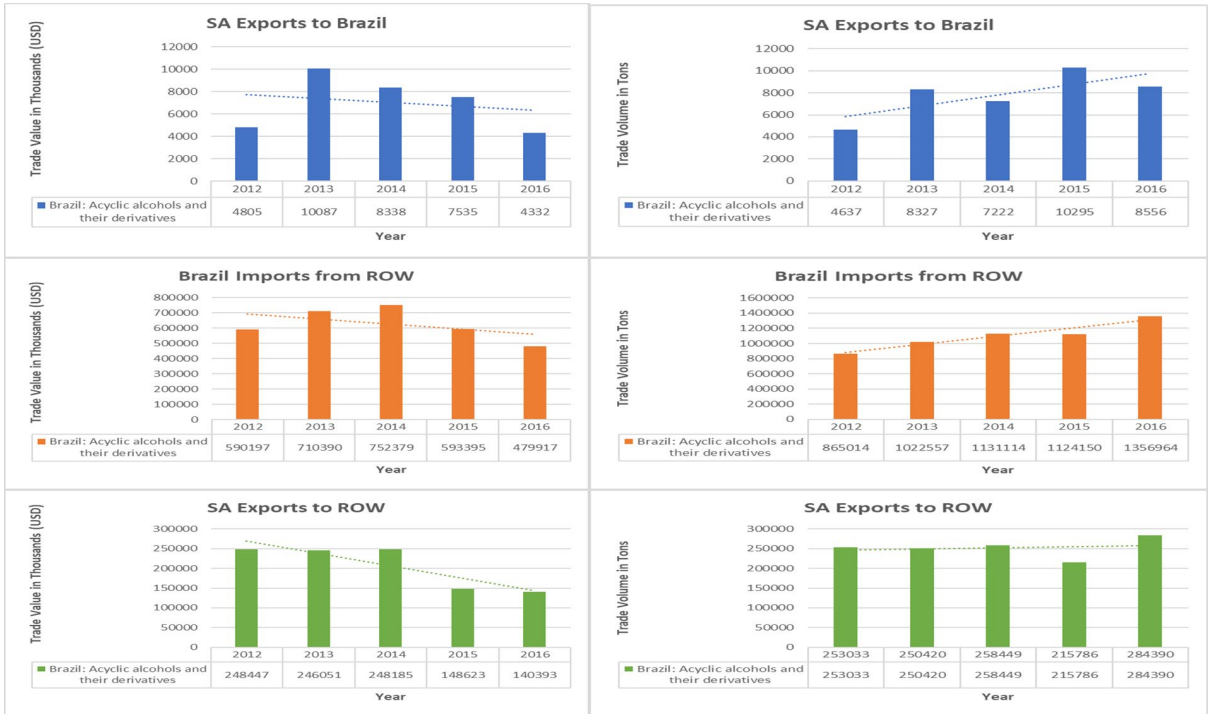


Figure A.25: Growth Results:Acyclic alcohols and their derivatives for Brazil. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

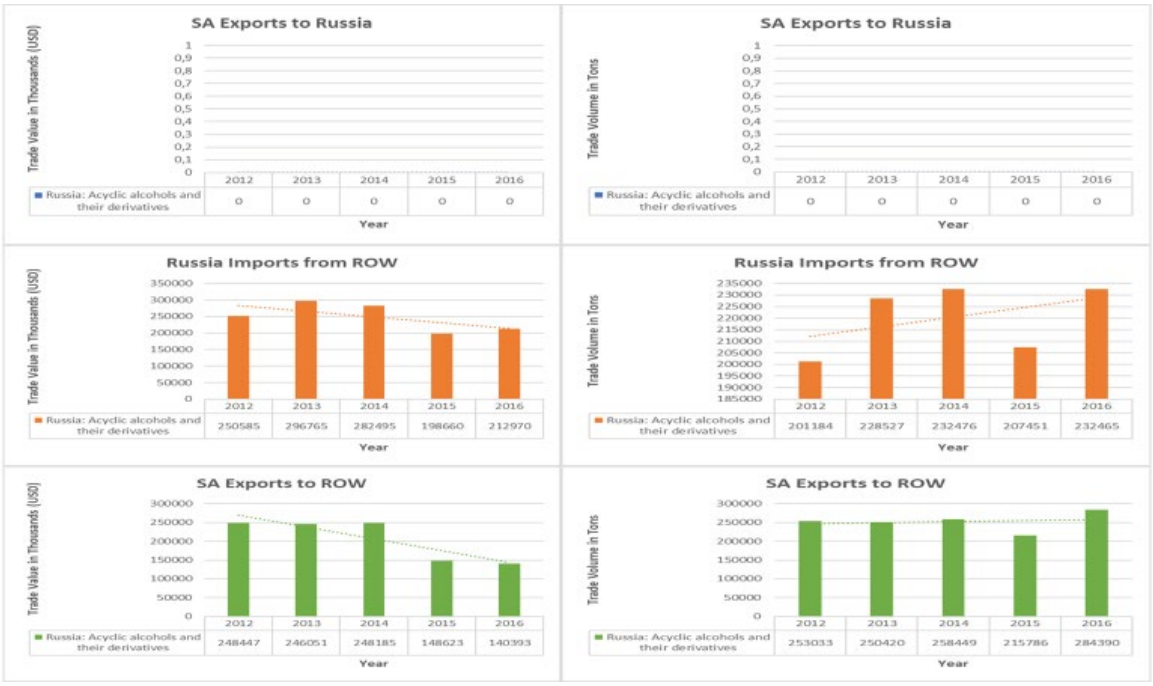


Figure A.16: Growth Results:Acyclic alcohols and their derivatives for Russia. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

