An analysis of the competitive performance of the South African citrus industry.

by

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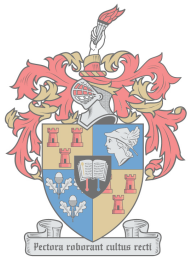

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Declaration

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Abstract

The main objective of this research was to measure and analyse the competitive performance of the South African citrus industry. With this purpose in mind, a five-step analytical framework used in competitiveness studies by Ismea (1999),Esterhuizen (2006), Van Rooyen, Esterhuizen and Stroebel (2011), Jafta (2014), Boonzaaier (2015), Angala (2015), and Boonzaaier and Van Rooyen (2017) was adapted and modified to meet the requirements of this study and to accommodate the available database.

The first step in the applied analytical framework deals with defining the term "competitiveness" in the context of the South African citrus industry. Consequently, having reviewed the relevant literature and situating the South African citrus industry, in particularly as it is as highly integrated into global trade, competitiveness in this study is defined as:

'the ability of the local citrus industry to produce and trade citrus fruit on a maintainable basis, in the global markets given the current economic structures and trade regimes, whilst earning returns that are equal or greater than the opportunity cost of scarce resources engaged'.

The second step deals with measuring the competitive performance of this industry over time and based on trade performance as per the definition; and comparing such performance with that of its major direct competitors. In order to do this, internationally recognised technique was considered reflecting comparative and competitive advantages, giving preference to measuring competitive advantage through Relative Trade Advantage (RTA) (Vollrath, 1991). Secondary trade data obtained from two data sources, namely the Food and Agriculture Organization (FAO) for the period 1961 to 2013 and the International Trade Centre (ITC) for the period of 2001 to 2016, was used for these measurements.

Results from the analysis of both datasets (i.e. FAO and ITC) showed that SA had positive figures throughout the period and has maintained such positive figures since the early 1960s (RTA of 4.6 in 1961(FAO); increasing to a RTA of 15.2 in 2005(ITC); and showing a gradually increasing trend over recent years (with a RTA of 18.6 in 2016, ITC data).

From a global comparison perspective (using ITC data), SA - with RTA of 18.6 - is the most globally competitive when compared to Southern Hemisphere-producing regions, which enjoy similar production seasons. When compared to the Northern Hemisphere producing regions – which enjoy counter-seasonal production – SA is outperformed by Egypt (RTA of 30.2) and Morocco (RTA of 18.8). In the analysis of individual citrus fruits, they all showed positive figures throughout the studied years, with oranges (RTA 27.6) being the most competitive citrus fruit type, followed by grapefruits (RTA 26.8), lemon & limes (RTA 16.3) and soft citrus (RTA 9.6) in 2016. In value-adding activities there was an observable decline in the competitive performance as one moves down the value chain for citrus juice (RTA 2.38) and orange juice

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(RTA 3.9), whereas the grapefruit chain showed increased competitive performance, with grapefruit juice recording maximum RTA values of 30.34 in 2016.

Step three involved determining the factors that influence (positively or negatively) the competitiveness status of the local citrus industry. With the view of accommodating a smaller database, the conventional framework was adapted with a two-round Delphi technique. In the first round, experts were served with a questionnaire (the citrus industry survey), developed and tested through interaction with the Citrus Growers Association and designed in the form of the Porter Competitive Diamond model, to rate the impact of factors using a Likert scale (with 1 – constraining; 3 – neutral; and 5 – enhancing). A total of 101 factors were identified, listed and rated in the citrus industry survey, of which 94 were found to be affecting the competitive success of the industry. The enhancing factors included factors such as economies of scale and availability of competitive local input suppliers, whilst constraining factors included opportunism in trade and quality of unskilled labour.

The fourth step grouped these factors into the six Porter competitive diamond determinants. Principal component analysis (PCA) was undertaken to pinpoint differences and consensus in the views of experts with regard to the current impact of factors identified for each determinant. The results reveal that there was consensus (similarity) in opinions with regard to 29 factors influencing the industry's competitive performance. These correlated factors (consensus factors) were further subjected to Cronbach's alpha analysis to assess their levels of internal reliability. The results show that there was no internal reliability in five of the factors and they were consequently removed, leaving 24 final factors. These 24 final factors were then subjected to the round two Delphi analysis. In this round, experts were asked to rate and discuss the relevance of these factors as determinants of competitiveness. The results reveal that most of these final factors, such as market development, infrastructure improvements, trade policy, labour policy and administrative regulations (red tape), are relevant to the future competitive success of this industry.

The final step (Step 5), derived from the findings and analysis in step 4, involved proposing industry-wide strategies to enhance the industry's global competitive performance. Based on the X-Y scatterplot of impact rating (Round 1) and relevance rating (Round 2), critical factors were identified that aided the formulation of strategies. The most important proposed strategies include effective marketing of citrus fruits domestically; development of foreign markets, improved logistics and distribution infrastructure; continued engagement with government regarding key industry issues (e.g. labour policy, trade policy, development of new markets, etc.).

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Opsomming

Die vernaamste doelwit van hierdie navorsing was om die mededingendheid van die Suid-Afrikaanse sitrusbedryf te meet en te ontleed. Met hierdie doel is ’n vyf-stap analitiese raamwerk, gebruik in studies soos die van ISMEA (1999), Esterhuizen (2006), Van Rooyen, Esterhuizen en Stroebel (2011), Jafta (2014), Boonzaaier (2015), Angala (2015) en Boonzaaier en Van Rooyen (2017), aangepas om aan die vereistes van hierdie studie te voldoen en die beskikbare databasis te akkommodeer.

Die eerste stap in die konvensionele raamwerk het te doen met die definiëring van die term “mededingendheid” in die konteks van die spesifieke bedryf. Ná ’n hersiening van die relevante literatuur en met inagneming dat die Suid Afrikaanse sitrus bedryf besonder suksesvol is in die internasionale handelsomgewing, is mededingendheid gevolglik vir hierdie studie gedefinieer as:

“die vermoë van die plaaslike sitrusbedryf om sitrusvrugte op ’n volhoubare basis, in globale markte te produseer en mee handel te dryf, gegewe die huidige ekonomiese strukture en handelstelsel, en om terselfdertyd opbrengste te verdien wat groter is as of gelyk is aan die geleentheidskoste van die skaars hulpbronne wat gebruik word”.

Die tweede stap in die studie het te doen met die meting van die mededingende prestasie van hierdie bedryf oor tyd en die vergelyking van hierdie prestasie met dié van sy vernaamste mededingers. Om dit te kan doen, is die internasionaal erkende tegniek wat vergelykende en mededingende voordele weerspieël, oorweeg naamlik die Relatiewe Handelsvoordeel (RTA) (Vollrath, 1991). In hierdie meting is sekondêre handelsdata vanaf twee bronne verkry en gebruik, naamlik die *Food and Agriculture Organization* (FAO) vir die tydperk vanaf 1961 tot 2013 en die *International Trade Centre* (ITC) vir die tydperk vanaf 2001 tot 2016.

Die resultate van die analise van beide datastelle (m.a.w. FAO en ITC) toon dat die bedryf deur al die studiejare positiewe syfers getoon het en dat hierdie positiewe syfers sedert die vroeë 1960’s volhou is (RTA van 4.6 in 1961-FAO, wat toegeneem het tot ’n RTA of 15.2 in 2005-ITC data) en in onlangse jare ’n geleidelik toenemende tendens getoon het (met ’n RTA van 18.6 in 2016).

