Analysis of determinants of South Africa's sugar production and export performance within the tripartite free trade area: A case of raw and refined sugar

by

MOKGOSHI JOHN MAMASHILA

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Student Number: 55588220

DECLARATION

I hereby declare that the work presented in the thesis "***Analysis of determinants of South Africa's sugar production and export performance within the Tripartite Free Trade Area: The case of raw and refined sugar***" is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references. This thesis was submitted to Turnitin as per University policy.

03 MARCH 2017

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Signature Date

DEDICATION

I dedicate this thesis to my late grandparents, Masefako Rebecca Mojapelo and Mathale Phineas Mojapelo, and my dearest parents, Mankopong Maria Mamashila and Masogana Frank Mamashila, for constantly reminding me that education is the key to success, for always encouraging me to study hard, pursue my dreams and become a better person, for always reminding me that success comes from perseverance and for their everlasting love.

I further dedicate this thesis to my son Bohlale. May he follow in my footsteps and never give up on his dreams, and may this thesis be a reminder that with hard work, dedication, perseverance and determination, he too can achieve his dreams.

ABSTRACT

This study was conducted with the aim of investigating the trends and determinants of South Africa's sugar production and exports within the TFTA between 1996 and 2014. The specific objectives of the study were (1) to identify trends in South Africa's sugar production and exports within the TFTA between 1996 and 2014; (2) to determine the drift rate in South Africa's sugar exports within the TFTA between 1996 and 2014; (3) to investigate the correlation between South Africa's sugar production and exports between 1996 and 2014; and (4) to determine the factors that affect production and exports in South Africa's sugar industry in order to identify the industry's major challenges and opportunities for sustained performance.

The secondary data, obtained from the Economic Analysis and Agricultural Statistics Directorate of the Department of Agriculture, Forestry and Fisheries (DAFF), were used to meet the first three objectives of the study. The primary data, obtained by means of a survey questionnaire and interviews with key stakeholders, were used to meet the fourth objective of the study. A 7-point Likert scale was applied to indicate the degree to which each of the determining factors are perceived to affect the performance and resulting competitiveness of the sugar industry. The Johansen test and Porter's Diamond Model were the analytical techniques used in the study.

The results of the analysis of the secondary data revealed continued fluctuations in sugar production in South Africa between 1996 and 2014. On the basis of this, the researcher rejected the hypothesis that there is no trend in South Africa's sugar production. It was therefore concluded that seasonal variations accounted for these fluctuations in the sugar industry. As determined using the Johansen test, drift rate variations came to 51%, indicating that there is potential for growth in South Africa's sugar exports. This was confirmed by the results of the bivariate correlation between production and exports which clearly indicated a positive relationship between the two and prompted the researcher to accept the hypothesis that there is a positive relationship between the production and export of sugar.

In determining the factors that influence South Africa's sugar production and exports, a number of obstacles to competitiveness success were identified. With regard to sugar production, applying Porter's Diamond model revealed that the major

constraints experienced by respondents in the study area were the availability of skilled labour; cost of doing business; level of infrastructure development; cost of infrastructure; water availability; climatic conditions; soil quality; rainfall patterns; availability of financial services; access to credit; crime; and HIV/AIDS. In terms of exports, tariffs were found to be the major constraint along with certain of the above-mentioned factors. While the majority of respondents view macroeconomic policy and trade policy as export constraints, South Africa's labour, B-BBEE and competition policies are seen as neither constraining nor supportive. Product design; packaging; labelling and pricing; as well as the manager's willingness to export; level of education and training; length of time in the business; experience; and language had a positive effect on competitive success.

Keywords: *Sugar production, sugar exports, Tripartite Free Trade Area, tariffs, trade liberalisation, competitiveness, Porter's Diamond method*

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COMESA	Common Market for Eastern and Southern Africa
DAFF	Department of Agriculture, Forestry and Fisheries
EAC	East African Community
EU	European Union
GDP	Gross Domestic Product
GLS	Generalised least squares
GTA	Global Trade Atlas
NDVI	Normalised difference vegetation index
OIC	Organization of Islamic Cooperation
RECs	Regional Economic Communities
SADC	Southern African Development Community
SASA	South African Sugar Association
TFTA	Tripartite Free Trade Area
WTO	World Trade Organization

CHAPTER 1: BACKGROUND AND INTRODUCTION

1.1 Background of the study

In South Africa, agricultural sector mainly consists of three subsectors, namely agriculture, forestry and fisheries. It is further subdivided into field animal production, crops, and horticulture. The performance of these subsectors plays a pivotal role in food security, employment and the overall performance of the manufacturing sector (DAFF, 2010).

Agricultural sector contribute relatively small share to Gross Domestic Product (GDP), however, it is an important sector in the South African economy. Agriculture continues to be a significant employment provider, mostly in the rural areas, and it is also a major earner of foreign exchange for the country. In South Africa, agricultural production value in 2013 was about R187 678 million and about R72 billion was its contribution to the GDP. An average of about 9,9% was recorded as a results of primary agricultural sector improvement between 1970 and 2013, although the country's overall economic growth of 12,9% per year over the same period resulted in agriculture's GDP share dropping from 7.1% in 1970 to 2,6 in the year 2013 (DAFF, 2013).

The industry of sugar in South Africa is a crucial contributor to employment and sustainable socio-economic development as a result of its industrial and agricultural investment, earnings of foreign exchange, intensity of labour and a link with major suppliers, industrial support and clients (SASA Year Book, 2013).

The Tripartite Free Trade Agreement (TFTA) is based on the three regional economic communities (RECs) already in place, namely the Common Market for Eastern and Southern Africa (COMESA)[1]; the East African Community (EAC)[2]; and the Southern African Development Community (SADC)[3]. The main objective of the TFTA is to obtain quota-free and duty-free trade in all products in the region and eliminate quantitative restrictions on goods that meet the tripartite rules of origin.

[1] Burundi, Union of Comoros, Democratic Republic of the Congo, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Rwanda, Sudan, Swaziland, Seychelles, Uganda, Zambia and Zimbabwe.
[2] Burundi, Kenya, Rwanda, Tanzania and Uganda.
[3] Angola, Botswana, Democratic Republic of the Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.

More than 75% of sugar produced by sugar industry in South Africa is exported and South Africa usually ranks within the top ten exporters in the world. Refineries in Asia, the Middle East and the Far East are the major importers of South African raw sugarcane. Thailand, Brazil, Guatemala and Australia are the major competitors of South African sugar industry for raw sugar market as well as with refineries in the European Union (DAFF, 2013).

1.2 Statement of the problem

The importance of increasing South Africa's exports in order to improve the country's balance of payments cannot be overemphasised. South Africa is one of Africa's major sugar producing countries but is certainly not the only African country exporting sugar, particularly among the member states of the TFTA.

Trade restrictions are a major challenge in South Africa's exports of agricultural products to certain countries in the world. Market access with regard to raw and refined sugar is constrained by high level of tariffs and trade preferential policies such as tariff-rate quotas (SASA Year Book, 2013). In Sub-Saharan Africa, trade policy works in much the same way as elsewhere. In the past, stringent trade barriers severely hampered exports and the decrease or elimination in that regard can actually come as a significant improvement in the region in terms of trade performance (Rodric, 1998).

It is believed that the Tripartite Free Trade Area has the potential to unlock sugar markets and establish new markets in the region. South Africa is not the only country exporting sugar within the TFTA means that the market is competitive and South Africa is challenged to improve its production and export performance in order to survive and dominate in the market in the long term.

The growth and survival of South Africa's sugar industry will largely depend on its ability to compete with rivals in this market in addition to increasing local production. The country's competitive ability is analytical for survival in the long term of the home sugar industry. A thorough analysis with regard to trends in and factors influencing South Africa's sugar production and exports is therefore the primary focus of this study.

1.3 Research questions

From the problem statement given above and based on the availability of secondary data, the following research questions were formulated:

i. What was the trend in South Africa's sugar production and exports between 1996 and 2014?

ii. What changes were there in South Africa's sugar exports within the Tripartite Free Trade Area between 1996 and 2014?

iii. What was the correlation between South Africa's sugar production and sugar exports between 1996 and 2014?

iv. What do sugar producers and key role players in the industry perceive as determining factors in the production and export performance of the South African sugar industry?

1.4 Aim and objectives of the study

The central aim of the study is to investigate trends in South Africa's sugar production and exports and to identify determinants in the performance and competitive advantage of the South African sugar industry as a basis for more informed and effective decision making in the industry going forward.

The specific objectives of the study are as follows:

i. To analyse the trends in South Africa's sugar production and exports within the Tripartite Free Trade Area between 1996 and 2014.

ii. To determine the drift rate in South Africa's sugar exports within the Tripartite Free Trade Area between 1996 and 2014.

iii. To establish the correlation between South Africa's sugar production and sugar exports between 1996 and 2014.

iv. To identify the factors that influence South Africa's sugar production and exports with a view to determining major challenges and opportunities for sustained performance.

1.5 Hypotheses

It is hypothesised that:

i. There were no trends in South Africa's sugar production and exports within the TFTA between 1996 and 2014.

ii. There was no drift rate variation in South Africa's sugar exports within the TFTA between 1996 and 2014.

iii. There was a positive correlation between South African's sugar production and exports between 1996 and 2014.

1.6 Motivation of the study

The aim of the study is to produce a concrete report that can form part of the critical research repository that is a source of useful information for academic reference as well as policy development to address critical issues within the agricultural sector.

Africa's sugar consumption is on the rise and the Tripartite Free Trade Agreement has the potential to open up the market for South Africa's sugar products. The agreement will provide an opportunity for South Africa's top producers to tap into major markets within the Tripartite Free Trade Area, which will translate into more foreign earnings for the country and a raise in the contribution of the agricultural sector as a whole to GDP. The significant determinants of sugar production and sugar export performance identified in the study will inform decision making going forward.

1.7 Delineation

The study focuses on the production and export of raw and refined sugar. The researcher aims to look at factors influencing the capacity of sugar producers in Nkomazi Municipality in the Ehlanzeni District of Mpumalanga Province, South Africa; trends in South Africa's sugar exports within the TFTA between 1996 and 2014; and the average rate of variation in sugar production and exports in the same period.

The motivation for the study is to create a basis for the formulation of concrete strategies to promote sugar production and exports so that South Africa plays a dominant role in the new African market of the TFTA. The findings of the study include

the factors that influence production and exports in South Africa's sugar industry and the major challenges and opportunities in terms of sustained performance.

1.8 Outline of the chapters

There are five chapters in this study:

- Chapter one highlights a background of the study including the statement of the problem that motivated the researcher to embark on the study; research questions to be answered on the basis of the findings; the study aim, objectives and hypotheses; and the delineation and potential contribution of the study.
- Chapter two contains a thorough review of the literature on the production and export of sugar by South Africa and the country's competitiveness in the industry, as well as the conceptual framework of the study.
- Chapter three presents the approach taken in the study and outlines the research methodology followed.
- Chapter four provides the presentation and interpretation of results of the research.
- Chapter five concludes with a summary and recommendations for possible strategies to improve the performance of the sugar industry going forward.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Sugarcane farming in South Africa is of good agricultural and economic importance and a leading contributor to employment in rural areas. In South Africa, it is a second largest field crop, surpassed by maize only in terms of gross value (SASA, 2012). It has been established more than 150 years ago. It is considered a mature industry today. It is well structured and supported through the extension, research and other services of the South African Sugar Association (SASA) and funding from millers and growers. Production data for quality mill are available and accurate production records are been kept by large scale growers (Van den Berg & Singels, 2013).

2.2 Sugar production in South Africa

According to statistics, there are about 29,130 sugarcane growers registered in South Africa, in the provinces of Mpumalanga, KwaZulu-Natal and the Eastern Cape. Of these, above 27,580 are small scale growers producing about 80% of the industry's total crop. Large scale growers number about 1,550 (Esterhuizen, 2011). In South Africa, commercial sugarcane crops are grown under a wide variety of agronomic and socioeconomic conditions which have been responsible, together with climatic variations, for a 17% variation in sugarcane production. There is a scope for improvement in productivity through the use of timeous accurate weather forecasts (Bezuidenhout & Singels, 2007).

2.3 The Tripartite Free Trade Agreement

A crucial feature of the world trade environment are trade arrangements within the regions. WTO, (2000) reported an estimation of 50% to 60% of global trade benefits from regional preferences. The Tripartite Free Trade Agreement signed on 10 June 2015 involves African member states of three regional economic communities already in place (RECs), namely the Common Market of Eastern and Southern Africa (COMESA); the East African Community (EAC); and the Southern African Development Community (SADC).

The primary objective of these three regional organisations is to expand trade, eradicate poverty and make improvement on the quality of life of people in the eastern

and southern African regions. The organisations are implementing regional integration programmes in trade and economic development including the establishment of Free Trade Areas, Customs Unions, Monetary Unions and Common Markets, as well as regional infrastructure development programmes in transport, information communications technology, energy and civil aviation as first steps towards the realisation of continental integration.

The focus in this study is on trade only.

2.4 Background on South Africa's sugar exports

South Africa exports more than 75% of its sugar production and generally ranks amongst the top ten sugar exporters globally. Raw sugarcane exports are predominantly to refineries in Asia, the Middle East and the Far East. South Africa is in direct competition with Brazil, Thailand, Australia and Guatemala for raw sugar markets and with refineries in the European Union where sugar exports are subsidised (DAFF, 2013). More than 37% of the 2.2 million tons of sugar produced in South Africa every season goes to the SADC market which includes 15 southern African countries, namely Tanzania; Angola; the Democratic Republic of the Congo; Malawi; Mauritius; Madagascar; Mozambique; Zimbabwe; Zambia; Botswana; Namibia; Lesotho; Swaziland; and South Africa.

2.5 Definition of economic competitiveness

There are a number of different perspectives on economic competitiveness. One definition is that it refers to the capability to sustain an acceptable growth rate and real standard of living (Landau, 1992). The definition of competitiveness is linked to a nation's employment levels and thereby the standard of living of its citizens, since these are dependent on the competitiveness of businesses in the country.

Analysing the competitiveness of a nation calls for an examination of the underlying factors that influence the competitiveness of individual firms and industries (Porter, 1990). Competitiveness is the capability of a business to outlast and prosper in the face of competition from other businesses for the same profits. Porter specifically defines competitive edge as the capability of a firm to produce products that offer customers extreme value than those of competitors, resulting in more sales and

greater profits for that company. Competitive advantage can only obtained if a firm manages to outlive its edge over its competitors over time (Porter, 1996).