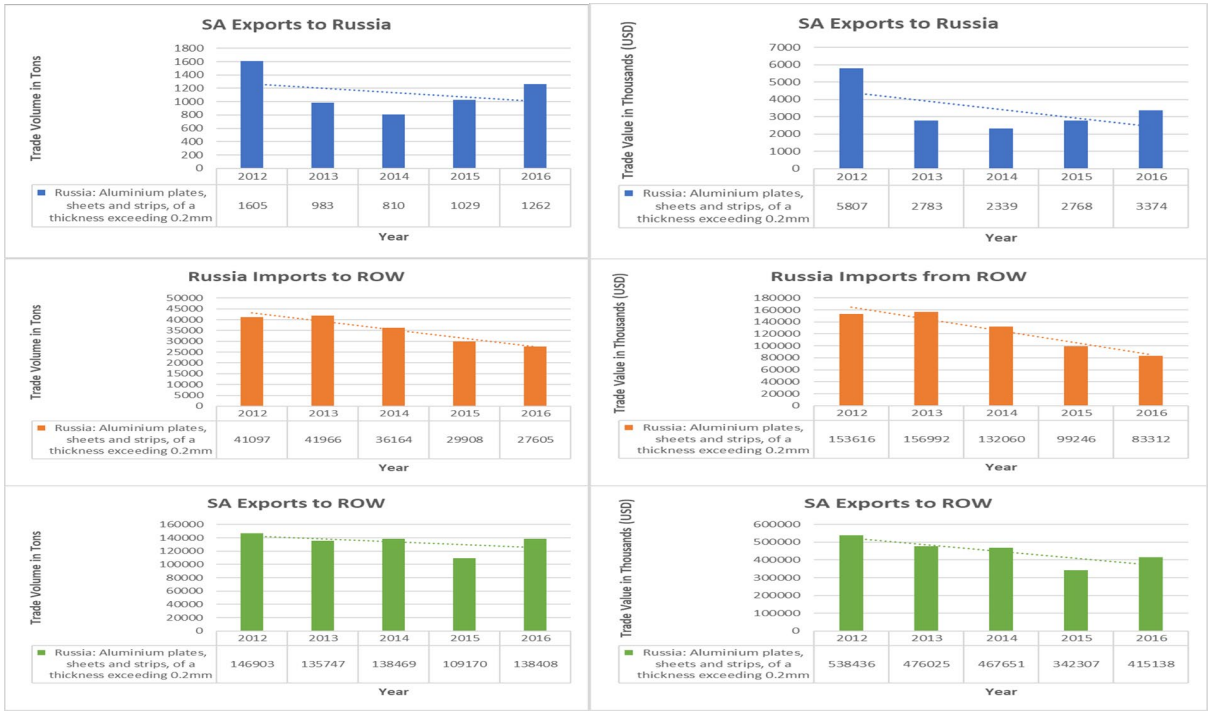


Figure A.17: Growth Results: Aluminium plates, sheets and strips, of a thickness exceeding 0.2mm for Russia. Source - Own. Compiled from International Trade Centre (TradeMap) Data (Years:2012-2016).

Appendix 2: References

Abdoulkarim E. (2014). *"Revealed Comparative Advantage and Measurement of International Competitiveness for Dates"*. Journal of International Food & Agribusiness Marketing, Vol. 26, No3, pp.209-217. [Online]. Available from https://doi.org/10.1080/08974438.2014.909280, [Accessed on 20 February 2019]

Ahn J. (2014). *"A welfare analysis of unilateral trade and FDI liberalization"*. The Canadian Journal of Economics / Revue canadienne d'Economique, Vol. 47, No.3 (August/ Août 2014), pp. 758-774. [Online]. Available from https://www.jstor.org/stable/43818886, [Accessed on 10 October 2018]

Akpan U.S., Isihaka S.R., Asongu S.A. (2014). "*Determinants of Foreign Direct Investment in Fast-Growing Economies: A Study of BRICS and MINT"*. African Governance and Development Institute: A G D I Working Paper, WP/14/002 [Online] Available from http://ssrn.com/abstract=2493410, [Accessed on 24 July 2017]

Alemu M.A. and Lee J. (2015). *"Foreign Aid on Economic Growth in Africa: A Comparison of Low and Middle-Income Countries"*. SAJEMS NS 18 (2015) No 4:449-462. [Online] Available from http://dx.doi.org/10.17159/2222-3436/2015/v18n4a1, [Accessed on 29 April 2018]

Allen T. (2014). "*Information Frictions on Trade*". Econometrica, Vol. 82, No. 6 (November 2014), pp. 2041-2083. [Online]. Available from https://www.jstor.org/stable/43616907, [Accessed on 10 October 2018]

Ametoglo M.E.S., Guo P. and Wonyra K.O. (2018). *"Regional Integration and Income Inequality in ECOIS Zone"*. Journal of Economic Integration, Vol. 33, No. 3 (September 2018),

pp. 604-627. [Online]. Available from https://www.jstor.org/stable/26484513, [Accessed on 10 October 2018]

Arvis J., Shepherd B., Duval Y., and Utoktham C. (2013). *"Trade Costs and Development: A New Data Set".The World Bank:* Poverty Reduction And Economic Management (Prem) Network, January 2013 , Number 104, pp1-4 [Online] http://siteresources.worldbank.org/EXTPREMNET/Resources/EP104.pdf, [Accessed on 20 November 2018]

Atieno A.P. (2009). "*An Analysis Of The Strengths And Limitation Of Qualitative And Quantitative Research Paradigms"*. Problems Of Education In The 21st Century Volume 13, 2009, pp13-18 [Online]. Available from http://www.scientiasocialis.lt/pec/files/pdf/Atieno_Vol.13.pdf, [Accessed on 20 November 2018].