Vanuit ’n globaal vergelykende perspektief is die bedryf (gebruik van ITC data), met ’n RTA van 18.6 in 2016, die globaal mees kompeterend wanneer dit vergelyk word met produksiegebiede in die Suidelike Halfrond, wat eenderse produksieseisoene het. Wanneer dit met produksiegebiede in die Noordelike Halfrond vergelyk word – wat teen-seisoenale produksieseisoene het – lê dit slegs agter Egipte (RTA van 30.2) en Marokko (RTA van 18.8). Analise van individuele sitrusvrugte het almal positiewe waardes oor die bestudeerde jare getoon, met lemoene (RTA 27.6) wat die mees mededingende sitrusvrug is, gevolg deur pomelo (RTA 26.8), suurlemoen en lemmetjies (RTA 16.3) en sagte sitrus (RTA 9.6) in 2016. M.b.t. waarde-toevoegende aktiwiteite was daar ’n waarneembare afname in mededingende prestasie laer af in die waardeketting vir sitrussap (RTA 2.38) en lemoensap (RTA 3.9), terwyl die pomelo-

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ketting toenemende mededingende prestasie getoon het, met pomelosap wat ’n RTA-waarde van 30.34 in 2016 gelewer het.

Stap drie het die bepaling van die faktore wat die mededingendheidstatus van die plaaslike sitrusbedryf beïnvloed (hetsy positief of negatief). In ’n poging om ’n kleiner databasis te akkommodeer, is die konvensionele raamwerk aangepas met ’n Delphi-tegniek van twee rondtes. In die eerste rondte is kundiges ’n vraelys gegee (die sitrusbedryfsoponame) wat ontwikkel en getoets is deur interaksie met die Sitruskwekersvereniging en ontwerp is in die vorm van ’n Porter mededingende diamantmodel om die impak van die faktore te skat m.b.v. ’n Likert-skaal (met 1 – beperkend; 3 – neutraal; en 5 – verbeterend). ’n Totaal van 101 faktore is geïdentifiseer, gelys en in die sitrusbedryfsopname gegradeer, waarvan 94 gevind is om die mededingendheidsukses van die bedryf te beïnvloed. Die verbeterende faktore het faktore ingesluit soos ekonomieë van skaal en beskikbaarheid van plaaslike insetverskaffers, terwyl beperkende faktore handelsopportunisme en gehalte van ongeskoolde arbeid ingesluit het.

Die vierde stap het die Porter diamantmodel gebruik om hierdie faktore in ses Porter mededingendheidsdiamant-determinante te groepeer. Hoofkomponent-analise (PCA) is onderneem om die verskille en konsensus in die sienings van die kundiges te bepaal m.b.t. die huidige impak van die faktore wat vir elke determinant geïdentifiseer is. Die resultate toon dat konsensus (eendersheid) in opinies was m.b.t. die 29 faktore wat die bedryf se mededingende prestasie beïnvloed. Hierdie gekorreleerde faktore (konsensusfaktore) is verder onderwerp aan Cronbach se alfa-analise om hulle vlak van interne betroubaarheid te assesseer. Die resultate toon dat daar geen interne betroubaarheid in vyf van die faktore was nie en hulle is gevolglik verwyder, wat 24 faktore gelos het. Hierdie finale 24 faktore is teruggestuur aan die kundiges vir die tweede ronde van die Delphi-analise. In hierdie rondte is die kundiges gevra om die relevansie van hierdie faktore as determinante van mededingendheid te gradeer. Die resultate toon dat die meerderheid van hierdie finale faktore, soos mark ontwikkeling, infrastruktuur verbetering en arbeidsbeleid en administratiewe regulasies, relevant was vir die toekomstige mededingende sukses van hierdie bedryf.

Die finale stap het die voorstel van bedryfswye strategieë behels om die bedryf se globale mededingendheid te verhoog. Op grond van die X-Y spreidiagram (*scatterplot*) van impakbeoordeling (Delfi rondte 1) en relevansiebeoordeling (Delfi rondte 2), is kritiese faktore geïdentifiseer wat gehelp het met die formulering van strategieë. Die voorgestelde strategieë sluit die volgende in: doeltreffende plaaslike bemarking van sitrusvrugte; bevordering van verbeterde logistieke en verspreidingsinfrastruktuur; en voortgesette betrokkenheid by die regering m.b.t. sleutel bedryfskwessies (bv. Infrastruktuur ontwikkeling, arbeidsbeleid, handelsbeleid, ontwikkeling van nuwe markte, ens.)

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Dedication

This work is dedicated to GOD ALMIGHTY (my source of inspiration); my family, and to my future wife, children and offspring – 'only for whom I have gone this far.'

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Acronyms

AGOA – African Growth and Opportunity Act

ARC – Agricultural Research Council

BFAP – Bureau for Food and Agricultural Policy

CA – Citrus Academy

CBS- – Citrus black spot

CES – Citrus Expert Survey

CGA – Citrus Growers' Association

CRI – Citrus Research International

CRW – Citrus Resource Warehouse

DAFF – Department of Agriculture, Food and Fisheries

DRC – Domestic resource cost ratio

EMS – Export market share

EPA – Economic Partnership Agreement

EU – European Union

FAO – Food and Agriculture Organization

FPEF – Fresh Produce Exporters Forum

GATT – General Agreement on Trade and Tariffs

GDP – Gross domestic product

HO – Heckscher-Ohlin

HS – Harmonised system

ITC – International Trade Centre

MAP – Marketing of Agricultural Products Act

NAMC – National Agricultural Marketing Council

NDP – National Development Plan

NSP – Net social profitability

NXi – Net Export Index

OECD – Organisation for Economic Co-operation and Development

PAM – Policy analysis matrix

PPECB – Perishable Products Export Control Board

RCA – Revealed comparative advantage

RCR – Resource cost ratio

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RMA – Relative import advantage

RTA – Relative trade advantage

RXA – Relative export advantage

SA – South Africa

SADC – Southern African Development Community

SH – Southern Hemisphere

SPS – Sanitary and phytosanitary

TDI – Trade Performance Index

UK – United Kingdom

USA – United States of America

USDA – United States Department of Agriculture

WEF – World Economic Forum

WTO – World Trade Organization

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Chapter 1: Introduction

1.1. Background

The South African citrus industry has a history dating back to the 1600s, when the first citrus fruit trees were planted in the Cape region. It has since experienced some growth, with the first citrus traded in the early 19th century, when three thousand boxes were exported (Furmarn, 2015). In the late 1940s, the South African Citrus industry was controlled by the then minister of agriculture together with a range of acts and regulations which determined production quantities, qualities and exports via a single statutory body named "Outspan" (Furmarn, 2015). The citrus industry, as many agricultural sectors in the early 1990s were still highly controlled by the former government (via marketing boards, such as the Citrus Control Board in the case of citrus), and producers had no freedom with regard to promoting their produce in the export channels. Nevertheless, this all changed in 1997, when the South African agricultural sector undertook a series of structural and policy changes. One of the standout policy changes was the implementation of the Marketing of Agricultural Products Act (MAP), No. 47 of 1996, which came into effect at the beginning of 1997, replacing the old Marketing Act of 1968 (Sandrey & Vink, 2008). The key objectives for this MAP Act was, amongst other things, to promote market deregulation and to promote transformation within the agricultural sector (Nyhodo & Burger, 2015). The application of this Act signalled the end of the single channel agricultural export marketing schemes and measures (government-directed producers) that had been introduced in terms of the 1968 Act. These regulation changes obligated producers and enterprises in the value chain to structure themselves as business-driven players, working in a less regulated and highly competitive trading environment (Van Rooyen *et al*., 1999). One of the beneficiaries of that policy change was the South African citrus industry.