Traditionally, the concept of competitiveness refers to the capability of a company or group of businesses to earn market share in the international or home market. This is typically advanced by achieving efficiencies in terms of cost throughout the interrelated chain of businesses, resulting in improved capital and labour returns (Baneerjee, 2004).

2.6 Indicators of competitiveness

According to Arjchariyaartong (2007), there are a number of competitiveness indicators. They include advertising and promotion, input costs, quality of product and enterprise differentiation, technology, as well as production economies. All these indicators can be broadly categorised into two groups, namely factors that affect a company's relative production cost and those that affect the quality, or perceived quality, of its product or business offering.

2.6.1 Technology

Proprietary technologies that improve the productivity of labour and capital can be a crucial factor in achieving cost advantage, and the improvement and adoption of such technological effect on a business in a number of ways. The impact of implementing new operational style is dependent on the firm's behaviour and the structure of industry. For instance, the introduction of productivity-enhancing technology makes it possible for a business to lower production costs while other technological tools or methods result in improved quality of output given an initial set of inputs.

As an example, assume there is a technological development in the form of a new fertiliser application technique aimed at increasing yields in the sugar industry. By adopting this new method, a producer could apply the same amount of inputs as before yet achieve an increase in levels of production. On the other hand, a proportional decrease in the amount of inputs applied will result in the same levels of production as those obtained with the old technology but the per unit cost of production will decline.

2.6.2 Input cost

The price, quality and reliability of purchased inputs are factors that affect a company's input costs and thereby its competitiveness. Two sugar producers will be affected in the same way by a decrease or increase in the price of sugarcane. Such a decrease or increase will not however affect the cost of the companies' production inputs relative to each other. In order to obtain a competitive advantage, a company must have lower costs of inputs than its rivals.

2.6.3 Production economies

Efficiency of production can be improved through economies of scale and by broadening production scope. A business improves its ability to produce without wastage when its output is modified in a way that reduces the average production cost. Broadening the scope of production to include a wider variety of related products could be another way to achieve economies.

2.6.4 Product and enterprise differentiation

This is about distinguishing a product from other similar products, in particular by making it more attractive to a specific target market. This involves differentiating it from the products of rivalries as well as from a firm's other products. Many agribusinesses differentiate their products from those of rivalries in order to raise market share and encourage customer loyalty. Superior quality is the primary way in which a company differentiates a product. This can be achieved through research and development, effective quality control processes and the application of higher quality inputs.

Competitiveness is also related to enterprise differentiation, in other words a company's ability to distinguish itself and stand out from its competitors.

2.6.5 Advertising and promotion

Customer perceptions are influenced by brand advertising and other strategies for promotion. An effective strategy for advertising creates a restriction to market entry by competitors through building brand loyalty that is based on the notion that the product in question offers more value than other close substitutes.

Brand loyalty permits a company to chase one of alternative strategies. It can either sell the same number of products at higher prices than its rivalries or it can sell more of its product at the same price as its competitors. Either way, demand for the company's product rises, as does its relative competitiveness in the market

2.6.6 External factors

Agribusiness and industries also face quite number of external factors that impact on their competitiveness. For one thing, there are many policies by government that can affect competitiveness of the industry in both domestic and international markets. Government subsidisation of the production of raw materials of agricultural commodities, for instance, directly affects the price of inputs for food processors. Less expensive inputs mean lower costs and a competitive advantage for a business downstream.

State policies also affect the ability of an agribusiness to achieve world market share. Government export subsidies reduce the price at which domestic industries are willing to sell their products internationally and increase the world market share of subsidised industries. Macroeconomic variables such as consumer income, population growth and exchange rates are further external determinants that have an impact on the competitiveness of a business.

2.7 Export performance indicators

A firm's marketing strategies and practices are the market determinants of business performance (Kotler & Armstrong, 2006; 2010). Factors such as product pricing, promotion and distribution should be suited to and appropriate for the type of products and services and the dynamics of target consumer tastes and behaviour (Kotler & Armstrong, 2010). Over the years, the impact of these determinants on the performance of individual firms and industry sectors has received little attention (Duenas-Caparas, 2006; Brodrechtova, 2008).

A large number of variables have been advanced in the literature to explain variations in export performance.

Many researchers claim that a company's exporting experience or maturity plays a role in its performance when it comes to solving issues and exploiting export

opportunities (Dean *et al*., 2000). Based on a meta-analysis of 36 empirical researches on the correlation between export strategies for marketing and performance in terms of export, Leonidou *et al*. (2002) highlighted the following:

- Product design and style have a significant positive effect on export performance.
- There is a significant relationship between branding and export performance in the case of industrial products but not consumer products.
- Packaging and labelling do not have any influence on of industrial product exports. There is no data available on their impact on consumer product exports.
- The uniqueness of the product exported has a significant impact on export performance.
- Pricing strategy has an impact on export performance.
- The success of a particular distribution channel rely on variable foreign market conditions such as the status of an economy, distribution infrastructure and competitive practices. There is a direct correlation between exports and these market conditions.
- Product promotion generally impacts positively on export performance.

Exporting experience has also been reported as a factor of export performance by other researchers. Shamsuddoha (2005) found that it is a critical determinant when competing in foreign markets. Other researchers have reported that managers with more extensive professional experience may have more success in exporting. This is supported by Nassimbeni (2001) who argues that experience plays a role in a manager's ability to identify opportunities and threats in international markets and to take appropriate action.

Language is a factor that has been examined by many researchers, but Sousa (2004) points out that studies have not actually evaluated its impact on exporting performance. Foreign market business is dependent on foreign language proficiency, without which trading can be difficult. Zarin and Vazife (2009) highlight the need to study language proficiency as a factor since they found that lack of English fluency in the majority of export managers led to misunderstandings in negotiations and business

meetings. Sousa *et al.* (2008) also found that managers with foreign language proficiency had greater export success.

There has been very limited empirical research on the effects of e-export on export performance but there are indications that e-export may have a number of benefits, such as:

- facilitating contact and communication with foreign businesses and customers;
- reducing the need for costly international advertising, transportation and product design;
- improving access to information about international markets;
- facilitating the communication of effective marketing methods in the global commercial environment;
- enhancing *pari passu* entry to international markets (i.e. entry at the same rate as or on an equal footing with competitors);
- facilitating customer access to product and service design; and
- facilitating sales without the limitation of trading hours (Clarke, 2002; Panagariya, 2000; Moodley, 2003).

2.8 Measuring export performance

There is no consensus on how best to measure export performance although many measures have been advocated in terms of conceptualisation and operationalisation.

Performance of export measures are categorised according to objective (financial, non-perceptual); subjective (non-financial, strategic, perceptual); and composite scales.

Objective measures are based on sales, profits and growth, with export intensity, sales, sales growth and profits being the most frequently used indicators (Deng *et al*., 2003; Dhanaraj & Beamish, 2003). Subjective measures, which are based on managerial perceptions, include perceived success, customer satisfaction and the achievement of goals such as penetration of new markets; increased market share in existing markets; increased number of export markets and export products; achieving

competitive advantage over competitors; responding successfully to domestic competitive pressure; and gaining in prestige (Ling-yee & Ogunmokun, 2001).

One of the most crucial determinants recently examined by researchers is the educational level of managers. Moghaddam *et al.* (2012) and Mavrogiannis *et al*. (2008) found this factor to be linked to export success. The educational level of managers can assist enterprises in leveraging international opportunities and mitigating threats (Julien & Ramangalary, 2003; Brodrechtova, 2008).

2.9 Conceptual framework of the research

The conceptual framework used as a basis for this study is shown in Figure 2.1 below.

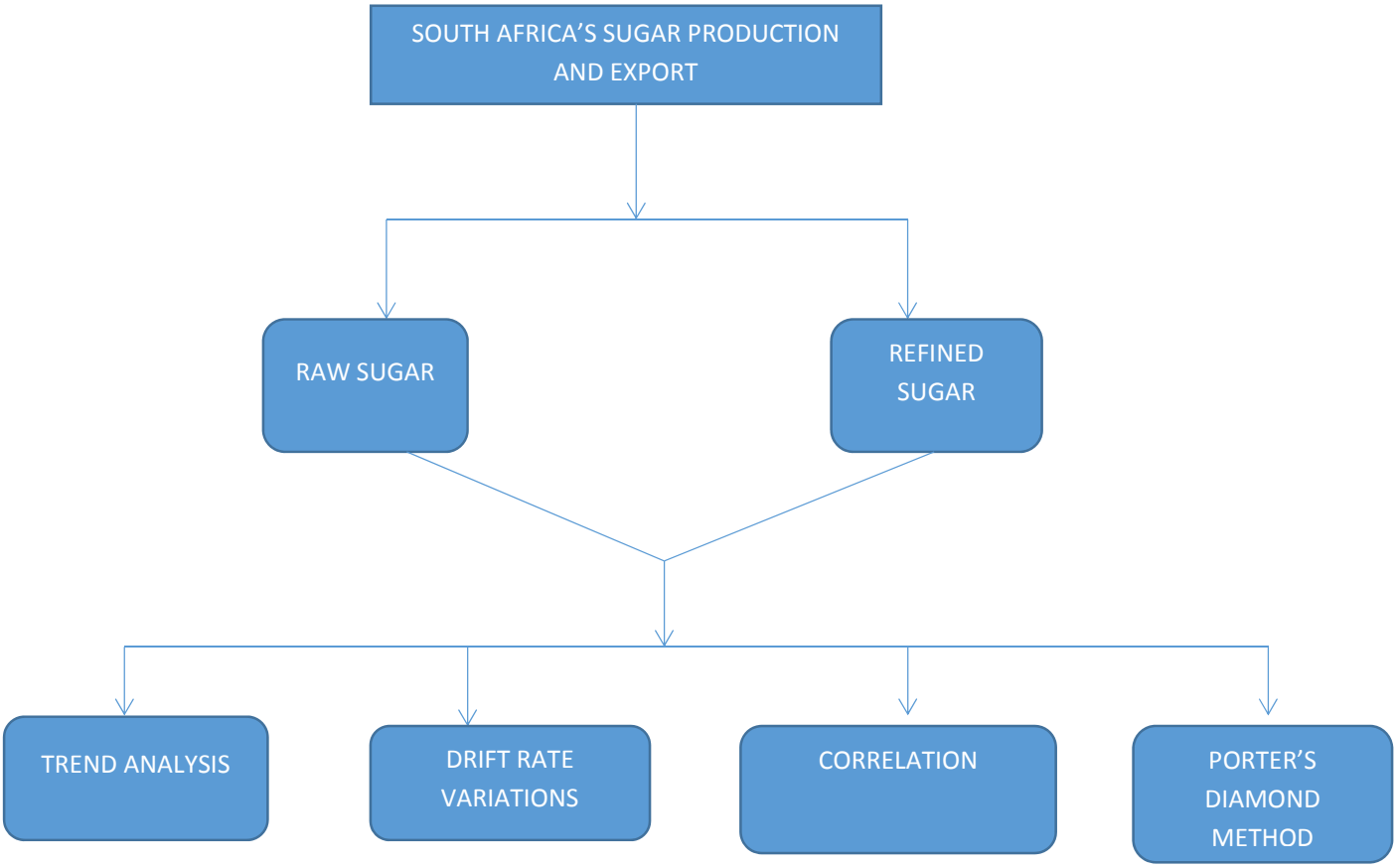

Figure 2.1: Conceptual framework

2.10 Review of previous studies

In this section studies by other researchers that are relevant to the scope of this research are discussed.

2.10.1 Determinants of sugar production and export performance

Allan (2016) investigated market determinants of export performance in 45 small and medium enterprises (SMEs) in the export sector in Ghana. Exploratory factor analysis was used to screen for determinant constructs and reduce the data to fewer variables using the quantitative research technique. Stepwise linear regression analysis was done to examine the correlation between each determinant and export performance. The results revealed the market determinants of export performance to be product features, price, market targeting, distribution and promotion. These factors significantly predicted export performance at the 5% significance level ($p<.05$) and accounted for 98.8% of the total variation. Product features were found to be the most dominant determinant, accounting for a variability of 92%. The researcher recommended that SMEs in the export sector improve the effectiveness of their marketing activities in the areas of product/brand packaging, pricing, market targeting, distribution and promotion.

A structural analysis by Ayan (2005) of the determinants of export performance in Turkey, indicated that managerial and environmental determinants as well as strategies for export marketing have a substantial impact on export performance as measured by export intensity and the extent to which export expectations are met. It was also found that the demographic characteristics of a firm do not appear to be a significant factor of export performance.

A report by McDonald (2004) on liberalization in terms of trade, efficiency and South Africa's sugar industry contains the results of a computable general equilibrium (CGE) analysis of the South African sugar industry. McDonald's analysis followed a prior study on the free trade agreement between the European Union and South Africa which highlighted the importance of sugar exports in terms of welfare gains from agricultural trade liberalisation and increased pressure on member countries of the Organization for Economic Cooperation and Development (OECD) to reform their sugar trade policies. In addition to the effects of trade liberalisation, McDonald's study

examined the impact of improving efficiencies in the conversion of sugarcane to raw sugar, which is an important factor of competitiveness in sugar production and exports. While the results indicated that there would be substantial welfare gains across all household groups and that agricultural producers in South Africa would benefit overall, there were substantial variations in the impact on agricultural producers in the various provinces, with farmers in some provinces experiencing a reduction in profitability.

In a study entitled “South Africa’s export performance: Determinants of exports supply”, Edwards and Alves (2006) conducted a comparative analysis of South Africa’s export structure and performance as well as an econometric investigation of the factors of export volumes. The researchers found that improvements in the growth and diversification of South African manufactured exports during the 1990s lagged behind those of East Asia and certain other resource-based economies. This was in part due to the relatively slow growth in resource-based products globally, but determinants affecting the profitability of export supply, such as the effective exchange rate, infrastructure costs, tariff rates and the cost of skilled labour were also found to be important. Export demand and the capability to compete pricewise in the export market were not found to be major constraints to export growth.

Abidin and Sahlan (2013) investigated the impact of economic determinants on bilateral exports between Malaysia and member countries of the Organization of Islamic Cooperation (OIC). The panel estimation of gravity model was used with data from the period 1997 to 2009. The gravity estimates indicated the importance of size effects, openness of the economy, inflation rates and exchange rates as factors in Malaysia’s exports to the said Islamic countries. The estimation of individual effects highlighted the distance between exporting and importing countries and institutions as a factor in enhancing Malaysia-OIC exports.

In a study conducted in China about virtual land use by, Qiang *et al*. (2013) found that trade liberalisation greatly increased the volume of traded agricultural products. The aim of the study was to measure and locate the virtual land use hidden in China’s imports and exports of both primary crops and processed products between 1986 and 2009. The results showed that as China’s crop imports increased dramatically, there was an increase in the net virtual land trade hidden in international trade, from -4.42

Mha in 1986 to 28.90 Mha in 2009. China's crop trade contributed on average to global land savings of 3.27 Mha annually between 1986 and 2009.