Banga R. (2014). *"Linking into Global Value Chains Is Not Sufficient: Do You Export Domestic Value-Added Contents?"*. Journal of Economic Integration, Vol. 29, No. 2 (June 2014), pp. 267-297 [Online] Available from http://www.jstor.org/stable/23723856, [Available on 24 July 2017]

Bernard A.B., Redding S.J. and Schott P.K. (2017). "*Comparative Advantage and Heterogeneous Firms"*. The Review of Economic Studies, Vol. 74, No. 1 (Jan., 2007), pp. 31-66. [Online]. Available on https://www.jstor.org/stable/4123236, [Accessed on 10 October 2018]

Bernhardt T. (2014). *"North-South Imbalances in the International Trade Regime Why the WTO Does Not Benefit Developing Countries as Much as it Could"*. Consilience, No. 12 (2014), pp. 123-141. [Online] Available from https://www.jstor.org/stable/26476156, [Accessed on 10 October 2018]

Bernstein A. (2014). *"South Africa's Key Challenges: Tough Choices and New Directions"*. The Annals of the American Academy of Political and Social Science, Vol. 652, Strengthening Governance in South Africa: Building on Mandela's Legacy (March 2014), pp.20-47. [Online]. Available from https://www.jstor.org/stable/24541715, [Accessed on 10 October 2018]

Bhorat H. and Tarp F. (2016). *"The Pursuit of Long-Run Economic Growth in Africa An Overview of Key Challenges"*. Africa's Lions: Growth Traps and Opportunities for Six African Economies. Brookings Institution Press. [Online] Available from https://www.jstor.org/stable/10.7864/j.ctt1hfr23q.4, [Accessed on 10 October 2018]

Borsboom D., Mellenbergh G.J., and van Heerden J. (2004). *"The Concept of Validity"*. Psychological Review 2004, Vol. 111, No. 4, 1061–1071 [Online]. Available from http://rhowell.ba.ttu.edu/borsboomValidity2004.pdf, [Accessed on 4 May 2018]

Bredeloup S. (2014). *"West African Students Turned Entrepreneurs in Asian Trading Posts: A New Facet of Globalization"*. Urban Anthropology and Studies of Cultural Systems and World Economic Development, Vol. 43, No. 1/2/3, SPECIAL ISSUE: Global African Entrepreneurs (SPRING, SUMMER, FALL 2014), pp. 17-56. [Online] Available from https://www.jstor.org/stable/24643107, [Accessed on 10 October 2018]

Burstein A. and Cravino J. (2015). *"Measured Aggregate Gains from International Trade"*. American Economic Journal: Macroeconomics, Vol. 7, No. 2 (April 2015), pp. 181-218. [Online]. Available from https://www.jstor.org/stable/24739276, [Accessed on 10 October 2018]

Cakir M. and Kabunda A. (2013). "*Trade shocks from BRIC to South Africa: A global VAR analysis"*. Economic Modelling, 2013, vol. 32, issue C, 190-202. [Online]. Available from

http://www.sciencedirect.com/science/article/pii/S0264999313000606, [accessed on 20 April 2017]

Campbell D. and Campbell S. (2008). *"Introduction to Regression and Data Analysis"*. Yale University StatLab Workshop Series 2008 [Online]. Available from http://statlab.stat.yale.edu/workshops/IntroRegression/StatLab-IntroRegressionFa08.pdf , [Accessed on 20 November 2018]

Chala B. W. and Lee H. (2017). *"Do Regional Trade Agreements Increase Bilateral Greenfield Investment?*". Journal of Economic Integration, Vol. 30, No. 4 (December 2015), pp. 680-707. [Online]. Available from https://www.jstor.org/stable/43630955, [Accessed on 10 October 2018]

Chaudhary A. (2016). *"Revealed Comparative Advantage Index: An Analysis of Export Potential of Indian Textiles Industry in the Post MFA Period"*. American Journal of Economics 2016, 6(6): 344-351. DOI: 10.5923/j.economics.20160606.05 [Online]. Available from http://journal.sapub.org/economics, [Accessed on 20 February 2019]

Chen C. (2018). *"The liberalisation of FDI policies and the impacts of FDI on China's economic development"*. China's 40 Years of Reform and Development: 1978–2018. [Online]. Available from https://www.jstor.org/stable/j.ctv5cgbnk.37, [Accessed on 10 October 2018]

Costinot A. (2009). *"An Elementary Theory of Comparative Advantage"*. Econometrica, Vol. 77, No. 4 (Jul., 2009), pp. 1165-1192. [Online]. Available on https://www.jstor.org/stable/40263857, [Accessed on 10 October 2018]

Creswell. J.W. (2014). *"Research Design"*. Sage Publications, Inc. 4th Edition. California.