After the deregulation, competition in the fruit export industry increased as hundreds of marketing agents and marketers entered the sector. The result was a huge drop in price and in the quality brought to an international market characterised by a growing demand for new products (Vink, 2004). The fruit industry has since revealed great refinements in terms of the development of new strategies and innovative systems with regard to supplying foreign markets. To date, the fruit industry has grown to be the largest contributor, by value, to local agricultural exports. The fruit industry is also an important foreign currency absorber, with about 90% of the revenue derived from fruit earnings originating from foreign exchange, and with a total export value of R22 billion (Uys, 2016). The citrus industry contributes approximately R6.8 billion to this total fruit export value, employs more than 74 000 permanent workers (this number increases as you move along the value chain) and contributes approximately 27% of the total agricultural exports (CGA, 2016b; Uys, 2016). Driving the success and development of the citrus sector is the Citrus Growers' Association (CGA), which protects the interests of stakeholders (growers) among exporters, suppliers, research institutions and government. The CGA was formed with the vision of gaining, retaining and optimising markets. That vision now has further expanded into keeping the citrus

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growers and other stakeholders well informed on matters that may affect their business. In the 21st century, the local citrus industry has been, since 2004, the second largest supplier of fresh citrus in foreign markets (behind Spain), even though the country is not amongst the top ten largest producers of fresh citrus (Chadwick, 2008). The industry supplies numerous varieties of citrus, such as soft citrus, lemons, limes, orange and grapefruit. The industry harvests more than two million tonnes of fresh citrus each year, of which about 70% is traded in foreign markets, 24% is supplied to the domestic market and the outstanding quantities are sold to processing industries (CGA, 2016a).

As one of the leading citrus-exporting countries, South Africa, through its citrus industry, can be seen as an avenue which can be used towards the achievement of Vision 2030 of the National Development Plan (NDP), the aim of which is to grow the local gross domestic product at an annual growth rate of 5.4% and to add a further 1 million jobs direct jobs in the agricultural and agro-processing sectors. Also, the agricultural sector has recently enjoyed attention from the Department of Planning Monitoring and Evaluation through the launch of Operation Phakisa. However, with the global markets gradually undergoing significant changes, such as the political changes in the United Kingdom (UK), facing Brexit, and the proposed potential "closed economy" in the USA market, it is necessary for the industry to continuously reassess its citrus competitiveness status in markets outside the country (since the industry is export orientated). Furthermore, according to Edmonds (2016), the rising costs of production and the international demand for food are placing many food industries, including the citrus industry, under continued pressure to be more competitive not only in local markets, but also in international markets.

Given the previous, re-assessing the South African citrus industry's competitiveness is useful for informing all relevant role players "government and policymakers, value chain players, industry bodies and producers" in terms of re-positioning strategies that can assist the industry to skilfully absorb the continuing changes in foreign markets and thus preserve its already recognised status as one of leading global suppliers of fresh citrus. This study will focus on describing and analysing competitive performance of the South African citrus industry.

1.2. Problem statement

Modern-day agriculture sector is exposed to an increasingly globalised society and, for producers, staying competitive in the global market has become extremely important. This rings particularly true in export-orientated industries such as the South African fruit industry (Bureau for Food and Agricultural Policy [BFAP], 2016). The increased world trade also increases the level of competition faced by local producers or service providers in global markets. It is reasons like these that have made the matter of competitiveness vital for export-orientated agricultural industries such as the citrus industry. According to O'Rourke (2011), these industries cannot maintain their financial relevancy and development without harvesting and promoting competitive products. In the words of Van Rooyen, Esterhuizen and Stroebel (2011), remaining competitive is essential for the future growth of the agricultural industries. This means

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that firms or producers in the value chain have to place themselves in a position where they can be competitive in the global markets. The competitive strength of a particular industry is affected by various forms of restrictions, policies and trade negotiations between countries (Jafta, 2014). At farm level, producers are faced with uncertain weather conditions, particularly the recent drought that has hit certain citrus-producing provinces hard, rising input costs, water restrictions, changing technology, and rising labour costs, etc. Others in the value chain have to contend with the stringent administrative and compliance regulations related to safety, ethical, environmental and financial requirements, increasing transportation costs (i.e. shipping), packaging and labelling regulations, etc. On the demand side, consumers are also concerned about food safety standards and health (in reference to citrus black spot), and this requires an active, efficient, competitive and sustainable economy. These conditions raise questions about the trends and status of competitive performance of the South African citrus industry in global markets.

Ndou (2012) attempted to ascertain the performance of the local citrus industry by analysing the competitiveness of the industry amidst the changes in the global business environment (period from 1987 to 2009) using the Constant Market Share Model and Porter diamond. Her analysis was incomplete from a competitiveness performance viewpoint: there was no analysis at the economy level, no comparison with major competitors, and the internationally recognised techniques that measure competitiveness, such as revealed comparative advantage (RCA), relative trade advantage (RTA), policy analysis matrix (PAM), *inter alia*, were not taken into account in their own right as measurements used to evaluate competitive advantage. The focus was rather on marketing and market shares disregarding other factors impacting on competitiveness such as natural endowments, industry structure and rivalry, production factors, government policies to mention some(Esterhuizen, 2006). Competitiveness analysis, to accommodate all these variables and factors, require a comprehensive view, relating many factors in the production, marketing, firm structure and strategy, support industry, policy and industry environment (Porter, 1990;98). It must also be emphasised that no single method can be viewed as the appropriate pointer of competitiveness performance (Ismea, 1999; Fertő & Hubbard, 2002; Van Rooyen, Esterhuizen and Stroebel, 2011; Jafta, 2014; Angala, 2015; Boonzaaier 2015). The chosen method used to analyse comparative and competitive advantage should firstly be directed by a particular “point of entrance” and related definition and problems of competitiveness that are the chosen focus of the analysis.

Recently, Sinngu (2014) carried out a study analysing the competitive performance of the SA citrus industry in relation to its southern hemisphere counterparts. However, this study only focused on the competition with southern hemisphere producers, without analysing the competition with the rest of the world. In addition, no definition of the term “competitiveness” was given as it applies in the context of the citrus industry; there was also no analysis of the industry as a whole – the analysis focused only on citrus fruits individually. Therefore there is a need for a more comprehensive analysis of competitiveness

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of the South African citrus industry in its global context, than that of Ndou (2012) and Sinngu (2014). That is, there is a need to determine the citrus industry's competitiveness in a comprehensive manner, as was attempted by ISMEA (1999), Esterhuizen (2006), Van Rooyen, Esterhuizen & Stroebel (2011), Jafta (2014), Angala (2015) and Boonzaaier (2015) for other agricultural commodities. Such a comprehensive determination will be used as baseline and intelligence for strategic planning. With that said, the measurements of Ndou (2012) and Sinngu (2014) are highly respected, and were incorporated into this research, but only as components of the more comprehensive approach proposed.