In a study to assess the potential impact of climate change on global agriculture, Calzadilla *et al.* (2014) explored two adaptation scenarios for South Africa. The updated GTAP-W model which distinguishes between rainfed and irrigated agriculture was used. It was found that for South Africa to adapt successfully to the adverse effects of global climate change, yield improvements of more than 20% over baseline investments in agricultural research and development would be required. Doubling irrigation development, however, would not be sufficient to reverse the adverse impact of climate change.

2.10.2 Methodologies for determining trends

Mutanga *et al*. (2013) conducted a trend analysis of small scale commercial sugarcane production in the post-resettlement area of Mkwasine in Zimbabwe, using hyper-temporal satellite imagery. The study made use of the normalised difference vegetation index (NDVI) derived from spot vegetation images as a proxy for a sugarcane growth and production model. Using the moving average computed in the R programming language, a time series analysis was done to monitor sugarcane production after the introduction of land reform in the Mkwasine Estate. The findings showed a general decline in production over the 11 year period of the study, with a few years of improved production.

Diakosavvas and Scandizzo (1991) conducted a study of trends in the trade of primary commodities between 1990 and 1982. The study examined in some detail the secular trends of terms of trade in 14 individual primary commodities and five commodity aggregates in the specified time period. Using a very sophisticated methodology and estimation procedure, the data gathered in this study is said to constitute the largest and most accurate time series of prices of primary products assembled to date. The estimation of secular trends was done by testing alternative model specifications. The problem of autocorrelation was also explicitly dealt with by applying a generalised least squares (GLS) estimation technique. The procedure allows for autocorrelation testing for one than one year and is therefore flexible.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

The main focus of this chapter is research methodology and model specification of the study and describes the methods and techniques used to arrive at the results discussed in the next chapter.

3.2 Study area

The study of the determinants of sugar production and export performance within the Tripartite Free Trade Area was conducted in South Africa (see Figure 3.1). South Africa is located at the southern tip of the African continent and has a coastline that stretches more than 2,005 km and includes the Atlantic and Indian Oceans. The country borders on Namibia; Botswana; Zimbabwe; Mozambique; Swaziland; and Lesotho. South Africa is a member of the Commonwealth of Nations and is widely recognised as the most economically developed country in Africa.

South Africa is an ethnically diverse nation with the largest racially mixed community in Africa. Black South Africans account for approximately 80% of the population. South Africa is divided into nine provinces namely Limpopo; Gauteng; Mpumalanga; Free State; KwaZulu-Natal; Eastern Cape; Western Cape; and Northern Cape. The provinces are further subdivided into 52 districts comprising six metropolitan and 46 district municipalities. Each province has its own provincial government with legislative power vested in a provincial legislature, and executive power vested in the provincial Premier and exercised together with the members of the community.

3.2.1 The main sugarcane producing regions in South Africa

In South Africa, sugarcane is cultivated in 14 cane-producing areas covering 430,000 ha and extending from Northern Pondoland in the Eastern Cape Province along the coastal belt of the KwaZulu-Natal Midlands to the Mpumalanga Lowveld. About 68% of the sugarcane is grown within 30 km of the coast and 17% in the high rainfall areas of KwaZulu-Natal. The remainder is cultivated in the northern areas of Pongola and the Mpumalanga Lowveld (DAFF, 2013)

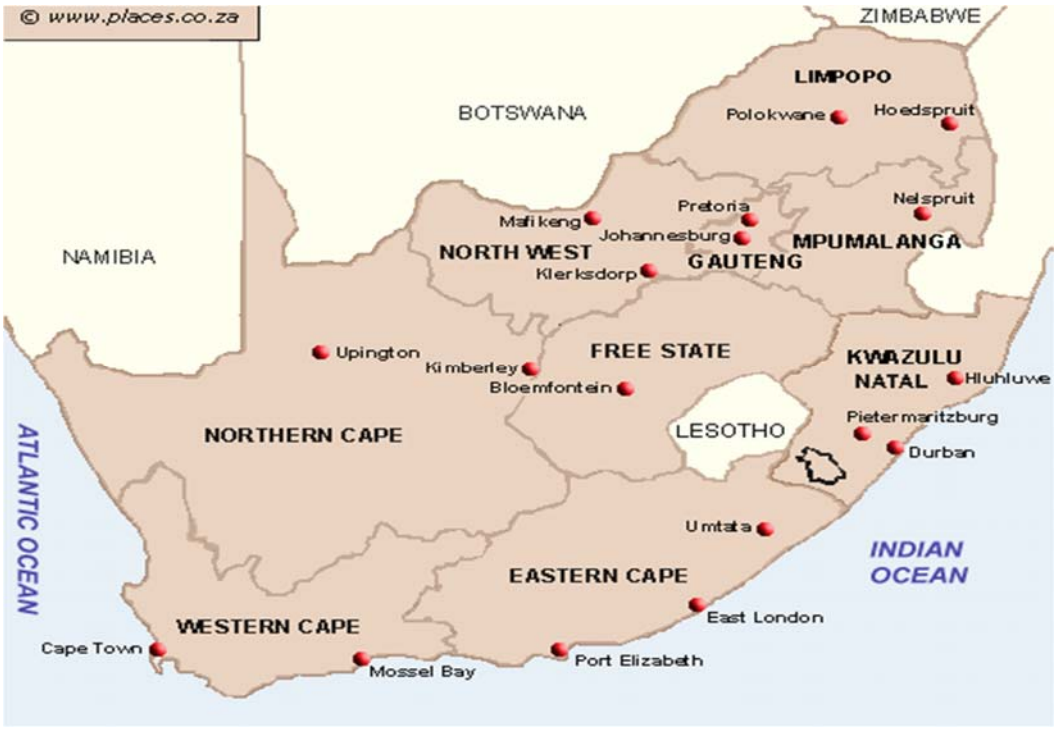

Figure 3.1: Map of South Africa
Source: www.places.co.za accessed on 15/06/2016

The study focused on Nkomazi Municipality in the Ehlanzeni District of Mpumalanga Province (see Figure 3.2). This municipality covers an area of 4,787 km^2 and has a population of approximately 390,610 with an estimated population growth of 1.55%.

Nkomazi Municipality is strategically positioned to the north of Swaziland and east of Mozambique. It is bordered by the Kruger National Park to the north, Umjindi Local Municipality to the southwest and Mbombela Local Municipality to the west and northwest. Two provincial roads link Nkomazi Municipality with Swaziland, and a railway line and the N4 national road (known as the Maputo Corridor) link the area with Mozambique. The majority of sugarcane growers in the study area are producing individually, and farm sizes vary.

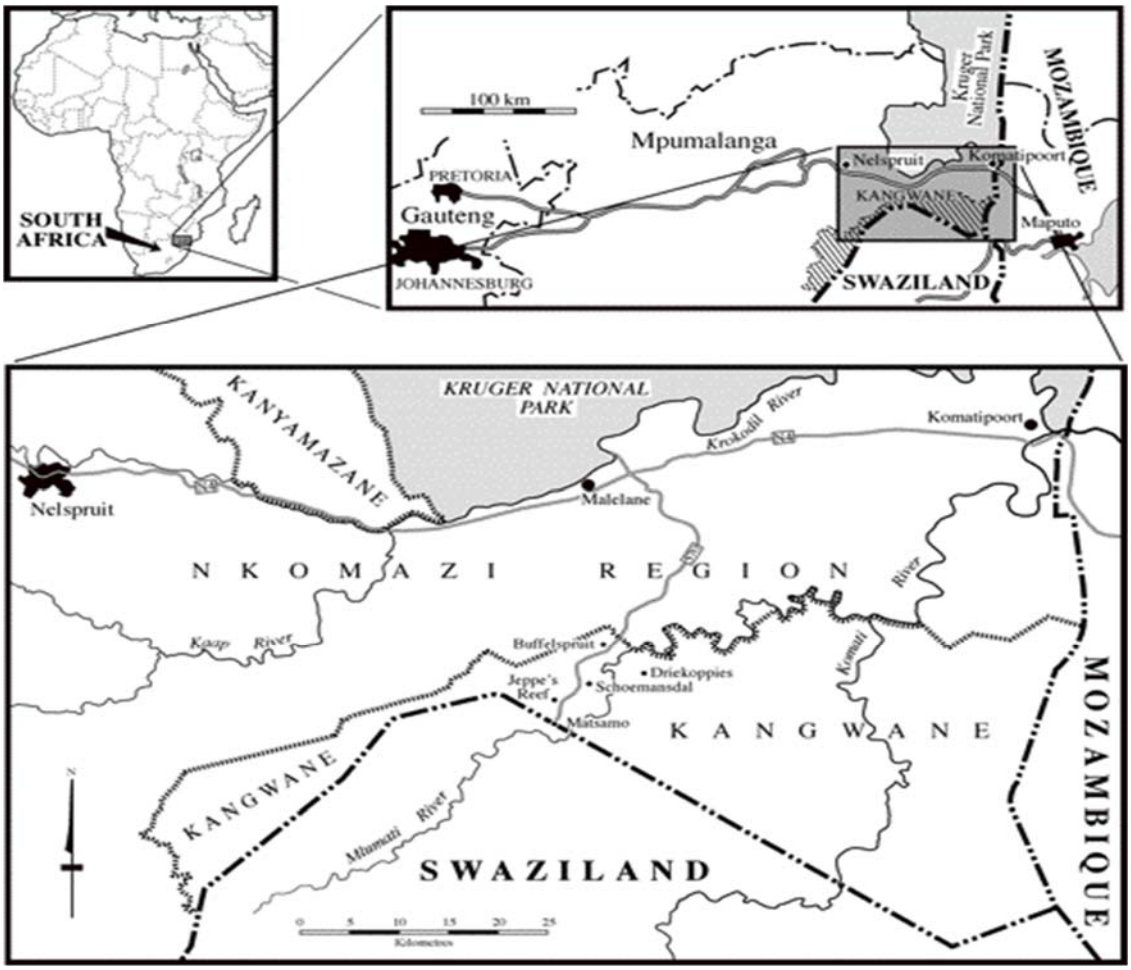

Figure 3.2: Map of Nkomazi Municipality
Source: https://www.google.co.za/search?q=nkomazi+region+map&biw accessed on 15/06/2016

3.3 Research design

This is a mixed methodology study. According to Boeije (2010) mixed methods research can be used in cases where both quantitative and qualitative data are collected in order to examine phenomena from different perspectives.

3.4 Sampling

According to Babbie and Mouton (2009), sampling involves the selection of a subset of individuals from a statistical population as a basis for estimating the characteristics of the entire population. Sampling is associated with three main advantages, namely less costly data collection, faster data collection and the ability to ensure homogeneity and therefore data accuracy and quality.

The following formula was used by Krejcie & Morgan (1970) to calculate a table for determining sample size from a given population (Table 3.1).

$$S = \frac{X^2NP(1-P)}{D^2(N-1) + X^2P(1-P)}$$

Where:

S = Required sample size

X = Table value of chi-square for 1 degree of freedom at the desire confidence level

N = Population size

P = Population proportion

Table 3.1 Table for determining sample size from a given population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2 800	338
15	14	110	86	290	165	850	265	3 000	341
20	19	120	92	300	169	900	269	3 500	346
25	24	130	97	320	175	950	274	4 000	351
30	28	140	103	340	181	1000	278	4 500	354
35	32	150	108	360	186	1100	285	5 000	357
40	36	160	113	380	191	1200	291	6 000	361
45	40	170	118	400	196	1300	297	7 000	364
50	44	180	123	420	201	1400	302	8 000	367
55	48	190	127	440	205	1500	306	9 000	368
60	52	200	132	460	210	1600	310	10 000	370
65	56	210	136	480	214	1700	313	15 000	375
70	59	220	140	500	217	1800	317	20 000	377
75	63	230	144	550	226	1900	320	30 000	379
80	66	240	148	600	234	2000	322	40 000	380
85	70	250	152	650	242	2200	327	50 000	381
90	73	260	155	700	248	2400	331	75 000	382
95	76	270	159	750	254	2600	335	100 000	384

NB: N= Population size
S= Sample size

Source: Krejcie and Morgan, 1970

In this study, a random sampling method was used. According to Ghauri and Gronhaug (2005), one of the characteristics of random sampling is that every person in the target population has an equal chance of being selected. There are 180 small scale sugarcane farmers in the study area. Using Table 3.1, a sample size of 123 was generated.

3.5 Research instruments

3.5.1 Reliability and validity of the questionnaires

Validity refers to the degree to which an instrument measures what it is supposed to measure (Polit & Beck, 2010). Burns and Grove (2004) define reliability as the degree of consistency with which an instrument measures the attribute it is designed to measure.

Questionnaires must adequately cover the critical issue being studied. Prior to the empirical data collection, the two questionnaires drafted for the purpose of this study were pre-tested to assess their effectiveness and efficiency as data gathering tools and to identify and eliminate any flaws that might influence the responses of participants.

3.6 Collection of data

This is the process of preparing and gathering information for the purpose of having it on record for reference when making decisions about pertinent issues or in order to communicate information to others. Both secondary and primary data can be collected (Leedy & Ormrod, 2010).

Primary data collection involves the use of a survey questionnaire, direct observations and interviews while secondary data refers to data collected by persons other than the current researcher. This study makes use of both secondary and primary data.

3.6.1 Primary data

Primary data was used to determine the factors affecting production and exports in South Africa's sugar industry with a view to determining major constraints and opportunities for promoting strengthened performance.

Primary data for the study was obtained by means of questionnaire-based interviews with 123 randomly selected sugarcane farmers in the Malelane area of Nkomazi Municipality and the completion of a second questionnaire by 100 key role players in the sugar export industry. A Seven-Point Likert scale was used to examine the extent to which each factor was perceived to affect the performance of the farmers or rather

industry. Scores of between 0 and 7 were assigned to each factor based on the simple arithmetical means of the responses.

3.6.2 Secondary data

Secondary data for the period 1996 to 2014 was used to:

- analyse the trends in South Africa's sugar production and exports within the TFTA;
- test the correlation between South African sugar production and exports;
- and determine the drift rate in South Africa's sugar export performance within the TFTA.

Secondary data sources were Department of Agriculture, Forestry and Fisheries (DAFF) statistics and the Global Trade Atlas database.

3.7 Ethical considerations

In the course of this study, the researcher adhered strictly to all ethical procedures for informing and protecting respondents.

Approval for the study was obtained from Unisa's Ethics Committee.