Dragusanu R., Giovannucci D. and Nunn N. (2014). *"The Economics of Fair Trade"*. The Journal of Economic Perspectives, Vol. 28, No. 3 (Summer 2014), pp. 217-236. [Online]. Available from https://www.jstor.org/stable/23800584, [Accessed on 10 October 2018]

Elmslie B. (2018). *"Retrospectives Adam Smith's Discovery of Trade Gravity"*. The Journal of Economic Perspectives, Vol. 32, No. 2 (Spring 2018), pp. 209-222. [Online] Available from https://www.jstor.org/stable/26409432, [Accessed on 10 October 2018]

Epstein D. (2015). "*New Development? The BRICS Bank and the International System*". Harvard International Review, Vol. 36, No. 2 (FALL 2014/WINTER 2015), pp. 12-13. [Online]. Available from https://www.jstor.org/stable/43649260, [Accessed on 10 October 2018]

Etikan I., Musa S.A, and Alkassim R.S. (2015). *"Comparison of Convenience Sampling and Purposive Sampling."* American Journal of Theoretical and Applied Statistics, Vol. 5, No. 1, (2016), pp. 1-4. [Online]. Available from http://www.sciencepublishinggroup.com/journal/paperinfo?journalid=146&doi=10.11648/j.ajtas.20160501.11 [Accessed on 19 November 2018]

Feenstra R.C. (2018). *"Alternative Sources of the Gains from International Trade Variety, Creative Destruction, and Mark ups"*. The Journal of Economic Perspectives, Vol. 32, No. 2 (Spring 2018), pp. 25-46. [Online]. Available from https://www.jstor.org/stable/26409423?seq=1&cid=pdf-reference#references_tab_contents, [Accessed on 10 October 2018]

French S. (2014). *"Revealed comparative advantage. What is it good for?"*. School of Economics. University of South Wales. [Online]. Available from http://research.economics.unsw.edu.au/sfrench/documents/French_RCA.pdf; [accessed on 20 February 2019]

Gauteng Provincial Treasury. (2013). "*South Africa's Position in Brics."* The Gauteng Provincial Treasury Quarterly Bulletin of January to March 2013. [Online]. Available from http://www.treasury.gpg.gov.za/Document/Documents/South%20African%20position%20in%20BRICS.pdf , accessed on [11 November 2016]

Giordano P. and Ramos B. (2014). *"South-South Trade in Latin America: Cyclical Trend or Permanent Feature?"*. Georgetown Journal of International Affairs, Vol. 15, No. 2 (Summer/Fall 2014), pp. 117-125. [Online] Available from https://www.jstor.org/stable/43773634, [Accessed on 10 October 2018]

Gnangnon S.K. (2017). *"Multilateral Trade Liberalization and Government Revenue"*. Journal of Economic Integration, Vol. 32, No. 3 (September 2017), pp. 586-614. [Online]. Available from https://www.jstor.org/stable/44324471, [Accessed on 10 October 2018]

Gnangnon S.K. (2018). *"Multilateral Trade Liberalization and Economic Growth"*. Journal of Economic Integration, Vol. 33, No. 2 (June 2018), pp. 1261-1301. [Online]. Available from https://www.jstor.org/stable/26431808, [Accessed on 10 October 2018]

Guillaume–Gentil A. (2014). "*SOUTH-SOUTH COOPERATION: Emerging nations play the agricultural card"*. Technical Centre for Agricultural and Rural Cooperation (CTA). [Online]. Available on https://www.jstor.org/stable/24344512, [Accessed on 10 October 2018]

Hanauer L. and Morris L.J. (2014). *"Intertwined Interests of China and Africa"*. Chinese Engagement in Africa: Drivers, Reactions, and Implications for U.S. Policy. [Online]. Available from https://www.jstor.org/stable/10.7249/j.ctt6wq7ss.9, [Accessed on 10 October 2018]

Hoi V. H and Tuyen Q.T. (2017). *"International Trade and Employment: A Quantile Regression Approach"*. Journal of Economic Integration, Vol. 32, No. 3 (September 2017), pp. 531-557. [Online]. Available from https://www.jstor.org/stable/44324469, [Accessed on 10 October 2018]

Hornok C., Korena M. (2015). *"Administrative barriers to trade"*. Journal of International Economics 96 (2015) S110–S122. [Online] Available from http://creativecommons.org/licenses/by/4.0/ , [Accessed on 19 April 2018]

Hunegnaw F.B. (2017). *"Real Exchange Rate and Manufacturing Export Competitiveness in Eastern Africa"*. Journal of Economic Integration, Vol. 32, No. 4 (December 2017), pp. 891-912. [Online]. Available from https://www.jstor.org/stable/44413477, [Accessed on 10 October 2018]

Industrial Development Corporation. (2014). *"Export opportunities for South Africa in other BRICS economies"*. Trade Report: Department of Research and Information. Available from https://www.idc.co.za/2014/06/06/export-opportunities-in-other-brics-economies/, [Accessed on 16 March 2016]

International Monetary Fund, World Bank, And World Trade Organization. (2017). *"Making Trade an Engine of Growth for All the Case for Trade and for Policies to Facilitate Adjustment"*. For Discussion at The Meeting Of G20 Sherpas, March 23–24, 2017, Frankfurt, Germany.