Therefore, the problem statement directing this study revolves around developing and applying a framework for a comprehensive statement on the competitive performance of the South African citrus industry as an important player in the global marketplace; and this to be attended to in terms of: defining competitiveness; measuring, identifying and analysing the factors influencing the competitive performance of the industry; and proposing new strategies that can be used by the industry to improve its level of competitiveness.

1.3. Main objective

The primary goal of this research was to measure and analyse the competitiveness of the South African citrus industry in context of its global environment.

1.3.1. Sub-objectives

The sub-objectives of this study can be broken down into the following elements:

- Define competitiveness in the context of the citrus industry.
- Measure the competitiveness performance of the industry over time and compare this with its major global competitors.
- Determine the factors that influence the competitiveness of the industry.
- Analyse such factors in order to establish major determinants that affect (positively or negatively) the competitiveness of the industry in question.
- Propose possible strategies and institutional incentives that could increase the industry's competitiveness level globally.

1.3.2. Research questions

- How can "competitiveness" be defined in the context of the SA citrus industry?
- How competitive has this industry been over time?
- How can such factors be analysed, that is, what framework of analysis will apply?
- What are the factors that drive the competitiveness of this industry?
- How can the industry improve its competitiveness over time?

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1.3.3. Hypothesis

- The South African citrus industry has performed competitively in the global markets over time, in a sustainable manner, with noticeable improvement after the deregulation period.
- A range of factors, such as cost of doing business, financial support systems, quality of technology, skilled labour, the international value of the Rand, government policies and supporting institutions determine the competitiveness of the industry, i.e. competitiveness is determined by a multiplicity of factors.

1.4. Analytical framework and research methodology

To achieve the overall objective, this study encompassed both quantitative and qualitative approaches to measure the competitive advantage, to determine the key constraints to and enhancements of the competitiveness of the citrus industry. This study adapted a "five step" analytical framework, which has been popularised by several scholars, most notably ISMEA (1999), Van Rooyen *et al.* (1999; 2011), Esterhuizen and Van Rooyen (2006), Jafta (2014), Boonzaaier (2015) and Angala (2015), in their quest to measure competitiveness in different agricultural industries. This study, however, will extend the conventional framework by utilising a technique named Delphi analysis to accommodate the available data sample (this analytical framework is explained in depth in chapter 4).

Step 1: Define competitiveness as it applies to the SA citrus industry.
Step 2: Assess the competitive performance of the industry over time.
Step 3: Identify the major factors that drive the competitiveness status of the industry.
Step 4: Establish and analyse the determinants of competitiveness in the South African citrus industry.
Step 5: Propose industry-level strategies that can enhance competitiveness performance of this industry.

1.5. Justification of the study

The citrus industry is export driven and is affected by globalisation and trade liberalisation between nations. Thus, there is a need to constantly evaluate and/or measure and understand the factors that enhance or constrain the competitiveness status of the citrus industry, in order to provide trade based strategies that will be crucial for the long-term competitiveness of the industry.

1.6. Data collection

This research used both primary and secondary data. Firstly, for the measurement of competitive advantage, this study made use of secondary trade data collected from the Food and Agriculture Organization (FAO) (period from 1961 to 2013) and the International Trade Centre (ITC) (period from 2001 to 2016. In the study preference for one of these data sets—ITC- will be argued. Other information regarding the history, location of producers, previous statistics, contribution of the industry to GDP, job

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creation, etc. was obtained from annual reports from the CGA, StatsSA, Quantac, etc., as well as from articles and research publications.

Using a two-round Delphi technique, this study collected primary data on views regarding factors enhancing and constraining competitiveness, through questionnaires that were issued to selected experts in the citrus value chain. The questionnaire was formulated and tested - in collaboration with the Citrus Growers Association executive - according to the Porter Competitive Diamond model, where the factors were grouped into six determinants namely production factors; demand factors; related and supporting industries; firm strategy, structure and rivalry; government support and policies; and chance factors.

1.7. Delimitations

This study aimed at analysing the competitiveness performance of the South African citrus industry. The analysis was done on the industry and global level, and not at government policy nor firm or enterprise levels, i.e. firm-level strategy development. This study furthermore did not attempt to predict the future of the industry; rather, it suggests certain industry-level strategies based on the findings obtained from analysing and interpreting factors influencing recent historical performances – "the historical future" in order to plan for the future.

1.8. Outline of the study

The thesis is organised into six chapters. The first chapter has presented an introduction to the main drive of the study: a problem statement; the research objectives and questions; the hypotheses of the study; and its delimitations. The next chapter provides a descriptive overview of the South African citrus industry, with special attention also given to its global competitors' performance. It deals with the key industry statistics (production, export performance, market shares, etc.), industry structure and value chain, and its contribution to the country's gross domestic product.

The third chapter reviews the relevant literature on the evolution of classical trade theories and their relevance to the South African citrus industry. This chapter also establishes a definition of competitiveness in the context of SA citrus industry; evaluates the various techniques used to measure competitiveness; and reviews previous studies conducted in the area of competitiveness. Chapter four presents the analytical framework, and outlines the methodologies and data that were used. Chapter five delivers a description and interpretation of the research findings and results. The last chapter provides conclusions, a summary of key findings, and provides strategies on how the industry can enhance its competitive performance industry.

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Chapter 2: Overview of the South African citrus industry

2.1. Introduction

The main aim of this chapter is to give a brief description of the South African citrus industry. While the primary focus of this chapter is on the performance of the South African citrus industry, it is fitting to consider the global context and competitors' performance, particularly in markets where they present a direct threat to the SA citrus industry's interests. The focus is on the description of the citrus industry in terms of production trends, export performance, market share, major importers and exporters. This section starts by giving a global overview, followed by the South African overview.

2.2. Global production

Figure 2.1 below shows global production estimates and area harvested for citrus over a period of twelve years. Globally, annual production of all types of citrus fruit stood at over 140 million tons in 2014. According to FAO (2015) this represents an increase of more than 50% than was produced during the late 1980's and early 1990's. Around 60% of all citrus production is oranges and 23% tangerines, mandarins, and clementines. Around 13.7 million tons of lemon and limes and 4.4 million tons of grapefruit and pomelos are also produced. Brazil produces a quarter of the world's citrus, 75% of which is processed for juice. China and the USA are also significant producers at 17.6 and 11 million tons respectively, (FAO, 2015). In the Mediterranean region (including countries such as Spain, Turkey, Italy, and Egypt), around 22 million tons of citrus is produced, mainly for fresh fruit consumption.