Permission to conduct the study was obtained in advance from the Municipal Manager of Nkomazi Municipality by means of a letter accompanied by positive identification of the researcher and details of people who could be contacted with any questions regarding the study.

It was made clear to the randomly selected respondents that they would be participating in a study and that their participation was entirely voluntary. The purpose of the study was explained and written consent was obtained from all respondents.

The rights of respondents to privacy, confidentiality and anonymity were respected. No video cameras, tape recorders, one-way mirrors or microphones were used when conducting interviews.

3.8 Analysis of primary data

The researcher used Porter's Diamond Model to put together information on major positive factors and challenges that impact on the performance of the South African sugar industry (see Point 3.8 for a detailed description of the model).

In the analysis of questionnaire responses, a Seven-Point Likert Scale was used to indicate how each determining factor was perceived to affect the competitiveness or performance of the industry. Each factor was assigned a score of between 0 and 7 based on the calculation of simple arithmetical means. The higher the score, the more the factor was perceived as being an enhancing element. Conversely, the lower the score, the more the factor was considered to be a constraint to competitiveness.

Of the sample of 123 sugarcane producers, three were unavailable for interviewing. Face-to-face interviews were conducted with some of the key personnel in exporting companies who were available to meet the researcher in person and telephonic interviews were conducted with sugar exporters who didn't manage to have time to fill out the questionnaire. Since some of the questionnaires emailed to role players in the

industry were not returned to the researcher, 84 questionnaires were ultimately available for analysis.

3.9 Analysis of Secondary data

The Johansen test was used to determine the drift rate in South Africa's sugar exports within the TFTA between 1992 and 2014. Named after Søren Johansen, this is a commonly used procedure for testing stochastic and cointegrating relationships. There are two types of Johansen test, the trace and the eigenvalue, which may result in slightly different inferences. Time series variables generally evolve stochastically and are frequently non-stationary in analysis of stochastic drift. They are typically modelled as either trend stationary or difference stationary.

A trend stationary process (y_t) is derived as follows:

$y_t = f(t)+e_t$

Where:

t = time (1=1992): base year

f = deterministic function

e_t = zero-long-run-mean stationary random variable

y_t= export of sugar at the time

In time series analysis, the independent variable is the period of time. A linear regression equation is used to calculate the trend of the dependent variable (y_t) as time passes. When time is used as the independent variable, however, a number of complications are introduced into the regression method. This is because the dependent variable will usually be subjected to a number of influences that are themselves affected by the unit used to measure time. In this case, the stochastic drift can be removed from the data by regressing y_t on t using a functional form coinciding with that of f and retaining the residuals.

In contrast to this, a unit root (difference stationary) process evolves as follows:

$y_t=y_{t-1}+c+u_t$

Where:

y_t = export of sugar at the time

u_t = zero-long-run-mean stationary random variable

c = non-stochastic drift parameter

In this case the non-stationary variable can be removed from the data by differencing first, and the differenced variable will have a mean of c and no drift rate.

A trend stationary process was selected as being most appropriate for this study.

The Johansen test clarifies what the assumptions are about the nature of the trend, at most a first-order polynomial in time. It helps one understand how the parameters of the reduced form are related to the coefficients of the matrix polynomial, shows how trending data affect inference and allows for a clear distinction between the data generating process and the regression system used to construct the estimates (Johansen, 1991).

However, the model also has limitations. A noticeable feature of the regression system is the absence of a vector of linear time trends as repressors. A regression model without trends does not allow for stationary variables with non-zero trends and limits the possibility of testing stochastic cointegration. Implementing Johansen's method with the regression system is therefore flawed or of little practical relevance (Johansen, 1991).

The Johansen test was selected as a suitable model for use in this study because the model can be applied to systems of variables that are trending and facilitates the interpretation of stochastic drift rate using coefficients.

An Excel spreadsheet was used to analyse the trends in South Africa's sugar production and exports within the TFTA between 1996 and 2014.

3.10 Porter's Diamond Methodology of Competitive Advantage

The Diamond Model of Competitive Advantage developed by Porter (1990) can be used to examine the structure of an industry and point out its competitive strengths and weaknesses. Pitts & Lagnevik (1998) reported that Porter's model measures competitive strength or performance, both of which are often qualitative in nature, by

investigating the availability of superior inputs or factors which contribute to competitiveness or could be used to improve it.

The advantage of this model is that it assesses the competitiveness of all participants in the value chain (Porter, 1990). In the case of this study these include sugar farmers and sugar processors as well as industry labour unions and associations. Apart from pinpointing the weaknesses and strengths of a sector, the Diamond Model also makes it possible to identify critical potential determinants in the value chain which can be leveraged with the objective of improving and sustaining future competitiveness. It has been widely used by researchers to assess the performance or competitiveness of a number of agricultural sub-sectors in South Africa (Esterhuizen & Van Rooyen, 1999).

Figure 3.3 illustrates the factors of performance or competitive advantage in Porter's Diamond Model. Competitiveness is based on six broad criteria or attributes that shape the environment in which firms or industries compete.

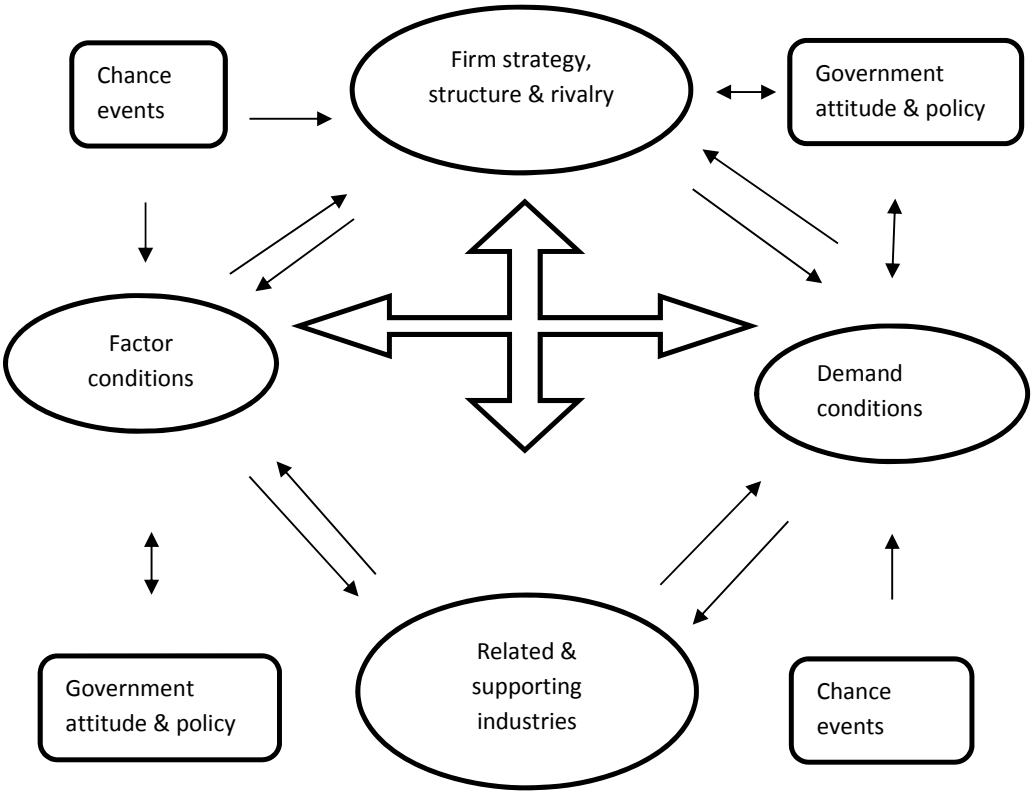

Figure 3.3: Porter's Diamond Model of Competitive Advantage

Source: Porter (1990)

3.10.1 Factor conditions

These are the favourable production determinants that provide a nation's industries a competitive edge over their rivalries. Factor conditions are created factors of production like labour (e.g. level of literacy of workers and quality of labour); infrastructure (e.g. systems in terms of communication and mode of transport); technology (e.g. research and technology availability); and costs of production (e.g. gas, human resource).

Great non-key factors like workers with no skills and raw materials do not contribute to an industry's competitive advantage as they are available to any industry. However, specialised key factors such as workers with necessary skills, access to capital and good infrastructure are associated with competitive advantage since they are not easy to replicate.

3.10.2 Conditions for demand

These refer to local demands for industry products and services and the ability to record these demands.

Demand conditions, which include the composition and size of home market demand and the internationalisation of domestic demand, are a crucial contributing determinant in terms of competitiveness. For instance, a sophisticated home market can put pressure on a company or industry to sell products of higher rank. Close proximity to their market also enables firms or industries to better understand the needs and wants of their clients.

3.10.3 Related and supporting industries

This determinant has to do with the international competitiveness of suppliers and related industries in a country. It has been argued by Porter (1990) that a set of powerful related and supporting industries is a crucial determinant in the competitiveness of a company or industries. Competitive domestic supporting industries and suppliers contribute to the competitiveness of a firm by allowing it to be more cost-efficient. These industries can include institutions for research, as well as institutions for financial, companies for transport, suppliers of electricity, inputs for agricultural production and materials for packaging purpose.

3.10.4 Firm strategy, structure and rivalry

These involve aspects such as culture, fabric, skills for managerial tasks, strategy for pricing, buyer and supplier market power, and threats from new industries or alternative producers. These are conditions that determine how firms or industries are created, structured and managed, and they influence the nature of domestic competition. Powerful competition in the home market promotes the development of necessary skills that provide a company or industry a competitive advantage internationally.

3.10.5 Government support and policy

As a factor of competitiveness, government is viewed as a factor apart from the four determining conditions already discussed. Government policies on issues such as trade, land reform, agriculture, labour, the environment and financial governance impact on all the other conditions, either positively or negatively.

3.10.6 Chance factors

Factors that are unrelated to the conditions in a country and are beyond the control of an industry or even national government can also negatively affect or positively affect an industry's competitive state. Those include wars, decisions by politicians of foreign states, huge raise in demand, shifts in world financial markets and rates of exchange, the discontinuance of technologies, vital breakthroughs in terms of technology or inventions, and increases in the incidence of crime or diseases such HIV/AIDS.

CHAPTER 4: PRESENTATION AND INTERPRETATION OF RESULTS

4.1 Introduction

This chapter focuses on the presentation and interpretation of the results of this study. Firstly, an overview of how South Africa has been performing previously in terms of production and export of sugar is presented. Secondly it provides the average drift rate of both raw and refined sugar together with the correlation between the production and export. Lastly, it provides an overview of the challenges and advantages that the sugar industry has in terms of production as well as export.

4.2 Trend analysis of South Africa's sugar production and exports within the tripartite area between 1996 and 2014

Figure 4.1 shows South Africa's sugarcane production in tons between 1996 and 2014. Indications are that overall production was very good, consistently exceeding 15,000 tons per year although there were slight annual fluctuations. The highest production was recorded in 2001. Despite a decrease in production in some years, there was a significant increase between 1996 and 1999 and again from 2011 to 2014.

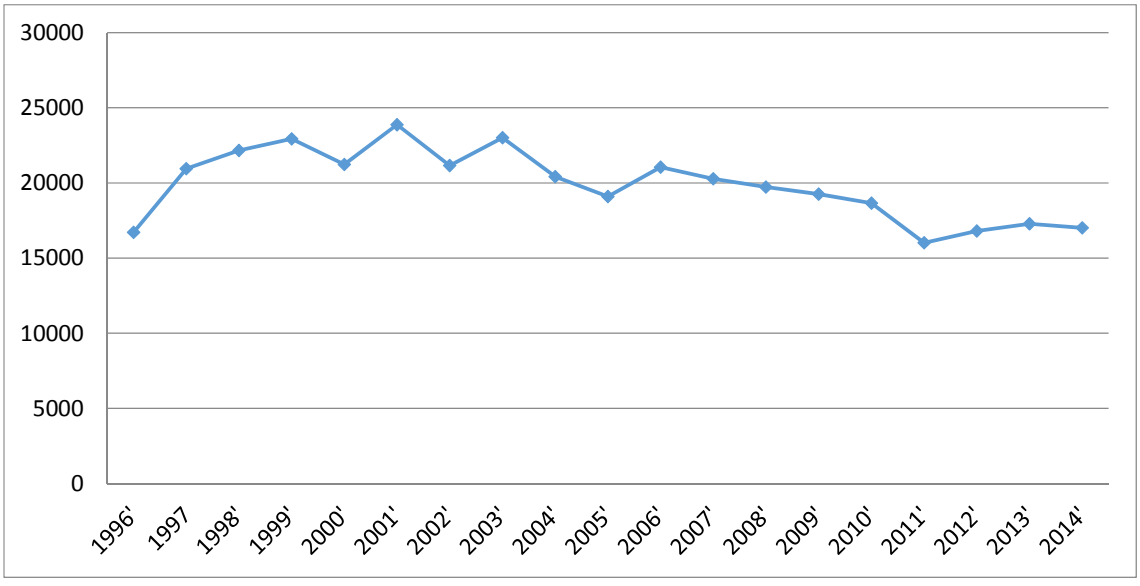

Figure 4.1: Sugarcane production in South Africa between 1996 and 2014
Source of data: Abstract of Agricultural Statistics, 2014

Figure 4.2 shows South Africa's exports of raw and refined sugar to the Tripartite Free Trade Area member states between 1996 and 2014. It is clear from the graph that

more raw sugar was exported in this period than refined sugar, with 2005 being the only year when the Rand value of raw and refined sugar exports was equal.