Johnson R.C. (2014). *"Five Facts about Value-Added Exports and Implications for Macroeconomics and Trade Research"*. The Journal of Economic Perspectives, Vol. 28, No. 2 (Spring 2014), pp. 119-142. [Online]. Available from https://www.jstor.org/stable/23723487, [Accessed on 10 October 2018]

Kanyane M.H. and Ilorah R. (2015). *"The Cooperative Landscape in South Africa: Analyzing Critical Issues"*. Africa Today, Vol. 61, No. 3 (Spring 2015), pp. 3-14. [Online] Available from https://www.jstor.org/stable/10.2979/africatoday.61.3.3, [Accessed on 10 October 2018]

Khosa J., Botha I. and Pretorius M. (2015). *"The impact of exchange rate volatility on emerging market exports*", Acta Commercii 15(1), Art. #257, 11 pages. [Online]. Available from http://dx.doi.org/10.4102/ac.v15i1.257, [Accessed on 28 April 2018]

Kirton, John (1999). *"What Is the G20."* Adapted from "The G7, China and the International Financial System." Paper presented at an International Think Tank Forum on "China in the Twenty-First Century." China Development Institute, November 10-12. Available from http://www.g20.utoronto.ca/biblio/index.html, [Accessed on 16 May 2017]

Koch S. and Peet M. (2015). *"Non-tariff barriers faced by South African firms: Are there any lessons?"*. SAJEMS NS 10 (2007) No 4.

Kohl T. (2014). "*Do we really know that trade agreements increase trade?"*. Review of World Economics / Weltwirtschaftliches Archiv, Vol. 150, No. 3 (2014), pp. 443-469. [Online]. Available from https://www.jstor.org/stable/44211813, [Accessed on 10 October 2018].

Koopman R., Wang Z. and Wei S. (2014). *"Tracing Value-Added and Double Counting in Gross Exports"*. The American Economic Review, Vol. 104, No. 2 (FEBRUARY 2014), pp. 459-494. [Online] Available from https://www.jstor.org/stable/42920705, [Accessed on 10 October 2018]

Krauss, S. E. (2005). *"Research Paradigms and Meaning Making: A Primer*." The Qualitative Report, 10(4), 758-770. [Online]. Retrieved from https://nsuworks.nova.edu/tqr/vol10/iss4/7 [Accessed on 19 November 2018]

Kurakin A.and Sukharenko A. (2018). *"Anti-Corruption in The Brics Countries"*. BRICS Law Journal. 2018;5(1):56-77 [Online]. Available from https://doi.org/10.21684/2412-2343-2017-5-1-56-77 [Accessed on 20 November 2018].

Larson M.G. (2006). *"Descriptive Statistics and Graphical Displays"*. Statistical Primer for Cardiovascular Research 2006; 114: 76-81. [Online]. Available from http://ahajournals.org, [Accessed on 20 November 2018]

Limão N. and Maggi G. (2015). *"Uncertainty and Trade Agreements"*. American Economic Journal: Microeconomics, Vol. 7, No. 4 (November 2015), pp. 1-42. [Online]. Available from https://www.jstor.org/stable/43949030, [Accessed on 10 October 2018]

Lumumba-Kasongo T. (2015). "Brazil, Russia, India, China, and South Africa (BRICS) and Africa: New Projected Developmental Paradigms". Africa Development / Afrique et Développement, Vol. 40, No. 3, Transforming Global Relations for a Just World/Transformer les relations internationales pour unmonde juste (2015), pp. 77-95. [Online] Available from http://www.jstor.org/stable/afrdevafrdev.40.3.77, [Accessed on 24 July 2017]

MacPhee C.R. and Sattayanuwat W. (2014). "*Consequence of Regional Trade Agreements to Developing Countries"*. Journal of Economic Integration, Vol. 29, No. 1 (March 2014), pp. 64-94. [Online]. Available from https://www.jstor.org/stable/23819362, [Accessed on 10 October 2018]

Makarychev A. and Morozov V. (2011). *"Multilateralism, Multipolarity, and Beyond: A Menu of Russia's Policy Strategies"*. Global Governance, Vol. 17, No. 3, Emerging Powers and Multilateralism in the Twenty-First Century (July- Sept. 2011), pp. 353-373. [Online]. Available from https://www.jstor.org/stable/23033752, [Accessed: 15 November 2018]

Maree, K. (Ed). 2007. *"First steps in research"*. Van Schaik Publishers

Marshall C. (2006). *"Data Collection Methods"*. Sage Publications [Online]. Available on https://www.sagepub.com/sites/default/files/upm-binaries/10985_Chapter_4.pdf, [Accessed on 19 November 2018]

Marshall M. (1996). *"Sampling for qualitative research."* Family Practice 1996; 13: 522-525. [Online]. Available from https://academic.oup.com/fampra/article-abstract/13/6/522/496701 , [Accessed on 19 November 2018]

Matthee M., Idsardi E. and Krugell. W. (2015). *"Can South Africa Sustain and Diversify its Exports?"*. SAJEMS NS 19 (2016) No 2:249-263 [Online] Available from http://dx.doi.org/10.17159/2222-3436/2016/v19n2a6, [Accessed on 28 April 2018]

Mazenda A. (2016). *"The effect of BRICS trade relations on South Africa's Economic Growth"*. University of Fort Hare, Department of Economics [Online]. Available from http://libdspace.ufh.ac.za/bitstream/handle/20.500.11837/662/Adrino%20Mazenda.pdf?sequence=1&isAllowed=y, [Accessed on 20 November 2018].