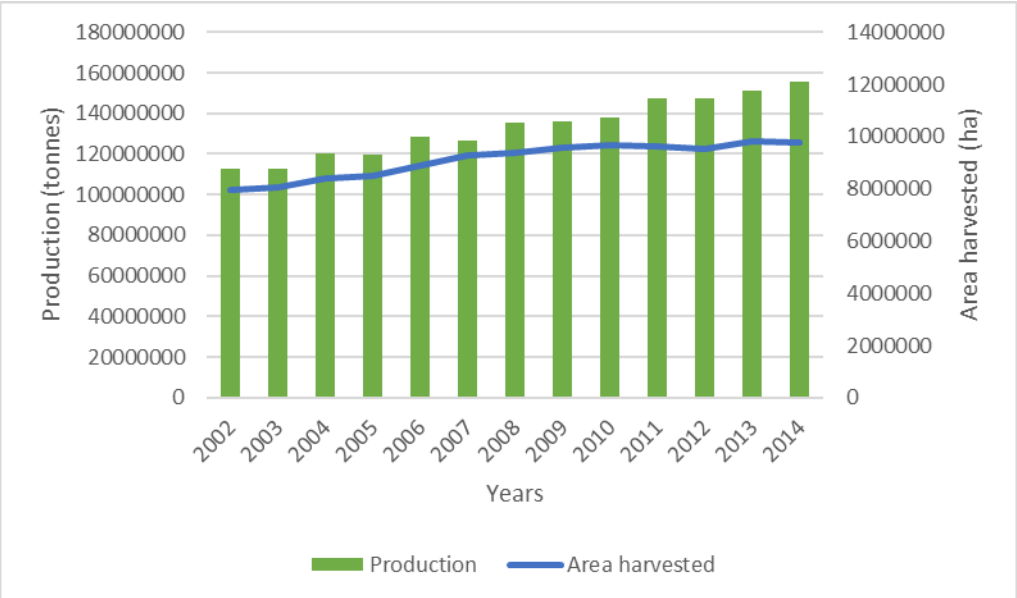

Figure 2.1: Global citrus production and area harvested
Source: Own calculation based on FAO data (2015)

Over the selected period, citrus production had an annual growth rate of 2.74. The harvested area has been increasing slightly from 2002 until 2012, when there was a slight decrease of 1%.

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2.3. Production of citrus per hemisphere

An updated and more historical picture of the production of citrus, firstly in the Northern Hemisphere and secondly in the Southern Hemisphere for the period 2007 to 2016, is presented in Table 2.1. The top part of the table shows the quantities of citrus production by the Northern Hemisphere. It is evident that the Northern Hemisphere dominates the production of all citrus fruit varieties. From this hemisphere, production quantities of oranges, tangerine and mandarin, lemon and limes, and grapefruit during the 2013/14 season were 1.02, 1.39, 1.12 and 1.18 more respectively when compared to the production quantities in the 2007/08 season. Tangerines and mandarins experienced the highest five-year (2009 to 2013) growth rate, with growth of 3.44, followed by grapefruit, with a growth figure of 3.12. Spain dominates in the production of lemon and limes in this hemisphere, while China dominates the production of oranges and grapefruit.

Table 2.1: Global citrus production by hemispheres (000 tonnes)

	2007/08	**2008/09**	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**
Northern Hemisphere									
Oranges	45 921.6	46 635.9	46 970.9	45 840.7	45 911.5	46 101.0	46 996.2	*46 44.5*	*47 242.3*
Tangerine	20 910.2	22 708.4	24 454.5	24 264.7	26 469.1	27 270.9	28 961.9	*35 911.7*	*30 609.4*
Lemon lime	9 400.7	9 942.2	10 001.8	9 972.5	9 996.7	9 771.5	10 490.3	*11 929.5*	*12 365.6*
Grapefruit	5 809.7	5 747.9	5 900.8	5 976.2	6 353.9	6 526.9	6 880.4	*7 774.8*	*7 631.6*
Southern Hemisphere									
Oranges	21 996.9	22 600.1	23 375.5	24 752.1	23 953.9	21 093.7	21 929.0	*22 157.2*	*19 731.9*
Tangerine	2 104.7	2 200	2 270.4	2 247.6	2 110.5	2 130	2 242.0	*2 394.0*	*2 359.1*
Lemon lime	3 119.6	2 982.6	2 755.1	3 441.8	3 306.8	3 171.9	2 862.0	*3 561.1*	*3616.2*
Grapefruit	785.1	771	681.6	804.3	679.9	707	745	*775.3*	*690.0*

Source: Own calculations based on FAO data (2016)

In the second block, production quantities in the Southern Hemisphere are shown. Brazil dominates the production of oranges in this hemisphere, with a share of 77% during the 2013/14 season. Brazil also dominates the world production of oranges, with a share of 35.8% during the 2015 season, and about two thirds of that production was used for processing while the rest was used for consumption. The USDA (2017) estimates that Brazil orange production will drop by around 2.4 million tonnes due to relatively high temperatures. According to the US International Trade Commission (2012) Brazil's low-cost resource base, as well as plentiful natural resources (i.e. water and land) and favourable weather conditions, enables the production of high-yielding crops across a wide range of agricultural products, including

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production of citrus fruit. Furthermore, state-funded agricultural research has developed crop varieties that flourish in the acidic soils of the country (US International Trade Commission 2012). The production of tangerines and mandarins during the 2013/14 season was 1.07 more than in the 2007/08 season. The rest of the citrus fruit were closely grouped, with increases below one.

2.4. Global citrus trade performance

World exports during the 2015 season amounted to close to $12.5 million, and this represents a decrease of 4% when compared to the export value in 2014 (see figure 2.2). Over the course of the years shown in the figure, the global export value of citrus showed positive annual growth of more than 6%. Spain, China, South Africa, the USA and Turkey are the top five exporting countries of citrus in terms of value, with a share of 28.8%, 10.1%, 8.3%, 8% and 6.6% respectively, in the world export market. Amongst the top five exporting countries, China and South Africa had the highest annual growth by value between the 2011 and 2015, with annual growth of 14% and 4% respectively. The USA and Turkey, on the other hand, had negative annual growth in value during the same period. Morocco, with a share of 2.9%, and Chile, with a share of 2%, complete the list of the top ten exporting countries.

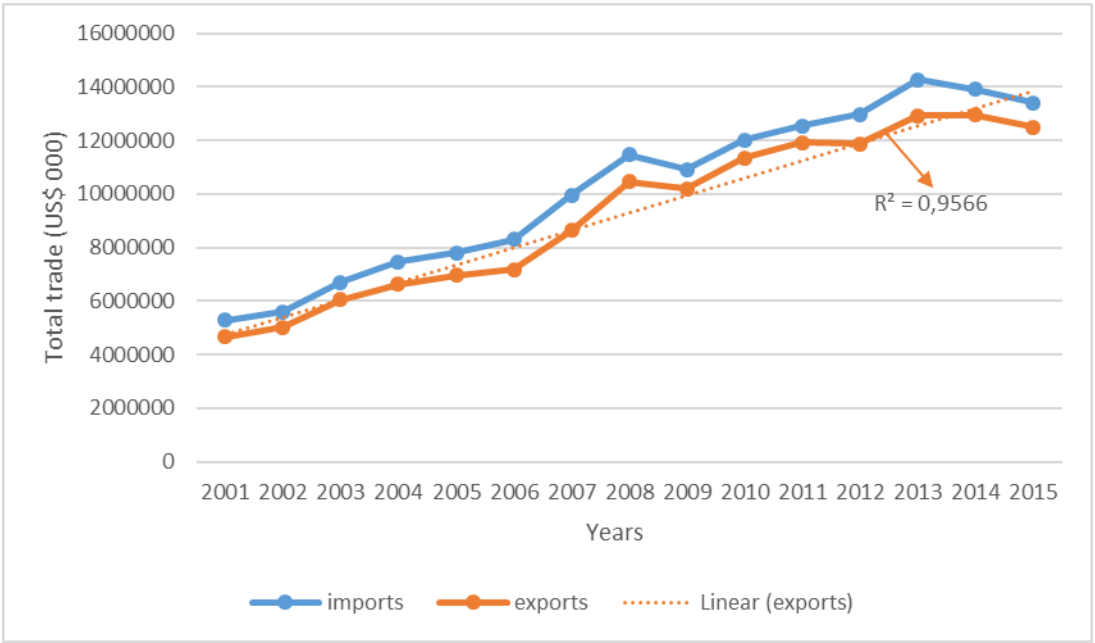

Figure 2.2: Global citrus trade
Source: Own calculations based on ITC data (2017)