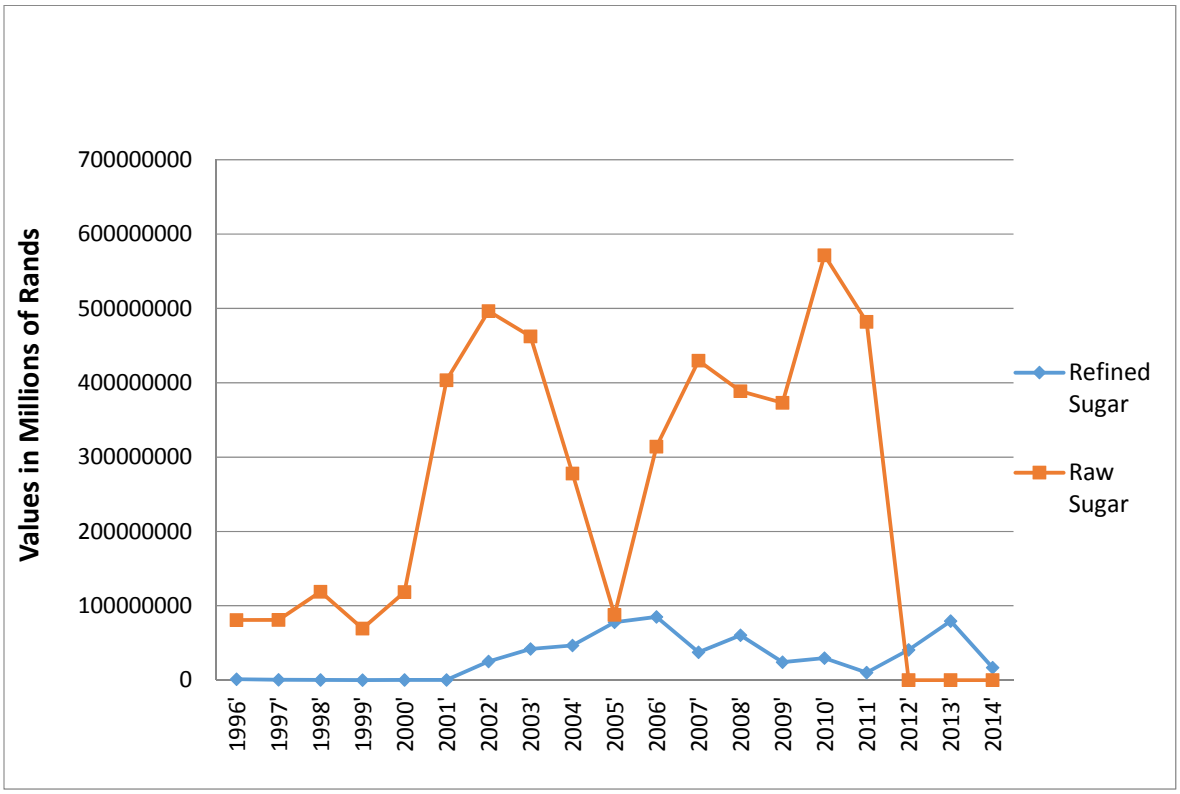

Figure 4.2: South Africa's raw and refined sugar exports to the TFTA (1996-2014)
Source: Global Trade Atlas, 2014

4.2.1 Analysis of drift rate in South Africa's sugar exports in the TFTA between 1996 and 2014

The recorded drift rate variations and t-ratios for raw and refined sugar are presented in Table 4.1. The 51% drift rate in the case of refined sugar indicates a positive average change in refined sugar exports, while the 8% drift rate for raw sugar indicates a negative average change in raw sugar exports. However, the t-ratio of 2.352 for refined sugar is statistically significant (greater than 2) while the t-ratio of 0.379 for raw sugar is not.

Table 4.1: Model summary of drift rate in South African sugar exports (1996-2014)

		Significance
Drift rate: Refined sugar	51%	-
Drift rate: Raw sugar	08%	-
t-ratio: Refined sugar	2.352	.032
t-ratio: Raw sugar	.379	7.09

Source: Own calculations based on secondary data

4.2.2 Correlation analysis of South Africa's sugar production and TFTA exports between 1996 and 2014

Pearson correlation values range from -1 (representing a negative correlation) to +1 (representing a positive correlation). As shown in Table 4.2, the two-tailed significance is .004, which is less than 0.5. This means that the correlation can be considered significant, i.e. there is 95% confidence that the correlation between these two variables is not due to chance.

There is a strong positive correlation between total sugar production and total sugar exports, since r (19) = 63 (p=0.004), indicating that as production increased so did exports.

Since the Pearson correlation value is .627 and is significant, it can be concluded that the data support the hypothesis that there is a positive correlation between sugar production and sugar exports in South Africa.

Table 4.2: Bivariate correlation analysis of secondary data

		Total exports	Total production
Total exports	Pearson Correlation	1	.627
	Sig. (2-tailed)		.004
	N	19	19
Total Production	Pearson Correlation	.627	1
	Sig. (2-tailed)	.004	
	N	19	19

Source: Own calculations based on secondary data

4.3 Results with respect to factors influencing sugar production in the study area

4.3.1 Demographic characteristics of respondents

Figure 4.3 shows the demographic characteristics of the farmers interviewed in the Malelane area of Nkomazi Municipality. In terms of ethnic groups, the graph clearly indicates that only black farmers are involved in the production of sugarcane in the study area. The majority of these are people between the ages of 36 and 45 who dropped out of secondary school. More males (71%) than females (29%) are involved in sugarcane production.

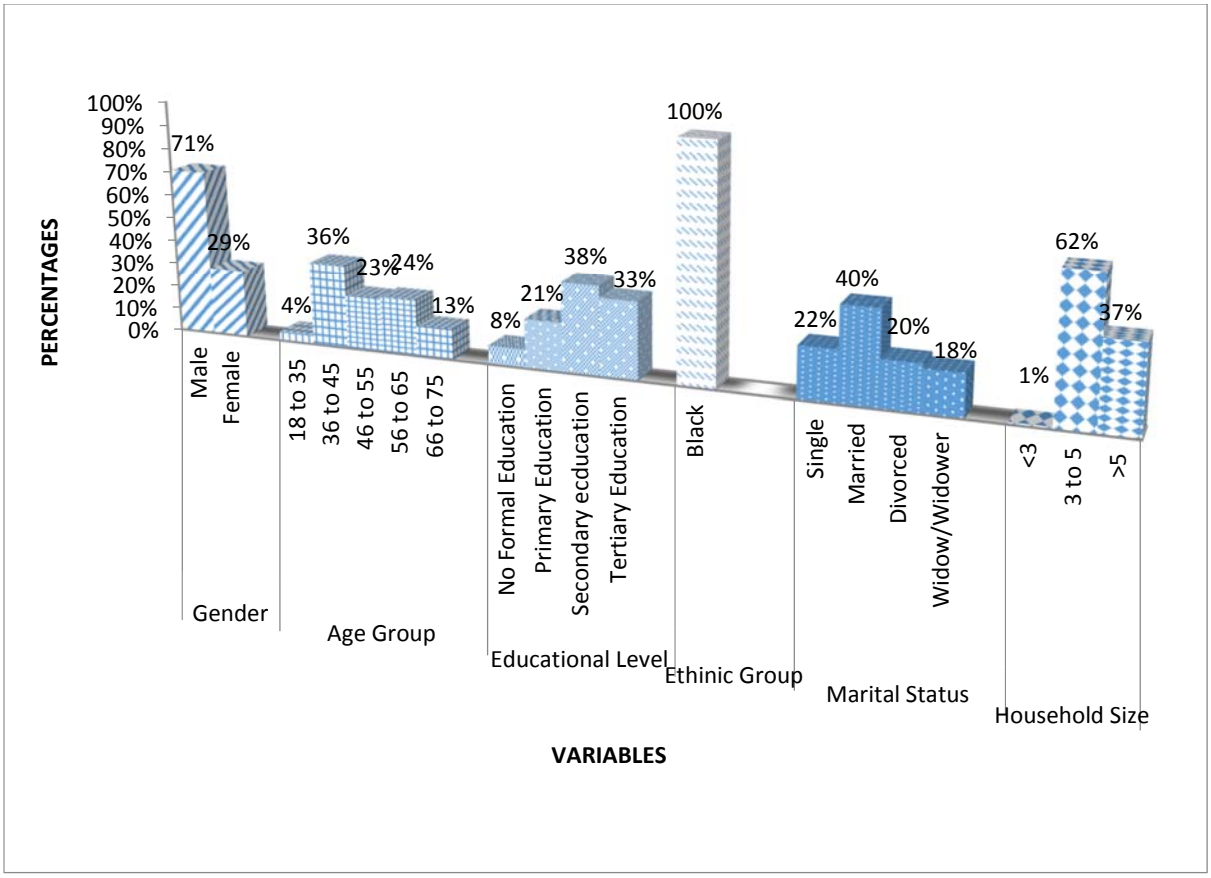

Figure 4.3: Demographic characteristics of respondents
Source: Data from the study

Based on the responses of the smallholder sugarcane farmers to a questionnaire (see Appendix 1), the factors that are perceived to impact on sugar production in the study area were empirically determined. The identified primary challenges and opportunities

in terms of sustained performance were then analysed according to the Porter methodology discussed in Section 3.8 of this study.

4.3.2 Labour factors

The outcome of the survey revealed that skilled labour availability is a major challenge facing sugarcane farmers in the study area. Unskilled labour on the other hand is available in abundance, which is not surprising in light of the high levels of unemployment in South Africa.

As shown Table 4.3a, many participants agreed that skilled labour is difficult to obtain, with 38.3% of the respondents strongly agreeing with this statement. On the other hand, many participants indicated that unskilled labour is easily obtainable, with 55.0% of the respondents strongly agreeing that it is extremely easy to obtain labours with no necessary skills.

Table 4.3a Farmer perceptions with respect to labour factors

	Agree Strongly	Agree	Agree somewhat	Neutral	Agree somewhat	Agree	Agree strongly	
Skilled labour is difficult to obtain	38.3%	27.5%	9.2%	13.3%	4.2%	5.0%	2.5%	Skilled labour is easy to obtain
Unskilled labour is difficult to obtain	0.0%	1.7%	5.8%	6.7%	11.7%	55.0%	19.2%	Unskilled labour is easy to obtain

Source: calculations from data

Table 4.3b shows the average ratings of availability of skilled and unskilled labour. The perception that unskilled labour is easier to obtain than skilled labour is confirmed by the average rating of 5.7.

Table 4.3b: Labour factors average rating

Labour factors	Average rating
Skilled labour	2.4
Unskilled labour	5.7

Source: Calculations from data

4.3.3 Business cost

The business cost is a crucial dimension of the determinant conditions needed for optimal performance in any venture. The majority of respondents (51.7%) agreed somewhat with the statement that the business cost too is high.

In addition, the overall state and cost of infrastructure appeared to be a challenge for most of the farmers in the study area, with 35.0% agreeing and another 35.0% agreeing somewhat that general infrastructure is poorly developed. The respondents also rated the cost of infrastructure as being extremely high, with 45.8% agreeing strongly and 25.0% agreeing somewhat with this statement.

Table 4.4a: Farmer perceptions on business cost and of infrastructure

	Agree Strongly	Agree	Agree somewhat	Neutral	Agree somewhat	Agree	Agree strongly	
The cost of doing business is extremely high	12.5%	26.7%	51.7%	7.5%	0.0%	1.7%	0.0%	The cost of doing business is very affordable
The general infrastructure is poorly developed	3.3%	35.0%	35.0%	25.8%	0.8%	0.0%	0.0%	The general infrastructure is well developed
The cost of infrastructure is extremely high	4.2%	45.8%	25.0%	15.0%	0.0%	0.0%	0.0%	The cost of infrastructure is very affordable

Source: Calculations from data

Respondents rated the cost of doing business with poorly developed infrastructure as well as the cost of infrastructure as constraints in their farming, with average ratings of 2.6, 2.9 and 2.4 respectively as shown in Table 4.4b below.

Table 4.4b Business cost and of infrastructure average rating

Business costs and cost of infrastructure	Average rating
Business cost	2.6
General infrastructure	2.9
Cost of infrastructure	2.4

Source: Calculations from data

4.3.4 Technology

Tables 4.5a and 4.5b presents respondent perceptions and average ratings in terms of two variables, namely quality of technology availability and quality technological cost. The majority of respondents agreed that the quality of technology in their day-to-day operations generally lags behind that of other farmers and that quality technological cost is too high.

Table 4.5a: Farmer perceptions with respect to technology

	Agree Strongly	Agree	Agree somewhat	Neutral	Agree somewhat	Agree	Agree strongly	
Quality of technology generally lags behind most others	4.2%	25.0%	43.3%	14.2%	1.7%	11.7%	0.0%	Quality of technology generally lags behind most others
Quality technological cost is too high	4.2%	35.0%	46.7%	11.7%	0.8%	0.8%	0.8%	Quality technology is very affordable

Source: Calculations from data

Of the participants, 43.3% agreed somewhat that the quality of available technology is comparatively inadequate and 46.7% agreed somewhat that the quality technological cost is very high. The average rating for these two variables is 3.2 and 2.8 respectively.

Table 4.5b: Technology average rating

Technology	Average rating
Quality of technology	3.2
Cost of quality technology	2.8

Source: Calculations from data

4.3.5 Natural resources

Natural resources such as water, soil quality and rainfall play a vital role in the production of most agricultural products, and the availability and accessibility of such resources are very important to producers. Water is one of the major production inputs and climatic conditions are also a key factor in production. Water is considered to be one of the scarce resources in South Africa and if the current rate of water usage continues, demand is likely to exceed supply at some point in time.

Respondent perceptions of the availability of water were generally very negative, with 40.0% strongly agreeing that water availability is very inadequate and only 1.7% experiencing it as favourable. It is possible that this small percentage of farmers have access to boreholes.

Table 4.6a: Farmer perceptions with respect to natural resources

	Agree Strongly	Agree	Agree somewhat	Neutral	Agree somewhat	Agree	Agree strongly	
Water availability is weak	40.0%	30.8%	13.3%	9.2%	5.0%	1.7%	0.0%	Water availability is favourable
Climatic conditions/weather are adverse	40.8%	20.8%	19.2%	5.8%	2.5%	9.2%	1.7%	Climatic conditions/weather are favourable
Soil quality is weak	8.3%	40.8%	19.2%	10.8%	17.5%	3.3%	0.0%	Soil quality is favourable
Rainfall is weak	35.8%	24.2%	20.0%	9.2%	8.3%	2.5%	0.0%	Rainfall is favourable

Source: Calculations from data

Climatic conditions, soil quality and rainfall patterns were also identified as factors that negatively influence sugarcane production. Responses were negative with respect to all of these three factors, with 40.8% strongly agreeing that weather patterns are adverse, 19.2% agreeing somewhat that soil quality is weak and 35.8% strongly agreeing that rainfall is weak. The average ratings for these factors were 2.4, 3.0 and 2.4 respectively.

Table 4.6b: Natural resources average rating

Natural resources	Average rating
Water availability	2.1
Climatic conditions	2.4
Soil quality	3.0
Rainfall patterns	2.4

Source: Calculations from data

4.3.6 Related and supporting industries

The data with regard to related and supporting industries are presented in Tables 4.7a and 4.7b below. Indications are that the availability of financial services and credit to aid producers are two critical challenges facing the respondents. Of the respondents, 30.8% strongly agreed that financial services are generally a constraint to competitiveness and 41.7% strongly agreed that it was extremely difficult for them to obtain credit from financial institutions. It is noteworthy that 50.0% of the respondents agreed somewhat that local suppliers of primary inputs are inefficient and have inadequate technological capacity.

A possible reason for the fact that a large proportion of the respondents (38.3%) were neutral on the subject of electricity supply as a constraint could be that they make little or no use of electricity in their day-to-day operations.