Melitz M.J. and Redding S.J. (2015). *"New Trade Models, New Welfare Implications"*. The American Economic Review, Vol. 105, No. 3 (MARCH 2015), pp. 1105-1146. [Online]. Available from https://www.jstor.org/stable/43495412, [Accessed on 10 October 2018]

Meyer T. (2018). *"Free Trade, Fair Trade, and Selective and Enforcement"*. Columbia Law Review, Vol. 118, No. 2 (MARCH 2018), pp. 491-566. [Online]. Available from https://www.jstor.org/stable/26371824, [Accessed on 10 October 2018]

Ministry of Finance, Government of India (2012). *"The BRICS Report. A Study of Brazil, Russia, India, China, and South Africa with special focus on synergies and complementarities"*. First Edition, Oxford University Press.

Mhaka S. and Jeke L. (2018). "An *evaluation of the trade relationships between South Africa and China: An empirical review 1995–2014'*, South African Journal of Economic and Management Sciences 21(1), a2106. [Online] Available from https://doi.org/10.4102/sajems.v21i1.2106, [Accessed on 10 October 2018]

Moyo T. (2016). *"Promoting Industrialisation in Mauritius, South Africa and Botswana Lessons for the Future"*. Africa Development / Afrique et Développement, Vol. 41, No. 3 (2016), pp. 139-163. [Online] Available from https://www.jstor.org/stable/90013883, [Accessed on 10 October 2018]

Naudé W., Szirmai A., Lavopa A. (2013). *"Industrialization Lessons from BRICS: A Comparative Analysis"*. IZA DP No. 7543 [Online]. Available from http://ftp.iza.org/dp7543.pdf, [Accessed on 20 November 2018]

Ncube P.Z. and Cheteni P. (2015). *"The nexus between the BRICS alliance and economic growth in South Africa"*. Banks and Bank Systems, Volume 10, Issue 1, 2015

Nel E.L. and Rogerson C.M. (2014). *"Re-Spatializing development: Reflections from South Africa's recent re-engagement with planning for Special Economic Zones"*. Urbani Izziv, Vol. 25, supplement: ADDRESSING SOUTH AFRICA'S URBAN CHALLENGES (2014), pp. S24-S35. [Online] Available from URL: https://www.jstor.org/stable/24920929, [Accessed on 10 October 2018]

Ng C. (2017). *"Commodity and Market: Structure of the Long-distance Trade in the EastAsian Seas and Beyond Prior to the Early Nineteenth Century"*. Boundaries and Beyond: China's Maritime Southeast in Late Imperial Times. NUS Press. [Online]. Available on https://www.jstor.org/stable/j.ctv3wdbw4.6, [Accessed on 10 October 2018]

Ngepah N. and Udeagha M.C. (2018). "*African Regional Trade Agreements and Intra-African Trade"*. Journal of Economic Integration, Vol. 33, No. 1 (March 2018), pp. 1176-1199. [Online]. Available from https://www.jstor.org/stable/26418780?seq=1&cid=pdf-reference#references_tab_contents, [accessed on 10 October 2018]

O'Neill J. (2001), "*Building better global Economics*". Goldman Sachs Global Economics Paper No66. [Online]. Available from http://www.gold.mansachs.com/our-thinking/archive/archive-pdfs/build-better-brics.pdf, [accessed on 20 April 2017].

O'Neill J. (2003), "*Dreaming with the BRICs: The Path to 2050*". [Online]. Available from http://www.goldmansachs.com/our-thinking/archive-pdf/brics-dream.pdf, [accessed on 29 November 2016]

Onyekwena C, Taiwo O. and Unenze E. (2014), *"South Africa in BRICS: A bilateral trade analysis"*, South African Institute of International Affairs Occasional Paper No181. [Online]. Available from https://www.saiia.org.za/occasional-papers/590-south-africa-in-brics-a-bilateral.../file, [accessed on 20 April 2017].

Özsu U. (2013). *"The Politics of "Multipolarity""*. Proceedings of the Annual Meeting (American Society of International Law), Vol. 107, International Law in a Multipolar World (2013), pp. 371-374 [Online]. Available from https://www.jstor.org/stable/10.5305/procannmeetasil.107.0371, [Accessed 15 November 2018]

Papageorgiou T. (2014). *"Learning Your Comparative Advantages"*. The Review of Economic Studies, Vol. 81, No. 3 (288) (July 2014), pp. 1263-1295. [Online]. Available from https://www.jstor.org/stable/43551626, [Accessed on 10 October 2018]

Patel S. (2015). "*The research paradigm – methodology, epistemology and ontology – explained in simple language"*. Salma Patel: Research Methods [Online]. Available from http://salmapatel.co.uk/academia/the-research-paradigm-methodology-epistemology-and-ontology-explained-in-simple-language/, [Accessed on 18 November 2018]

Pomfret R. and Sourdin P. (2010). *"Why do trade costs vary?"*. Review of World Economics / Weltwirtschaftliches Archiv, Vol. 146, No. 4(December 2010), pp. 709-730. [Online] Available from https://www.jstor.org/stable/40985498, [Accessed on 10 October 2018]

Prado M.M. and Salles F.C. (2014). *"The BRICS Bank's potential to challenge the field of development cooperation"*. Verfassung und Recht in Übersee / Law and Politics in Africa, Asia and Latin America, Vol. 47, No. 2, Thematic Issue: New Actors and Instruments in the Law of Development Cooperation (2014), pp. 147-197. [Online]. Available from https://www.jstor.org/stable/43239731, [Accessed on 10 October 2018].

Pradhan R.P., Dasgupta P. and Bele S. (2013) *Finance, Development and Economic Growth in Brics: A Panel Data Analysis.*". Journal of Quantitative Economics, Vol. 11 Nos.1&2 (Combined), January-July 2013.