Spain citrus exports are mostly concentrated to European countries, such as Germany, France and the United Kingdom, where it holds a share of 26.2%, 21.6% and 8.5% respectively. Furthermore, in these markets, Spain enjoys a relative advantage over its competitors from the Northern Hemisphere due to the EU trade agreement, which allows it to sell its citrus facing a 0% ad valorem equivalent tariff. Its competitors in these markets, such as China, face a tariff of up to 10.29% in each of the markets. When looking at countries from the Southern Hemisphere, Argentina and Australia are amongst the top twenty citrus-exporting countries, with a share of 1.8% and 1.7% respectively. Chile supplies most of its citrus to

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countries like the USA, Japan and the Netherlands, where it faces tariff barriers of 0%, 15.84% and 1.84% respectively. Australia, on the other hand, mostly supplies its citrus to the Asian market – to countries like China, Japan and Hong Kong.

When looking at each of the citrus varieties in detail, Spain dominates the export market for oranges with a share of 29%, followed by SA with a share of 13.8% and the USA with a share of 13.8%. More than 4.5 million US dollars' worth of soft fruits were exported in 2015, with Spain again dominating in world exports of this variety, with a share of 35.1%. In 2014 and 2015, China, which ranked second in world exports for soft fruits, had an annual growth in value of 7%, which is higher than any of the top five exporters. Grapefruit, which is the least exported citrus variety in terms of value, had a total value exported of just under a million dollars (US$) in 2015. The top five exporting countries of this product are China, the USA, the Netherlands, Turkey and South Africa. These five countries together hold more than half of the market share, with China holding just under a quarter, with a share of 20.7%. From 2011 to 2015, the Netherlands, which is a net importer of this product, had an annual growth in value of negative 6%. The export market for lemons and limes is dominated by the usual countries, namely China, Mexico, Turkey and South Africa. Together, these countries have a share of more than 50%. Of these countries, Turkey is the only country that had a negative annual growth in value between 2011 and 2015.

On the demand side, the value of imports rose from a mere US$5 million in 2001 to more than US$13 million in 2015. This rise was largely driven by the increased demand for citrus fruits in the relatively larger markets, such as the EU, USA and UK. Prior to 2007, no European country imported more than a million dollars (US$) worth of citrus. Currently, the Russian Federation, Germany and France all import citrus worth more than a million dollars. The annual growth rate (between 2001 and 2015) in global citrus imports currently stands at 6.4%. The top three citrus-importing countries, the Russian Federation, Germany and France, all have a share of above 8% in world imports. They are closely followed by the USA, the Netherlands and the UK, with shares of 7.4%, 6.6% and 5.9% respectively.

Figure 2.3 below shows global citrus imports from the year 2001 to 2015. From the value of total imported citrus, oranges commanded a share of more than 36%, followed by soft citrus fruits with a share of 33%. The import trend of oranges and soft fruits has been almost identical, experiencing similar growth and decrement in the same years.

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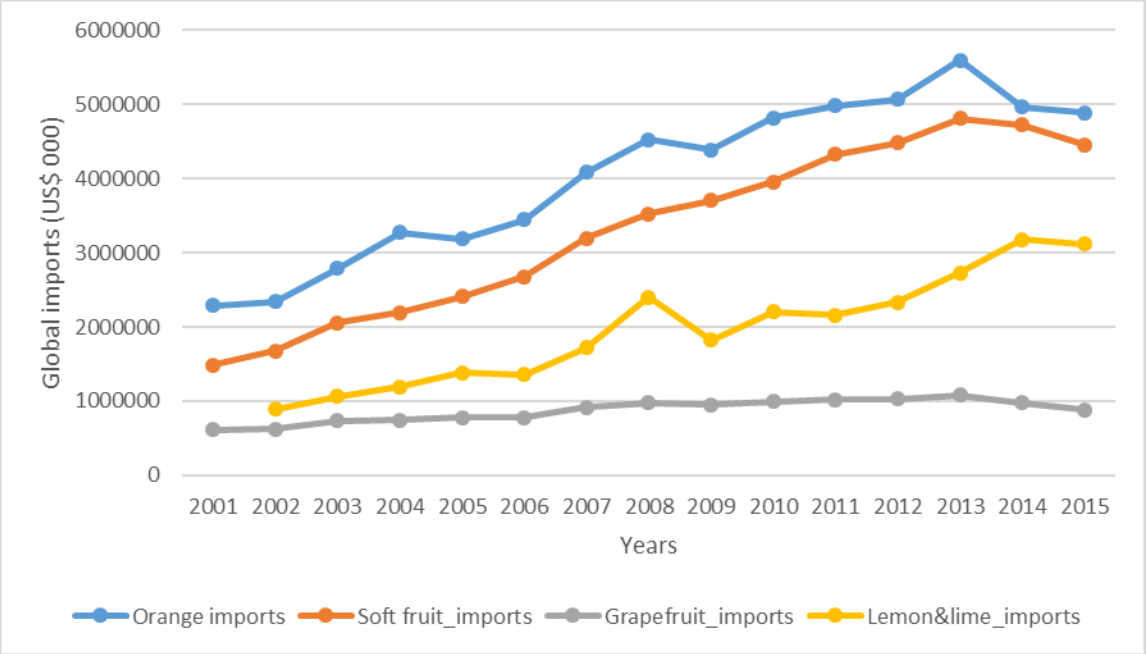

Figure 2.3: Global citrus imports
Source: Own calculations based on ITC data (2017).

Oranges and soft fruits also had the highest value of imports during the same year (2013), when more than 5.5 million US$ and 4.8 million US$ were imported respectively. The USA, Germany and France dominate the import market for lemon and limes, while Japan, the Netherlands and the Russian Federation dominate the import market for grapefruit. Interestingly, all these top three importers of grapefruit had a negative annual growth in value between 2011 to 2015.

2.5. Processed commodities (value adding)

There is an evident change in major players when one moves from primary products down to processed products. Key primary citrus exporters, such as Spain and South Africa, are not amongst the top five exporters of orange juice and citrus juice. In 2013, Brazil and Belgium were the leading suppliers of orange juice, with a share of 32% between them (FAO, 2015). The 2017 data from the Trade Map website shows that Brazil enjoys a share of more than 80% share in the world market exports of frozen orange juice (under HS code 200911 & HS 200919). Belgium and Netherlands are also notable exporters of this product with market shares of 23.8% and 20.2%, respectively (ITC, 2017). In processed grapefruit (Under HS 200921), Israel is the leading exporter by value with market share of 22.9% followed by Netherlands—share of 16.1% and USA with a share of 13.4% (ITC, 2017).