Table 4.7a: Farmer perceptions with respect to related and supporting industries

	Agree Strongly	Agree	Agree somewhat	Neutral	Agree somewhat	Agree	Agree strongly	
Financial Services are a constraint to competitive success	30.8%	34.2%	11.7%	15.8%	3.3%	4.2%	0.0%	Financial services enhance competitive success
Obtaining credit is extremely difficult	41.7%	37.5%	8.3%	8.3%	2.5%	1.7%	0.0%	Obtaining credit is easy
Local suppliers of primary inputs are largely non-existent	3.3%	3.3%	27.5%	51.7%	13.3%	0.0%	0.8%	Local suppliers are numerous and include the most important equipment and services
The quality of local suppliers of inputs is inefficient and they have little technological capacity	0.0%	7.5%	50.0%	39.2%	2.5%	0.0%	0.8%	The quality of local suppliers of inputs is internationally competitive and assists in new product & process development
Electricity supply is constraint to production	10.8%	3.3%	10.0%	38.3%	29.2%	8.3%	0.0%	Electricity supply is not a constraint to production
The sustainability of local suppliers of inputs is a huge problem	0.8%	9.2%	45.8%	23.3%	9.2%	8.3%	3.3%	The sustainability of local suppliers of inputs is not a problem
Storage facilities are largely non-existent	1.7%	5.8%	26.7%	35.8%	25.8%	4.2%	0.0%	Storage facilities are numerous and include the most important materials, equipment and services
The cost of using storage facilities is extremely high	5.8%	37.5%	35.0%	15.8%	4.2%	0.0%	1.7%	The cost of using storage facilities is affordable
Transport is not available	2.5%	23.3%	55.0%	13.3%	5.0%	0.8%	0.0%	Transport is readily available

Source: Calculations from data

This is strongly confirmed by the 4.0 average rating of electricity supply as a factor.

Most of the farmers indicated that their production fluctuates and that storage is a challenge at peak production times. While 25.8% of the respondents agreed somewhat that there are numerous storage facilities which also offer the most important materials, components, equipment and services, storage costs are clearly a major challenge, especially for farmers experiencing an increase in production. This is confirmed by the fact that 37.5% agreed that the cost of using available storage facilities is extremely high. Transport also appears be a constraint, with 55.0% of the respondents agreeing somewhat that transport is not readily available.

Table 4.7b: Related and supporting industries average rating

Related and supporting industries	Average rating
Financial services	2.4
Obtaining credit	2.0
Availability of local supplies of industry primary inputs	3.7
Quality of local suppliers of industry primary inputs	3.4
Electricity supply	4.0
Sustainability of local suppliers of primary inputs	3.7
Availability of storage facilities	3.9
Cost of using storage facilities	2.8
Availability of transport	3.0

Source: Calculations from data

4.3.7 Firm strategy, structure and rivalry

Tables 4.8a and 4.8b below present the perceptions of respondents and the average ratings in terms of firm strategy, structure and rivalry. Access to information is always important and undoubtedly has a positive effect on productivity. Of the farmers interviewed, 31.7% agreed somewhat that the flow of information from primary suppliers of basic inputs is very poor while 37.7% were neutral on this point. In actual terms, this indicates that almost half of the respondents do not really rely on information from suppliers because they know where to get what they need for their production. However, the fact that 1.7% of respondents felt strongly that information

flow is very poor is an indication that a small number of producers are interested in having access to information that will help them enhance their productivity.

A very small percentage of the respondents (0.8%) strongly agreed that industry's expenditure on research and development is massive whereas 22.5% did not have an opinion either way.

Table 4.8a: Farmer perceptions with respect to firm strategy, structure and rivalry

	Agree strongly	Agree	Agree somewhat	Neutral	Agree somewhat	Agree	Agree strongly	
The information flow from primary suppliers is very poor	1.7%	2.5%	31.7%	31.7%	25.8%	6.7%	0.0%	The information flow from primary suppliers is very good
Industry's expenditure on R&D is very low	2.5%	1.7%	20.8%	22.5%	35.0%	16.7%	0.8%	Industry's expenditure on R&D is massive

Source: Calculations from data

Table 4.8b: Firm strategy, structure and rivalry average rating

Firm strategy, structure and rivalry	Average rating
Information flow from primary suppliers	4.0
Industry expenditure on R&D	4.4

Source: Calculations from data

4.3.8 Government support and policies

Tables 4.9a and 4.9b deal with some of the policy areas which the respondents very strongly believe impact on their operations. In general, South Africa's land reform policy appears to be perceived as favourable, with 25.0% of the respondents strongly agreeing that it offers opportunities for advancement and the policy receiving an average factor rating of 4.9.

The majority of respondents were neutral on the impact of macroeconomic policy, labour policy and competition law on their production (71.7%, 56.7% and 64.2% respectively).

It was the view of 45% of the respondents that South Africa's regulatory standards are neither particularly stringent nor particularly weak, while 56% also did not feel strongly either way about the impact of administrative regulations. Slightly more than half of those interviewed (50.8%) were also non-committal on the extent to which the country's tax system hinders or promotes investment and risk taking.

Table 4.9a: Farmer perceptions of government support and policies

	Agree strongly	Agree	Agree somewhat	Neutral	Agree somewhat	Agree	Agree strongly	
Macroeconomic policy constrains competitive success	0.0%	4.2%	22.5%	71.7%	1.7%	0.0%	0.0%	Macroeconomic policy enhances competitive success
The land reform policy is a constraint to competitive success	8.3%	5.0%	16.7%	5.8%	7.5%	31.7%	25.0%	The land reform policy provides opportunities for competitive success
Labour policy is a constraint to competitive success	8.3%	8.3%	20.8%	56.7%	4.2%	1.7%	0.0%	Labour policy enhances competitive success
Competition law is a constraint to competitive success	0.8%	8.3%	15.8%	64.2%	8.3%	1.7%	0.8%	Competition law enhances competitive success
The B-BBEE policy is a constraint to competitive success	1.7%	20.8%	5.0%	9.2%	2.5%	33.3%	27.5%	The B-BBEE policy enhances competitive success
Regulatory standards are non-existent	0.0%	4.2%	20.0%	45.0%	23.3%	7.5%	0.0%	Regulatory standards are among the most stringent
Administrative regulations are burdensome	0.0%	4.2%	11.7%	56.7%	19.2%	6.7%	1.7%	Administrative regulations are not burdensome
The tax system hinders investment and risk taking	0.8%	1.7%	15.0%	50.8%	28.3%	3.3%	0.0%	The tax system promotes investment and risk taking
Environmental regulations are not enforced or are enforced erratically	0.0%	2.5%	22.5%	11.7%	25.0%	37.5%	0.8%	Environmental regulations are enforced consistently and fairly
Complying with environmental standards hurts competitiveness	2.5%	0.8%	20.0%	18.3%	22.5%	35.0%	0.7%	Complying with environmental standards helps long term competitiveness

Source: own calculations based on survey data

Table 4.9b: Government support and policies average rating

Government attitude and policy	Average rating
South Africa's macroeconomic policy	3.7
South Africa's land reform policy	4.9
South Africa's labour policy	3.5
South Africa's competition law	3.8
South Africa's BEE policy	5.0
Regulatory standards	4.1
Administrative regulations	4.2
Tax system	4.1
Environmental regulations	4.8
Complying with environmental standards	4.7

Source: Calculations from data

4.3.9 Chance factors

The perceptions and average ratings of respondents in terms of chance factors impacting production are found in Tables 4.10a and 4.10b.

Crime is rated as the number one constraint facing the majority of respondents in the study area followed by the risk of HIV/AIDS, with 47.5% strongly agreeing that crime significantly impacts on the cost of production and 42.5% agreeing that HIV/AIDS is also a production constraint.

The majority of respondents responded neutrally to questions on the impact of South Africa's economic stability and exchange rate on their productivity.

Table 4.10a: Farmer perceptions of the impact of chance factors

	Agree strongly	Agree	Agree somewhat	Neutral	Agree somewhat	Agree	Agree strongly	
Crime imposes significant costs on the farm	47.5%	30.8%	5.0%	14.2%	1.7%	0.8%	0.0%	Crime does not impose significant costs on the farm
HIV/AIDS imposes significant cost to the farm	21.7%	42.5%	15.0%	17.5%	1.7%	1.7%	0.0%	HIV/AIDS does not impose significant cost to the farm
Economic stability is a constraint to competitive success	6.7%	5.0%	5,8%	45.2%	24.2%	4.2	0.0%	Economic stability provides opportunity to increase competitive success
The exchange rate is a constraint to competitive success	0.8%	2.5%	10.1%	57.1%	24.4%	5.0%	0.0%	The exchange rate enhances competitive success

Source: Calculations from data

Table 4.10b: Chance factors impact average rating

Chance factors	Average rating
Crime	1.9
HIV/AIDS	2.4
Economic stability	4.0
Exchange rate	4.2

Source: Calculations from data

4.4 Results with respect to factors influencing sugar exports

Based on the responses of key exporting personnel and organisations to a questionnaire (see Appendix 2), an empirical determination of the factors impacting on South Africa's exports was done. This was followed by an analysis of the major challenges and opportunities for sustained performance using the Porter methodology

discussed in Section 3.8 of this dissertation. Key export success factors and constraints were identified in terms of Porter's determinants of competitiveness.

4.4.1 Export factor conditions

Tables 4.11a and 4.11b present the perceptions of respondents and average ratings in terms of export factor conditions. Variables identified as having a significant positive impact on sugar export performance are product design, packaging, labelling and pricing as well as the manager's willingness to export, level of education and training, length of time in the business, experience and language.

The majority of respondents viewed pricing as an important factor, with 47.6% strongly agreeing that price has a significant influence on sugar exports. The findings agree with those of Leonidou (2002) who indicated that product design, branding, pricing and promotion have a significant positive effect on export performance, while packaging and labelling do not.

Table 4.11a: Respondent perceptions of the impact of export factor conditions

	Agree strongly	Agree	Agree somewhat	Neutral	Agree somewhat	Agree	Agree strongly	
Product design improves exports	0.0%	2.4%	40.5%	39.3%	10.7%	7.1%	0.0%	Product design does not improve export
Packaging improves exports	0.0%	6.0%	46.4%	35.7%	11.9%	0.0%	0.0%	Packaging does not improve export
Labelling has a positive effect on exports	0.0%	7.1%	45.2%	42.9%	4.8%	0.0%	0.0%	Labelling does not improve exports
Pricing has a positive influence on exports	47.6%	46.4%	6.0%	0.0%	0.0%	0.0%	0.0%	Pricing does not improve exports
Promotion improves exports	31.0%	61.9%	7.1%	0.0%	0.0%	0.0%	0.0%	Promotion does not improve export
Distribution channels improve exports	4.8%	1.2%	41.7%	47.6%	4.8%	0.0%	0.0%	Distribution channels do not improve exports
Tariffs are a major barrier to exports	67.9%	31.0%	1.2%	0.0%	0.0%	0.0%	0.0%	Tariffs are not a major barrier to exports

	Agree strongly	Agree	Agree somewhat	Neutral	Agree somewhat	Agree	Agree strongly	
Manager's willingness to export improves exports	1.2%	23.8%	47.6%	25.0%	2.4%	0.0%	0.0%	Manager's willingness to export does not improve exports
Socio-cultural specifications are barriers	0.0%	3.6%	39.3%	40.5%	14.3%	2.4%	0.0%	Socio-cultural specifications are not barriers
Managers' education and training levels improve exports	0.0%	13.1%	35.7%	17.9%	25.0%	8.3%	0.0%	Managers' education and training levels do not improve exports
Manager's period in the business improves exports	2.4%	25.0%	27.4%	27.4%	16.7%	1.2%	0.0%	Manager's period in the business does not improve exports
Managers' experience improves exports	19.0%	17.9%	22.6%	27.4%	11.9%	1.2%	0.0%	Managers' experience does not improve exports
Language is a constraint	0.0%	2.4%	34.5%	27.4%	2.6%	13.1%	0.0%	Language is not a constraint
Transportation due to infrastructure is a constraint	0.0%	4.8%	28.6%	59.5%	6.0%	1.2%	0.0%	Transportation due to infrastructure is not a constraint
Transportation cost is very high	0.0%	6.0%	35.7%	56.0%	2.4%	0.0%	0.0%	Transportation cost is affordable

Source: Calculations from data

Tariffs appear to be a major challenge, with 67.9% of respondents strongly agreeing that they are a constraint in exporting.

Of the respondents in the sugar exporting industry, 35.5% agreed somewhat that language is a constraint. This is due to the fact that different countries have different official languages and as a result translators and even interpreters become necessary.

Table 4.11b: Export factor conditions average rating

Export factors	Average rating
Product design	3.8
Packaging	3.5
Labelling	3.5
Pricing	1.6
Promotion	1.8
Distribution channel	3.5
Tariffs	1.4
Manager's willingness to export	3.0
Socio-cultural specifications	3.7
Manager's educational and training level	3.8
Period of manager in the business	3.4
Manager's experience	3.0
Language	4.1
Transportation due to infrastructure	3.7
Transportation cost	3.6

Source: Calculations from data

4.4.2 Related and support industries

This aspect of the research dealt with the presence or absence of internationally competitive supplier and related industries, including input industries, financial institutions, research institutions and suppliers of services such as electricity, telecommunication and internet services. When such industries exist, the sugar industry can have access to products and services at competitive prices. In their absence, prices are higher because products and services have to be imported.

Tables 4.12a and 4.12b present the perceptions of respondents and the average ratings with respect to related and supporting industries. Despite Eskom's recent increases in the price of electricity, electricity supply was not seen as a major constraining factor, with the majority of responses in this regard being neutral. There were no respondents who either strongly agreed or strongly disagreed that electricity supply is a constraint in the sugar exporting industry.