President Jacob Zuma. (2013). "*South Africa in the BRICS: Evolving International Engagement and Development"*. Harvard International Review, Vol. 35, No. 2 (FALL 2013), pp. 17-21. [Online] Available from http://www.jstor.org/stable/42763568, [Accessed on 24 July 2017]

Rahi S. (2017). *"Research Design and Methods: A Systematic Review of Research Paradigms, Sampling Issues and Instruments Development."* International Journal of Economics & Management Sciences, Vol. 6, No. 2 (2017), pp. 403-407. [Online]. Available from https://www.omicsonline.org/open-access/research-design-and-methods-a-systematic-review-of-research-paradigms-sampling-issues-and-instruments-development-2162-6359-1000403.pdf, [Accessed on 19 November 2018]

Rasoulinezhad E. and Jabalameli F. (2018). *"Do BRICS Countries Have Similar Trade Integration Patterns?"*. Journal of Economic Integration, Vol. 33, No. 1 (March 2018), pp. 1011-1045. [Online]. Available from https://www.jstor.org/stable/26418775, [Accessed on 10 October 2018]

Revesz R.L. (2014). *"Quantifying Regulatory Benefits"*. California Law Review, Vol. 102, No. 6 (December 2014), pp. 1423-1456. [Online]. Available from https://www.jstor.org/stable/24758173, [Accessed on 10 October 2018]

Riaz K. and Jansen H.G.P. (2012). "*Spatial Patterns of Revealed Comparative Advantage of Pakistan's Agricultural Exports"*. Pakistan Economic and Social Review, Vol. 50, No. 2 (Winter 2012), pp. 97-120. [Online]. Available from https://www.jstor.org/stable/43855776, [Accessed on 10 October 2018]

Rodrik D. (2018). *"What Do Trade Agreements Really Do?"*. The Journal of Economic Perspectives, Vol. 32, No. 2 (Spring 2018), pp. 73-90. [Online] Available from https://www.jstor.org/stable/26409425, [Accessed on 10 October 2018]

Rolland S.E. (2013). *"The BRICS' Contributions to the Architecture and Norms of International Economic Law"*. Proceedings of the Annual Meeting (American Society of International Law), Vol.107, International Law in a Multipolar World (2013), pp. 164-170 [Online] Available from http://www.jstor.org/stable/10.5305/procannmeetasil.107.0164, [Accessed on 24 July 2017]

Schwabish J.A. (2014). *"An Economist's Guide to Visualizing Data"*. The Journal of Economic Perspectives, Vol. 28, No. 1 (Winter 2014), pp. 209-233. [Online]. Available from https://www.jstor.org/stable/43193723, [Accessed on 10 October 2018]

Sejkora J. and Sankot O. (2017). *"Comparative advantage, economic structure and growth: The case of Senegal"*. South African Journal of Economic and Management Sciences 20(1),

a1685. [Online]. Available on https://doi.org/10.4102/sajems.v20i1.1685, [Accessed on 10 November 2018]

Sekan U. and Bougie R. (2016). *"Research methods for business: a skill-building approach"*. John Wiley & Sons. Seventh Edition. United Kingdom.

Shayanewako V.B. (2018). *"The Relationship between Trade Openness and Economic Growth: The Case of BRICS Countries"*. Journal of Global Economics, 2018, 6:289. [Online] Available from doi: 10.4172/2375-4389.1000289, [Accessed on 10 November 2018]

Simon M.K. (2011). *"Writing a purpose statement"*. Dissertation and scholarly research: recipes for success. 2011 Edition. Lexington KY. Dissertation Success, LCC

Singaravelu R. (2017). *"Sample and Sampling Design"*. [Online]. Available from https://www.slideshare.net/crjayaprakash1/sampling-design-15280476, [Accessed on 20 April 2017]

Singh K. (2016). "*Intra-Brics intensities: An analytical study"* IOSR Journal of Humanities And Social Science (IOSR-JHSS) Volume 21, Issue 6, Ver. 8 (June. 2016) PP 103-114. [Online]. Available from http://www.iosrjournals.org/iosr-jhss/papers/Vol.%2021%20Issue6/Version-8/N0210608103114.pdf [accessed on 20 April 2017]

Soete S. and Van Hove J. (2017). *"Dissecting the Trade Effects of Europe's Economic Integration Agreements"*. Journal of Economic Integration, Vol. 32, No. 1 (March 2017), pp. 193-243. [Online]. Available from https://www.jstor.org/stable/44133862, [Accessed 10 October 2018]

South African Government. (2016). *"BRICS (Brazil, Russia, India, China, South Africa"*. [Online]. Available from http://www.gov.za/about-government/brics-brazil-russia-india-china-south-africa [accessed on 20 November 2016]

South African Industrial Development Corporation (IDC). (2014). "*Export opportunities for South Africa in other BRICS economies*". [Online]. Available from https://www.idc.co.za/images/2014/pdfs/IDC%20R&I%20publication%20-%20Export%20opportunities%20for%20SA%20in%20the%20BRICS.pdf, [accessed on 11 November 2016]

South African Revenue Services (2019). Trade statistics. Trade statistics dashboard. Commodities. [Online] Available from https://tools.sars.gov.za/tradestatsportal/Bubble_Chart2.aspx, [Accessed on 20 February 2019]