On the imports side, USA, Germany and Japan were the major importers for orange juice with import shares of 21.9%, 9.7 and 6.4%, respectively (ITC, 2017). The citrus juice (HS 200931) import market is highly concentrated with the top ten importers accounting for over 55% of global imports, with the rest accounting for the remaining share. In terms of citrus juice (under HS 200931), the top five importers are USA, France, United Kingdom, Canada and Germany. In these top five importing countries, France is the only country that has had a negative (-9) annual import growth in value between 2012 and 2016. This

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decline has been largely associated with the availability of competition such as juice made from other fruits, non-alcoholic beverages and decline in purchasing power.

2.6. Overview of the South African citrus industry

This section focuses on the performance of the South African citrus industry. As stated earlier, the citrus industry is one of the important agricultural industries that contribute greatly to the country's GDP. The citrus industry is guided by the CGA, which protects the interests of the relevant stakeholders. The CGA provides membership to more than 1 000 growers throughout the country, few others in Zimbabwe and Swaziland. Supporting the CGA are various institutions, such as the Grower Development Company, which targets transformation in the industry by currently supporting and developing more than 100 black citrus farmers in the country, which is aimed at increasing equity in the sub-sector across the value chain (Citrus Resource Warehouse [CRW], 2017). Other key organisations supporting the citrus industry in various forms include the Agricultural Research Council (ARC), Citrus Research International (CRI), the Perishable Products Exporters Control Board (PPECB), the Fresh Produce Exporters Forum (FPEF), the Citrus Academy, learning institutions such as Stellenbosch University and the University of Pretoria, and the Department of Agriculture, Forestry and Fisheries (DAFF).

2.6.1. Production and distribution trends

According to Sinngu (2014), the citrus industry in SA is characterised by a diversity of growers, fluctuating from large and highly profitable producers to small-scale producers who mostly sell their products in local markets. Citrus fruit are grown in fifteen regions across the country, and eighteen when one includes the regions in Swaziland, Namibia and Zimbabwe. In 2015, Limpopo had the largest area planted to citrus, with about 28 846 ha, which equates to about 42% of the total area planted in the country. This province dominates mainly in the production of Valencia oranges, with 16 008 hectares being under production. Gauteng and Free State are the only provinces of SA that do not produce citrus (see Figure 2.4). The Eastern Cape, on the other hand, dominates the production of navel oranges, with more than 6 000 ha used for the production of this orange cultivar (CGA, 2016b). Most of the soft citrus fruits are produced in the cooler climates of the Western Cape, with about 42% of production coming from this region, followed by the Eastern Cape with a production share of 31%. In 2015 there was a total area of 68 272 hectares planted, which yielded more than two million tons of citrus fruit, as shown in Table 2.2 below.

Oranges dominate the share of total area planted, covering more than 60%, followed by grapefruit, with a share of 15% of the total area planted. Most of the grapefruit are produced in the Limpopo province, which produces roughly 55% of the country's grapefruit.

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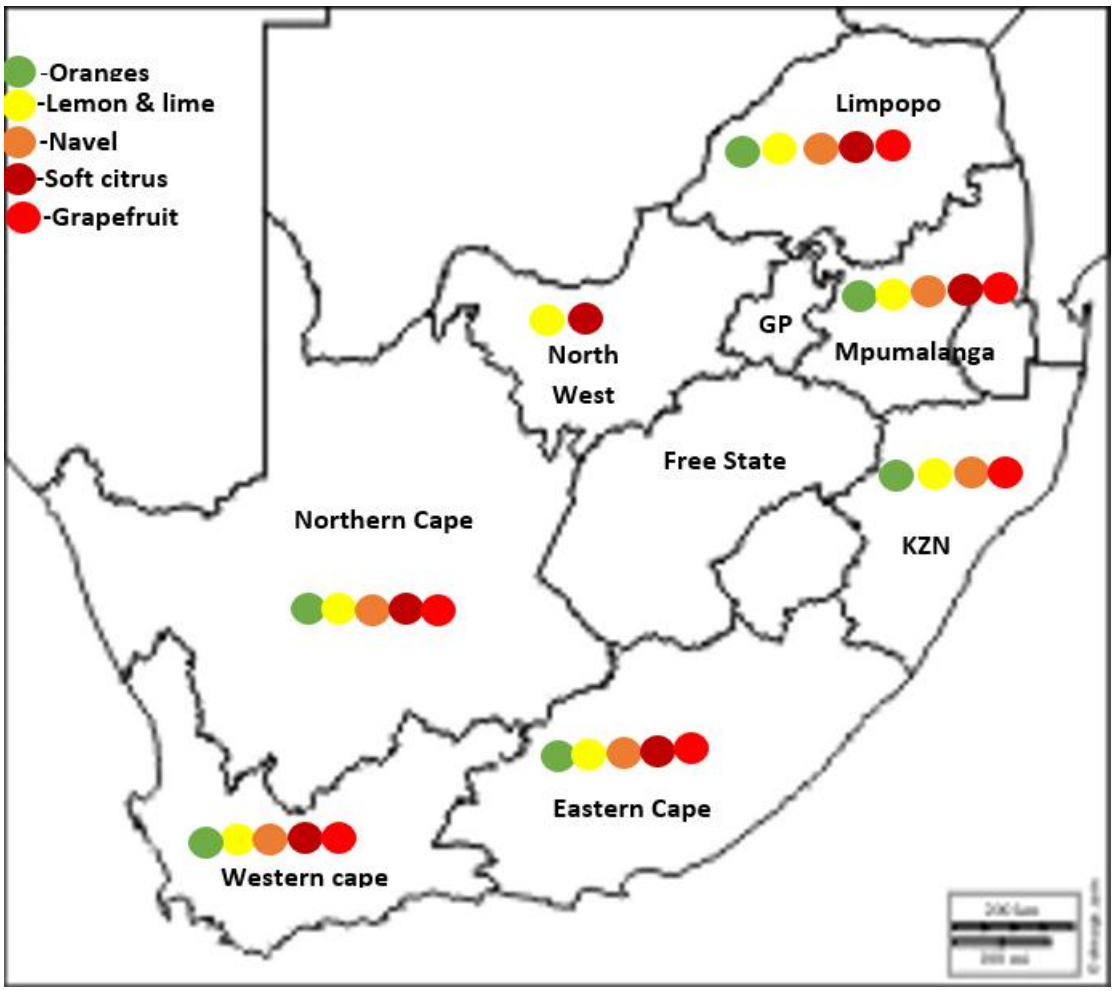

Figure 2.4: Citrus-producing regions of South Africa
Source: CGA (2016)

Table 2.2: SA citrus production and area harvested

Citrus fruits	Area planted (ha)	% share (ha)	Produced tons	Distribution (tons)		
				Local	Exported	Processed
Oranges	42 986	63% *5%	1 645 183	110 898	1 130 339	403 946
Soft citrus	9 335	14% *6%	202 563	23 941	150 002	28 620
Lemons and limes	8 262	12% *7%	339 130	15 127	226 105	97 898
Grapefruit	7 678	11% *15%	386 569	3 991	228 813	153 765
Note: * percentage increase/decrease from 2015 figures						

Source: Own calculations based on CGA (2015) and CGA (2016a) data.