Table 4.12a: Respondent perceptions with respect to related and supporting industries

	Agree strongly	Agree	Agree somewhat	Neutral	Agree somewhat	Agree	Agree strongly	
Financial services are a constraint to competitive success	0.0%	1.2%	36.9%	58.3%	3.6%	0.0%	0.0%	Financial services enhance competitive success
Obtaining credit is extremely difficult	0.0% %	4.8% %	57.1%	31.0%	7.1%	0.0%	0.0%	Obtaining credit is easy
Scientific research institutions are non-existent	0.0%	1.2%	17.9%	56.0%	20.2%	4.8%	0.0%	Scientific research institutions are the best in their fields
Industry's collaboration with scientific research institutions is non-existent	0.0%	1.2%	26.2%	57.1%	15.5%	0.0%	0.0%	Industry's collaboration with scientific research institutions is intensive and ongoing
Electricity supply is a constraint to production	0.0%	3.6%	20.2%	63.1%	10.7%	2.4%	0.0%	Electricity supply is not a constraint to competitiveness
Telecommuni-cations constrain competitiveness	0.0%	1.2%	17.9%	60.7%	20.2%	0.0%	0.0%	Telecommuni-cations enhance competitiveness
Suppliers of primary inputs are largely non-existent	0.0%	0.0%	25.0%	60.7%	14.3%	0.0%	0.0%	Suppliers of primary inputs are numerous and include the most important equipment and services
The quality of suppliers of primary inputs is inefficient and they have little technological capability	0.0%	6.0%	71.4%	19.0%	3.6%	0.0%	0.0%	The quality of suppliers of primary inputs is internationally competitive and enhances new product and process development

	Agree strongly	Agree	Agree somewhat	Neutral	Agree somewhat	Agree	Agree strongly	
Sustainability of local suppliers of primary inputs is a huge problem	0.0%	0.0%	31.0%	66.7%	1.2%	1.2%	0.0%	Sustainability of local suppliers of primary inputs is not a problem
Storage facilities are largely non-existent	0.0%	1.2%	22.6%	36.9%	38.1%	1.2%	0.0%	Storage facilities are numerous and include most important materials, components equipment and service
Cost of using storage facilities is extremely high	0.0%	7.1%	77.4%	15.5%	0.0%	0.0%	0.0%	Cost of using storage facilities is affordable
Transport is not available	0.0%	0.0%	34.5%	60.7%	4.8%	0.0%	0.0%	Transport is readily available

Source: Calculations from data

With financial services and the availability of credit being important determinants of an industry's competitiveness, 36.7% of the respondents agreed somewhat that financial services are a major constraint to exports and 57.1% agreed somewhat that obtaining credit is extremely difficult.

Table 4.12b: Related and supporting industries average rating

Related and supporting industries	Average rating
Financial services	3.6
Obtaining credit	3.4
Scientific research institutions	4.1
Industry's collaboration with scientific research institutions in their R&D activity	3.9
Electricity supply	3.9
Telecommunications	4.0
Availability of suppliers of primary inputs	4.0
The quality of suppliers of primary inputs	3.2
The sustainability of local suppliers of primary inputs	3.7
Availability of storage facilities	4.2
The cost of storage facilities	3.1
Availability of transport	3.7

Source: Calculations from data

4.4.3 Firm strategy, structure and rivalry

Firm strategy, structure and rivalry are conditions within a country relating to how companies are created, organised and managed as well as the nature of domestic rivalry.

Tables 4.13a and 4.13b presents the perceptions of the respondents and the average rating of these factors as determinants of competitiveness in the South African sugar exporting industry. The flow of information from end users to manufacturers or producers and their corresponding response influence the competitive success of the industry.

Table 4.13a: Respondent perceptions with respect to firm strategy, structure and rivalry

	Agree strongly	Agree	Agree somewhat	Neutral	Agree somewhat	Agree	Agree strongly	
Industry's expenditure on R&D is very low	0.0%	0.0%	21.4%	63.1%	15.5%	0.0%	0.0%	Industry's expenditure on R&D is massive
The information flow from primary suppliers is very poor	0.0%	2.4%	41.7%	50.0%	6.0%	0.0%	0.0%	The information flow from primary suppliers is very good
Competition in the local market is very limited	0.0%	1.2%	9.5%	10.7%	42.9%	31.0%	4.8%	Competition in the local market is very intense
New competitors almost never enter the local market	0.0%	0.0%	4.8%	9.5%	28.6%	52.4%	4.8%	Entry of new competitors is common in the local market
Competition in the international market is very limited	0.0%	0.0%	2.4%	7.1%	9.5%	44.0%	36.9%	Competition in the international market is very intense

Source: Calculations from data

It is interesting to note that 52.4% of the respondents agreed somewhat that new competitors regularly enter the local market.

Table 4.13b: Firm strategy, structure and rivalry average rating

Firm strategy, structure and rivalry	Average rating
Industry's expenditure on R&D	4.0
Information flow from primary suppliers	3.6
Competition in the local market	5.1
Entry of new competitors	5.4
Competition in the international market	6.1

Source: Calculations from data

4.4.4 Government support and policies

Support and policies of government play an important role in driving the competitive success of any industry. Governmental policies, programmes and operational systems can positively or negatively impact competitiveness. It is not the State's responsibility to ensure that all the businesses operating in an industry are competitive. The role of government is to create an environment in which businesses can operate effectively.

Tables 4.14a reflects some of the policy areas on which the respondents had very strong views in terms of their impact on operations. For example, the majority of respondents (65.5%) agreed somewhat that South Africa's macroeconomic policy is a constraint.

Table 4.14a: Respondent perceptions of government support and policies

	Agree strongly	Agree	Agree somewhat	Neutral	Agree somewhat	Agree	Agree strongly	
South Africa's trade policy is a constraint to company competitive success	0.0%	4.8%	35.7%	48.8%	9.5%	1.2%	0.0%	South Africa's trade policy enhances company competitive success
South Africa's land reform policy is a constraint to competitive success	0.00%	1.2%	19.0%	45.2%	27.4%	7.1%	0.0%	South Africa's land reform policy promotes competitive success
South Africa's labour policy is a constraint to competitive success	0.0%	1.2%	34.5%	61.9%	2.4%	0.0%	0.0%	South Africa's labour policy enhances competitive success
South Africa's macroeconomic policy is a constraint to competitive success	0.0%	16.7%	65.5%	17.9%	0.0%	0.0%	0.0%	South Africa's macroeconomic policy enhances competitive success
South Africa's competition law is a constraint to competitive success	0.0%	9.5%	44.0%	45.2%	0.0%	1.2%	0.0%	South Africa's competition law is enhancement to competitive success

	Agree strongly	Agree	Agree somewhat	Neutral	Agree somewhat	Agree	Agree strongly	
South Africa's B-BBEE policy is a constraint to competitive success	0.0%	0.0%	19.0%	50.0%	26.2%	4.8%	0.0%	South Africa's B-BBEE policy is enhancement to competitive success
Regulatory standards are non-existent	0.0%	1.2%	19.0%	75.0%	3.6%	1.2%	0.0%	Regulatory standards are among the world's most stringent
Administrative regulations are burdensome	0.0%	0.0%	19.0%	77.4%	3.6%	0.0%	0.0%	Administrative regulations are not burdensome
The tax system hinders investment and risk taking	0.0%	17.9%	66.7%	14.3%	1.2%	0.0%	0.0%	The tax system promotes investment and risk taking
Environmental regulations are not enforced or are enforced erratically	0.0%	8.3%	38.1%	52.4%	1.2%	0.0%	0.0%	Environmental regulations are enforced consistently and fairly
Complying with environmental standards hurts competitiveness	0.0%	3.1%	54.8%	27.4%	4.8%	0.0%	0.0%	Complying with environmental standards promotes long term competitiveness

Source: Calculations from data

While the efforts of government to be trade friendly by concluding trade agreements with a number of countries and even regions are adequate, 35.7% of the respondents still strongly agreed that the existing trade policy is a constraint to the sugar industry's competitiveness. The average rating of 3.7 shown in Table 4.14b is a clear indication that South Africa's trade policy is still a constraint to some sugar exporters.

Administrative regulations do not appear to be a grave concern, with 77.4% of the responses being neutral in this regard. The same can be said of land reform, labour and B-BBEE policy, with 45.2%, 61.9% and 50.0% of the respondents respectively viewing these as neither a constraint nor an advantage. The majority of respondents (75.0%)

were also neutral on the subject of the existence and stringency of regulatory standards, and 52.4% did not see environmental regulations as having an impact either way.

The country's tax system, however, is definitely viewed as a constraint, with 66.7% of the respondents agreeing somewhat that it hinders investment and risk taking. This is confirmed by an average rating of 3.0 for this factor as shown in Table 4.14b.

Table 4.14b: Government positions and policies average ratings

Government support and policy	Average rating
South Africa's macroeconomic policy	3.7
South Africa's land reform policy	4.2
South Africa's labour policy	3.7
South Africa's competition law	3.0
South Africa's B-BBEE policy	3.4
Regulatory standards	4.2
Administrative regulations	3.9
Tax system	3.9
Environmental regulations	3.0
Complying with environmental standards	3.5

Source: Calculations from data

4.4.5 Chance factors

Tables 4.15a and 4.15b present the perceptions of the respondents and the average ratings of the impact of chance factors on the sugar industry. Crime appears to have cost implications for companies in the sugar industry, with 61.9% of the respondents agreeing somewhat in this regard. The prevalence of HIV/AIDS is also a cost to companies, with a total of 67.9% of the respondents agreeing somewhat that it is a real constraint. This factor's average rating of 3.1 as shown in Table 4.15b confirms that HIV/AIDS is one of the major constraints to competitive success in South Africa's sugar industry.

Table 4.15a: Respondent perceptions of the impact of chance factors

	Agree strongly	Agree	Agree somewhat	Neutral	Agree somewhat	Agree	Agree strongly	
Crime imposes significant costs on your company	16.7%	61.9%	19.0%	2.4%	0.0%	0.0%	0.0%	Crime does not impose significant costs on your company
HIV/AIDS imposes significant costs on your company	0.0%	9.5%	67.9%	22.6%	0.0%	0.0%	0.0%	HIV/AIDS does not impose significant costs on your company
Economic stability is a constraint to competitive success	0.0%	3.6%	50.0%	46.4%	0.0%	0.0%	0.0%	Economic stability is an opportunity to increase competitive success
The exchange rate is a constraint to competitive success	0.0%	3.6%	58.3%	34.5%	1.2%	2.4%	0.0%	The exchange rate enhances competitive success

Source: Calculations from data

The average rating of 3.4 for economic stability and exchange rate respectively are an indication that these two variables are also experienced as a constraint.

Table 4.15b: Chance factors average rating

Chance factors	Average rating
Crime	2.2
HIV/AIDS	3.1
Economic stability	3.4
Exchange rate	3.4

Source: Calculations from data

CHAPTER 5: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The first four chapters of this dissertation consist of an introduction and background to the study, a literature review, a description of the approach and methodology used and presentation and interpretation of the data. The purpose of this chapter is to summarise the crucial findings of this study by answering the research questions presented in chapter one on the basis for the evidence presented in chapter four. The chapter concludes with recommendations for the way forward. The central aim of the study was to investigate trends in South Africa's sugar production and exports and to identify the determining factors involved in the performance and competitive advantage of the South African sugar industry. With this aim in mind, the specific objectives of the study were formulated as follows:

- To analyse the trends in South Africa's sugar production and exports within the Tripartite Free Trade Area between 1996 and 2014.
- To determine the drift rate in South Africa's sugar exports within the Tripartite Free Trade Area between 1996 and 2014.
- To determine the correlation between South Africa's sugar production and sugar exports in the period 1996 to 2014.
- To identify factors that influence South Africa's sugar production and exports with a view to identifying major challenges and opportunities for sustained performance.

The researcher set out to test the following hypotheses:

i. There were no trends in South Africa's sugar production and exports within the TFTA between 1996 and 2014.

ii. There was no drift rate variation in South Africa's sugar exports within the TFTA between 1996 and 2014.

iii. There was a positive correlation between South African's sugar production and exports between 1996 and 2014.

The key to testing these hypotheses lay in answering the following research questions as outlined in chapter one:

- What was the trend in South Africa's sugar production and exports between 1996 and 2014?
- What changes were there in South Africa's sugar exports within the Tripartite Free Trade Area between 1996 and 2014?
- What was the correlation between South Africa's sugar production and sugar exports between 1996 and 2014?

In addition, primary data was used to answer the following research question:

- What do sugar producers and key role players in the industry perceive as determining factors in the production and export performance of the South African sugar industry?

Guided by the above research objectives and questions, the study made use of a variety of research methods and techniques. Time series data on South Africa's sugar production and exports between 1996 and 2014 were entered on an Excel spreadsheet with a view to determining trends. The Johansen test was also used to determine the drift rate in sugar exports in the period 1996 to 2014.

In addition, a survey was conducted to obtain quantitative and qualitative data from smallholder sugarcane farmers and key role players in the sugar industry for analysis using the Porter Diamond model to identify the factor conditions in the business environment that are perceived to have an impact on the sugar production and exports and thereby on the competitiveness of South Africa's sugar industry.

5.2 Summary of the research findings

5.2.1 Trends in South Africa's sugar production and exports within the TFTA between 1996 and 2014

The results of the secondary data analysis indicate that there were regular fluctuations in sugarcane production in the period 1996 to 2014. Based on this, the researcher rejected hypothesis (i) (there were no trends in South Africa's sugar production and exports within the TFTA between 1996 and 2014). Not surprisingly, the same pattern

was observed in raw and refined sugar exports during the period studied. Regular fluctuations are usually ascribed to factors of a seasonal nature and it was concluded that seasonal variations explained the fluctuations in this case as well.

The Johansen test revealed a drift rate variation of 51% in refined sugar exports which is indicative of growth potential in sugar exports by South Africa. These results motivated the rejection of hypothesis (ii) (there was no drift rate variation in South Africa's sugar exports within the TFTA between 1996 and 2014).

The results of bivariate correlation between sugar production and exports in the period 1996 and 2014 also clearly indicate a positive relationship between the production and export of sugar. The researcher therefore accepted hypothesis (iii) (there was a positive correlation between South African's sugar production and exports between 1996 and 2014).

5.2.2 Factors influencing South Africa's sugar production and exports

Applying the Porter Diamond model to the primary data from the survey of sugar producers in the study area revealed that farmers find their production constrained by the unavailability of skilled labour; the cost of doing business; the general state of infrastructure; the cost of infrastructure; water availability; climatic conditions; soil quality; rainfall patterns; access to financial services; access to credit; crime; and HIV/AIDS.

The survey of key role players in the sugar industry revealed that they experience tariffs as the major constraint in terms of sugar exports. The majority of these respondents also agreed that South Africa's macroeconomic and trade policies are constraining factors, while policies relating to land reform, labour, B-BBEE and competition were not highlighted as either constraining or enhancing factors by the majority of the respondents. Factors that were reported as having a positive effect on sugar exports were product design, packaging, labelling and pricing. The manager's willingness to export, level of education and training, length of time in the business, experience and language also emerged as positive influences.

5.3 Conclusion

Based on the findings of this study, it can be concluded that the South African sugar industry has the potential to maintain and even improve its competitive advantage within the TFTA.