Sperlich Y. and Sperlich S. (2014). *"Income Inequality in the South-South Integration"*. Journal of Economic Integration, Vol. 29, No. 4 (December 2014), pp. 726-758. [Online]. Available from https://www.jstor.org/stable/43150576, [Accessed on 10 October 2018]

Strambo C., González Espinosa A.C., Velasco A.J. P. and Atteridge A. (2018). *"Political Factors in The Introduction, Maintenance Andremoval of Subsidies"*. Privileged coal: the politics of subsidies for coal production in Colombia. [Online] Available from https://www.jstor.org/stable/resrep17197.8, [Accessed on 10 October 2018]

Stuenkel O. (2013). *"The Financial Crisis, Contested Legitimacy, and the Genesis of Intra-BRICS Cooperation"*. Global Governance, Vol. 19, No. 4 (Oct.–Dec. 2013), pp. 611-630. [Online]. Available from https://www.jstor.org/stable/24526396, [Accessed on 10 October 2018]

Trochim W.M.K (2006). *"Philosophy of Research"*. [Online]. Available from http://www.socialresearchmethods.net/kb/philosophy.php, [Accessed on 6 April 2017]

Türkcan K. and Saygılı H. (2018). *"Economic Integration Agreements and the Survival of Exports"*. Journal of Economic Integration, Vol. 33, No. 1 (March 2018), pp. 1046-1095. [Online]. Available from https://www.jstor.org/stable/26418776, [Accessed on 10 October 2018]

Ulasan B. (2008). *"Trade openness and economic growth: a cross-country empirical investigation"*. University of Nottingham [Online]. http://eprints.nottingham.ac.uk/12843/1/518802.pdf, [Accessed on 05 November 2018]

United Nations Conference on Trade and Development (UNCTAD). (2016). "Foreign Direct Investment". Economic Trends. Available from http://stats.unctad.org/handbook/EconomicTrends/Fdi.html,[\ [Accessed on 16 May 2017]

United Nations Office for South-South Cooperation (UNOSSC). (2016). "*South-South Cooperation"*. [Online]. Available from http://ssc.undp.org/content/ssc.html [accessed on 20 November 2016]

Van Agtmael A. (2012). *"Think Again: The Brics"*. Foreign Policy, No. 196 (November 2012), pp. 76-79. [Online]. Available from https://www.jstor.org/stable/41726721, [Accessed on 10 October 2018]

Walliman N.S.R. (2011). *"Research Methods: The basics"*. Routledge Publications, First Edition. London.

Williams J. (2017). *"Research Paradigm and Philosophy"*. [Online]. Available from http://www.howtodo.dissertationhelpservice.com/research-paradigm-and-philosophy/, [accessed on 06 April 2017]

World Bank Group and World Trade Organization. (2015). "*The Role of Trade in Ending Poverty"*. World Trade Organization: Geneva.

World Bank. (2016). *"Revealed Comparative Advantage"*. [Online]. Available from http://www.worldbank.org/en/news/video/2014/09/30/revealed-comparative-advantage-data , [accessed on 11 November 2016]

World Trade Organisation. (2018). *"Regional trade agreements and preferential trade arrangements"*. [Online]. Available from https://www.wto.org/english/tratop_e/region_e/rta_pta_e.htm, [Accessed on 10 April 2018]

Yenokyan K., Seater J.J. and Arabshahi M. (2014). *"Economic Growth with Trade in Factors of Production"*. International Economic Review, Vol. 55, No. 1 (February 2014), pp. 223-254. [Online]. Available from https://www.jstor.org/stable/24517168, [Accessed on 10 October 2018]

Appendix 3: Ethical Clearance Approval

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

17 July 2017

Ms Nobantu Madikizela (200273060)
Graduate School of Business & Leadership
Westville Campus

Dear Ms Madikizela,

Protocol reference number: HSS/1048/017M
Project title: A growth analysis of the South African revealed comparative advantage exports within the BRICS economies

Full Approval – No Risk / Exempt Application

In response to your application received on 03 July 2017, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and FULL APPROVAL for the protocol has been granted.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

[redacted]

Dr Shamila Naidoo (Deputy Chair)

/ms

Cc Supervisor: Dr Rosemary Sibanda
Cc Academic Leader Research: Dr Muhammad Hoqe
Cc School Administrator: Ms Zarina Bullyraj

Humanities & Social Sciences Research Ethics Committee
Dr Shenuka Singh (Chair)
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000
Telephone: +27 (0) 31 260 3587/8350/4557 **Facsimile:** +27 (0) 31 260 4609 **Email:** ximbap@ukzn.ac.za / snymanm@ukzn.ac.za / mohunp@ukzn.ac.za
Website: www.ukzn.ac.za

Appendix 4: Turnitin Report

turnitin

Digital Receipt

This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

The first page of your submissions is displayed below.

Submission author:	Nobantu Madikizela
Assignment title:	Dissertation
Submission title:	Third Draft_turnitin
File name:	Third_Draft_Submission_0712201...
File size:	16.68M
Page count:	133
Word count:	35,567
Character count:	194,449
Submission date:	08-Dec-2018 02:24AM (UTC+0200)
Submission ID:	1044876785

Turnitin Originality Report

Processed on: 08-Dec-2018 2:27 AM CAT

ID: 1044876785

Word Count: 35567

Submitted: 2

Third Draft_turnitin By Nobantu Madikizela

Similarity Index	Similarity by Source	
8%	Internet Sources:	7%
	Publications:	5%
	Student Papers:	2%