5.4 Recommendations

Government intervention is sorely needed for the sugar industry to improve its competitiveness. With the cost of doing business, crime, lack of water, inadequate infrastructure and other factors highlighted as major constraints to sugar production in the study area, it is clear that government assistance could have a very positive impact on the day-to-day operations of sugarcane farmers and thereby on production outputs.

Based on the positive results of the bivariate correlation between sugar production and exports in the period 1996 to 2014, it can be assumed that increased production will lead to an increase in exports which will in turn contribute greatly to South Africa's GDP. Improving productivity through appropriate government interventions can be expected to have a positive impact on sugar exports and South Africa's balance of payments.

Competitive strategies need to be implemented to improve the competitive advantage of the domestic sugar industry. The critical aspects highlighted by the study as having a positive impact on competitiveness should receive special attention in order to sustain and enhance the performance of the industry through innovation.

The state can assist with the provision of institutional support for research and development in the area of sugar production so that the industry can become more competitive in the international market. Investment in the development of technology and scarce skills is a further recommendation for the advancement of the South African sugar industry.

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APPENDIX 1: PRODUCTION SURVEY QUESTIONNAIRE

Crossing: 1 means you agree strongly with the left-hand side

Crossing: 2 means you agree with the left-hand side

Crossing: 3 means you agree somewhat with the left-hand side

Crossing: 4 means your opinion is indifferent/Neutral between the two answers

Crossing: 5 means you agree somewhat with the right-hand side

Crossing: 6 means you agree with the left-hand side

Crossing: 7 means you agree strongly with the right-hand side

A. CHARACTERISTICS AND FARM INFORMATION

(1) Gender:

1. MALE	2. FEMALE

(2) Age:……

18 to 35	
36 to 45	
46 to 55	
56 to 65	
66 to 75	
76 to 85	
86 to 95	
>96	

(3) (i) Educational level:

No formal education	
Primary education	

Secondary education	
Tertiary education	

(ii) Number of years at school…….

(4) Ethnic group:

Black	
White	
Indian	
Coloured	

(5) Marital status:

Single	
Married	
Divorced	
Widow	

(6) Household size: …….

(7) Farm size: ……

Less than 5 hectares	
5 to 10 hectares	
11 to 20 hectares	
21 to 50 hectares	
51 to 100 hectares	
More than 100 hectares	

(8) Type of farming practice:

Commercial	
Subsistence	

(9) Number of permeant workers: ……

(10) Number of temporary workers: ……..

(11) Number of skilled labourers: ……...

(12) Number of Unskilled labours: ……..

(13) General production constraints……..

B. PRODUCTION FACTOR CONDITIONS

(1) The general infrastructure:

Poorly developed & efficient	1	2	3	4	5	6	7	Well developed & efficient

(2) The cost of infrastructure:

Extremely high	1	2	3	4	5	6	7	Very affordable.

(3) The cost of doing business:

Extremely high.	1	2	3	4	5	6	7	Very affordable.

(4) Quality of technology:
(if any):

Generally lags behind most other	1	2	3	4	5	6	7	Is among the world leaders

(5) The cost of quality technology:

Extremely high.	1	2	3	4	5	6	7	Very affordable.

(6) Skilled labour is:

Difficult to obtain	1	2	3	4	5	6	7	Easy to obtain

(7) Unskilled labour is:

Difficult to obtain	1	2	3	4	5	6	7	Easy to obtain

(8) Climate/weather is:

Adverse	1	2	3	4	5	6	7	Favourable

(9) Soils

Weak	1	2	3	4	5	6	7	Favourable

(10) Rainfall

Weak	1	2	3	4	5	6	7	Favourable

(11) Water availability

Weak	1	2	3	4	5	6	7	Favourable

(12) Other production factors that affects competitiveness

C. RELATED AND SUPPORT INDUSTRY

(1) Electricity suppliers:

Constrain to production	1	2	3	4	5	6	7	Not a Constraint

(2) Availability of local suppliers of primary inputs:

Largely non-existing.	1	2	3	4	5	6	7	Numerous and include the most important equipment & services.

(3) The quality of local suppliers of your industry primary inputs is:

Inefficient & have little technological capability	1	2	3	4	5	6	7	Internationally competitive & assist in new product &process development

(4) The sustainability of local suppliers of your industry primary inputs:

Huge problem.	1	2	3	4	5	6	7	No problem at all.

(5) Availability of storage facilities:

Largely non-existing.	1	2	3	4	5	6	7	Numerous & include most important materials, components equipment & services.

(6) The cost of using storage facilities are:

Extremely high.	1	2	3	4	5	6	7	Affordable.

(7) Availability of transport:

Not available	1	2	3	4	5	6	7	Readily available

(8) Obtaining credit is:

Extremely difficult.	1	2	3	4	5	6	7	Easy.

(9) Financial services are generally:

Constraint to competitive success.	1	2	3	4	5	6	7	Enhancement to competitive success.

D. FIRM STRATEGY, STRUCTURE AND RIVALRY

(1) Industry`s expenditure on Research & Development is:

Very low	1	2	3	4	5	6	7	Massive

(2) The information flow from primary suppliers is:

Very poor.	1	2	3	4	5	6	7	Very good.

(3) Others:

E. GOVERNMENT SUPPORT AND POLICIES

(1) South Africa's land reform policy is a:

Constraint to competitive success	1	2	3	4	5	6	7	Opportunity to increase competitive success.

(2) South Africa's labour policy is a:

Constraint to competitive success	1	2	3	4	5	6	7	Enhancement to competitive success.

(3) South Africa's macro-economic policy is a:

Constraint to competitive success	1	2	3	4	5	6	7	Enhancement to competitive success.

(4) South Africa's competition law is a:

Constraint to competitive success	1	2	3	4	5	6	7	Enhancement to competitive success.

(5) South Africa's BEE policy is a:

Constraint to competitive success	1	2	3	4	5	6	7	Enhancement to competitive success.

(6) Regulatory standards (e.g. products standards, energy, safety, & environment) in your opinion are:

Lacks or non-existent.	1	2	3	4	5	6	7	Among the world's most stringent.

(7) Administrative regulations are:

Burdensome.	1	2	3	4	5	6	7	Not burdensome.

(8) The tax system:

Hinders investment & risk taking.	1	2	3	4	5	6	7	Promotes investment & risk taking.

(9) Environmental regulations are:

Not enforced or enforced erratically.	1	2	3	4	5	6	7	Enforced consistently and fairly.

(10) Complying with environmental standards:

Hurts competitiveness.	1	2	3	4	5	6	7	Helps long term competitiveness

(11) Other factors as experienced by your firm:

F. CHANCE FACTORS

(1) Crime:

Imposes significant costs on your company.	1	2	3	4	5	6	7	Does not impose significant costs on your company.

(2) HIV/AIDS:

Imposes significant costs on your company.	1	2	3	4	5	6	7	Does not impose significant costs on your company.

(3) Economic stability in South Africa is a:

Constraint to competitive success.	1	2	3	4	5	6	7	Opportunity to increase company competitive success.

(4) Is the current exchange rate a:

Constraint to competitive success	1	2	3	4	5	6	7	Enhances competitive success.

GENERAL QUESTIONS - IN YOUR OPINION:

(1) What are the main factors that enhance the production performance?

(2) What are the main factors that constrain the production performance?

(3) Who are the most threatening competitors (both international and local)?

(4) Do you think the current strength is sufficient to cope with competition? If not, what can be done?

(5) How does the government influence the production?

(6) What can be done to improve?

END - THANK YOU SO MUCH FOR YOUR TIME

APPENDIX 2: EXPORT SURVEY QUESTIONNAIRE

Crossing: 1 means you agree strongly with the left-hand side

Crossing: 2 means you agree with the left-hand side

Crossing: 3 means you agree somewhat with the left-hand side

Crossing: 4 means your opinion is indifferent between the two answers

Crossing: 5 means you agree somewhat with the right-hand side

Crossing: 6 means you agree with the left-hand side

Crossing: 7 means you agree strongly with the right-hand side

A. EXPORT FACTOR CONDITIONS

(1) Product design:

Improve exports	1	2	3	4	5	6	7	Does not Improve exports

(2) Packaging:

Improve exports	1	2	3	4	5	6	7	Does not improve exports

(3) Labelling has:

Positive effect On export	1	2	3	4	5	6	7	No effect on export

(4) Pricing has:

Positive Influence On exports	1	2	3	4	5	6	7	Have no influence on exports

(5) Promotion:

Improve Exports	1	2	3	4	5	6	7	Does not improve export

(6) Distribution channel:

Improve export performance	1	2	3	4	5	6	7	Does not improve Export performance

(7) Tariffs are:

Major barriers to export	1	2	3	4	5	6	7	Not a major barriers to export

(8) Manager's willingness to export:

Improve export.	1	2	3	4	5	6	7	does not improve export

(9) Socio-cultural specifications of markets are:

Barriers	1	2	3	4	5	6	7	Not barriers

(10) Manager's educational and training level:

Improve export.	1	2	3	4	5	6	7	Does not improve export.

(11) Period of manager in the business:

Improve export	1	2	3	4	5	6	7	Does not improve export

(12) Manager's experience

Improve export	1	2	3	4	5	6	7	Does not improve export

(13) Language is

A Constraint	1	2	3	4	5	6	7	Not a constraint

(14) Transportation, due to infrastructure is

A constraint	1	2	3	4	5	6	7	Not a constraint

(15) Transportation costs is:

Very high	1	2	3	4	5	6	7	affordable

G. DEMAND/MARKET FACTORS

(1) Local market size is in terms of obtaining economy of scale to:

Too small	1	2	3	4	5	6	7	Large enough

(2) Is the growth in the local market?

Too slow for investment in new technology	1	2	3	4	5	6	7	Fast enough for investment in new technology

(3) Internationalization of local buyers:

Behind the rest of the world	1	2	3	4	5	6	7	In pace with the rest of the world

(4) Local buyers are:

Slow to adopt new products, technologies & processes	1	2	3	4	5	6	7	Actively seek out the latest products, technologies & processes

(5) Other demand factors that affects competitiveness

H. RELATED AND SUPPORT INDUSTRY

(1) Scientific research institutions are:

None-existent.	1	2	3	4	5	6	7	The best in their fields.

(2) Your company's collaboration with scientific research institutions in their R&D activity is:

Non-existent.	1	2	3	4	5	6	7	Intensive and ongoing.

(3) Electricity suppliers:

Constraints competitiveness	1	2	3	4	5	6	7	Enhancement the competitiveness

(4) Telecommunication firms are:

Constraint of competitiveness	1	2	3	4	5	6	7	Enhancement of competitiveness

(5) Availability of local suppliers of primary inputs:

Largely non-existing.	1	2	3	4	5	6	7	Numerous and include the most Important equipment & services.

(6) The quality of local suppliers of your industry primary inputs is:

Inefficient & have little technological capability	1	2	3	4	5	6	7	Internationally competitive & assist in new product &process development

(7) The sustainability of local suppliers of your industry primary inputs:

Huge problem.	1	2	3	4	5	6	7	No problem at all.

(8) Availability of storage facilities:

Largely non-existing.	1	2	3	4	5	6	7	Numerous & include most important materials, components equipment & services.

(9) The cost of using storage facilities are:

Extremely high.	1	2	3	4	5	6	7	Affordable.

(10) Availability of transport:

Not available	1	2	3	4	5	6	7	Readily available

(11) Obtaining credit is:

Extremely difficult.	1	2	3	4	5	6	7	Easy.

(12) Financial services are generally:

Constraint to company's competitive success.	1	2	3	4	5	6	7	Enhancement to company competitive success.

I. FIRM STRATEGY, STRUCTURE AND RIVALRY

(1) Industry`s expenditure on Research & Development is:

Very low	1	2	3	4	5	6	7	Massive

(2) The information flow from primary suppliers is:

Very poor.	1	2	3	4	5	6	7	Very good.

(3) The flow of information from customers to your company is:

Very poor.	1	2	3	4	5	6	7	Very good.

(4) Competition in the local market is:

Very limited.	1	2	3	4	5	6	7	Very intense.

(5) Entry of new competitors:

Almost never occurs in the local market.	1	2	3	4	5	6	7	Is common in the local market.

(6) Competition in international market is:

Very limited.	1	2	3	4	5	6	7	Very intense.

(7) Others:

J. GOVERNMENT SUPPORT AND POLICIES

(1) South Africa's trade policy is a:

Constraint to company competitive success	1	2	3	4	5	6	7	Enhancement to company competitive success.

(2) South Africa's land reform policy is a:

Constraint to company competitive success	1	2	3	4	5	6	7	Opportunity to increase company company competitive success.

(3) South Africa's labour policy is a:

Constraint to company competitive success	1	2	3	4	5	6	7	Enhancement to company competitive success.

(4) South Africa's macro-economic policy is a:

Constraint to company	1	2	3	4	5	6	7	Enhancement to company

competitive success | competitive success.

(5) South Africa's competition law is a:

Constraint to company competitive success	1	2	3	4	5	6	7	Enhancement to company competitive success.

(6) South Africa's BEE policy is a:

Constraint to company competitive success	1	2	3	4	5	6	7	Enhancement to company competitive success.

(7) Regulatory standards (e.g. products standards, energy, safety, & environment) in your opinion are:

Lacks or non-existent.	1	2	3	4	5	6	7	Among the world's most stringent.

(8) Administrative regulations are:

Burdensome.	1	2	3	4	5	6	7	Not burdensome.

(9) The tax system:

Hinders investment & risk taking.	1	2	3	4	5	6	7	Promotes investment & risk taking.

(10) Environmental regulations are:

Not enforced or enforced erratically.	1	2	3	4	5	6	7	Enforced consistently and fairly.

(11) Complying with environmental standards:

Hurts competitiveness.	1	2	3	4	5	6	7	Helps long term competitiveness

(12) Other factors as experienced by your firm:

K. CHANCE FACTORS

(1) Crime:

Imposes significant costs on your company.	1	2	3	4	5	6	7	Does not impose significant costs on your company.

(2) HIV/AIDS:

Imposes significant costs on your company.	1	2	3	4	5	6	7	Does not impose significant costs on your company.

(3) Economic stability in South Africa is a:

Constraint to company competitive success.	1	2	3	4	5	6	7	Opportunity to increase company competitive success.

(4) Is the current exchange rate a:

Constraint to company competitive success	1	2	3	4	5	6	7	Enhances company competitive success.

GENERAL QUESTIONS - IN YOUR OPINION:

(1) What are the main factors that enhance export performance?

(2) What are the main factors that constrain the export performance?

(3) Who are the most threatening competitors (both international and local)?

(4) Do you think the current strength is sufficient to cope with competition? If not, what can be done?

(5) How does the government influence the exports?

END - THANK YOU SO MUCH FOR YOUR TIME