Very little of the grapefruit output is sold to the local market, with only about 1% of the total output being sold to the local market in 2016 (CGA, 2016a). Most of the grapefruits – 59% – are exported, while the remaining are used by the processing industries to make grapefruit juice. Of all citrus varieties,

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soft citrus has the highest share of quantity exported, at about 74%, closely followed by oranges and lemons and limes, with a share of 69% and 67% of total output exported respectively.

2.7. Citrus fruit production and market prices

2.7.1. Oranges

The citrus industry is export orientated; the reasons for this are plenty, chief amongst them being the high returns per ton obtained from export markets. Figure 2.5 below shows the production of oranges and their market prices per ton when sold locally, exported and sold to the processing industries. From 2006 to 2015, the highest returns from the export market have always been greater than the value per ton obtained from selling in local markets. In 2015, the price per ton in the export market averaged R6 576.00, which was 14% higher when compared to the preceding year, and 3.57 times more when compared to the 2006 price. In the local markets, the price per ton in 2015 averaged only R2 535.00, which was 2.47 times more than the 2006 figures.

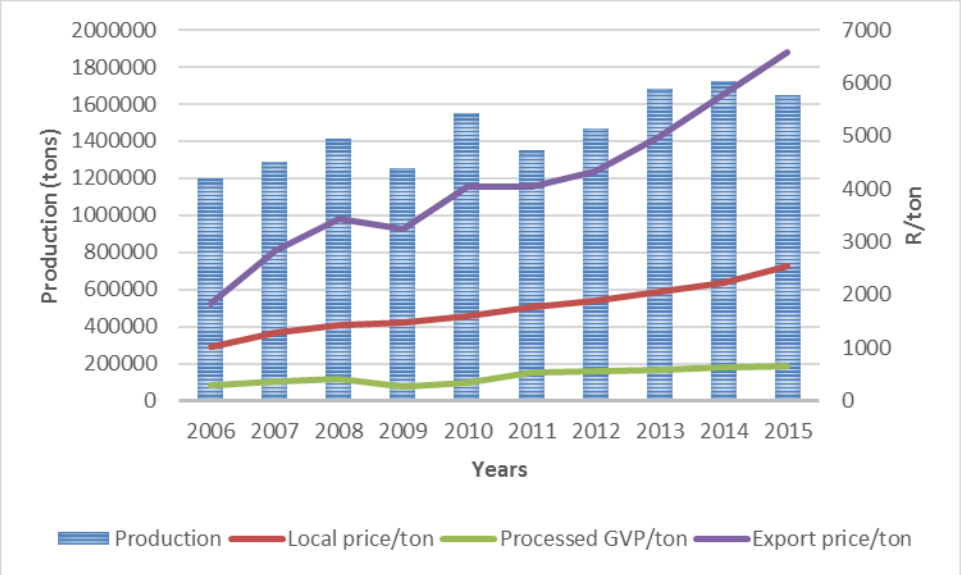

Figure 2.5: Local orange production and prices per tonne
Source: Own calculations based on CGA data (2016a)
*GVP = Gross value of production

The price per ton in export markets has gradually been increasing since 2006, with the exception of 2009 and 2011, when it experienced a -6% and -0.32% decrease in price respectively. According to a report by the CGA (2010), this decline in export price per ton was caused by the rough international financial conditions that were felt at the end of the 2008 production season and had a heavy impact on the 2009 citrus trade season. The CGA report further explains that major markets for local citrus experienced a tough trading environment, leading to "recession economics" of low supply, experiencing relatively low prices across all citrus varieties. Those absorbed by the processing industry fetched the lowest price, at R652.00 per ton. In 2009, the price per ton for oranges sold to the processing sector was at its lowest, with a ton going for only R268.00.

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2.7.2. Soft citrus

Soft citrus also fetches the highest returns per ton in the export markets. This can be explained by the highest annual growth in the export price, which stood at 11.08% between 2006 and 2015. That of the processing sector and local markets stood at 8.4% and 11.03% respectively in the same period. As it was in the case of quantity of oranges exported, the export price per ton experienced some tumble during 2009, decreasing by -6.64% from 2008 figures. The average price per ton received by a local exporter in the export markets in 2015 was R 11 392.00, which is more than double compared to the 2010 figures (see Figure 2.6). The local growers of soft fruits also obtain the lowest returns per ton when they trade their products in the processing sector. The average price received in the local markets during 2015 was R5 606.00 per ton, which was its highest thus far. It is also important to note that prices of soft citrus for local markets experienced a decline of negative 8.09% in 2012.

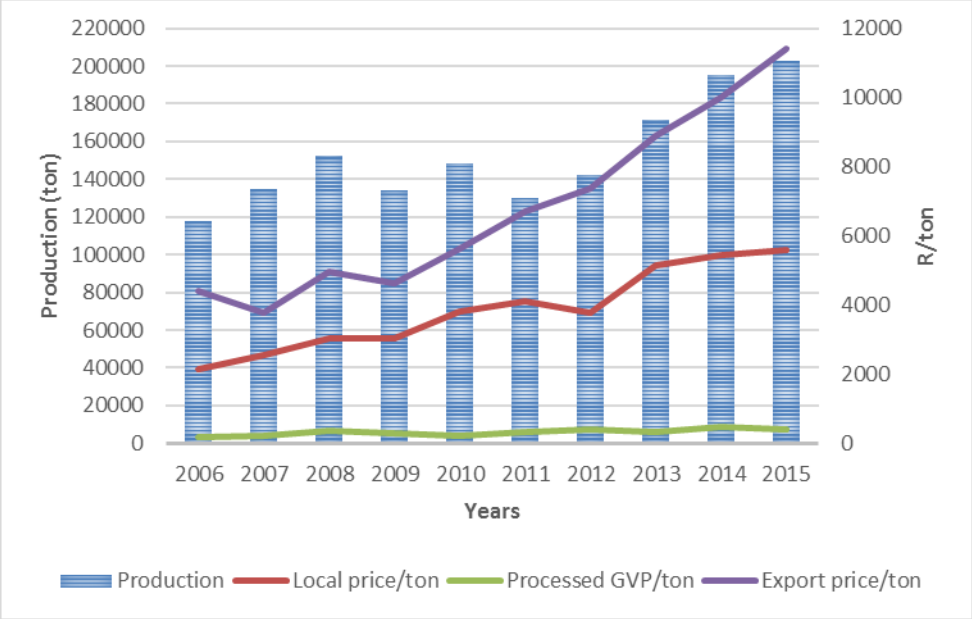

Figure 2.6: Soft citrus production and prices per tonne
Source: Own calculation based on CGA data (2016a)
*GVP= Gross Value of Production

2.7.3. Grapefruit

The selling price per ton in both the local and export markets has been highly volatile in the last decade, as shown by the zigzag curves in Figure 2.7. The highest price per ton in the local market was realised in 2015, while the lowest was obtained in 2010, when it experienced a 22% decrease from the 2009 figures. The price per ton of selling to processors had negative annual growth between the years shown in the figure, while the export market had the highest annual growth rate. Again, as was the case for oranges and soft citrus, grapefruit also experienced a decline in the price per ton in the export market during the global financial crisis. Interestingly, in 2009, grapefruit traded at almost similar prices per ton in the local and export markets, with only a 13 cent difference between these two markets. The price of a ton sold to

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the processing industry experienced a decrease in 2015, and it has never increased for more than three years in a row.

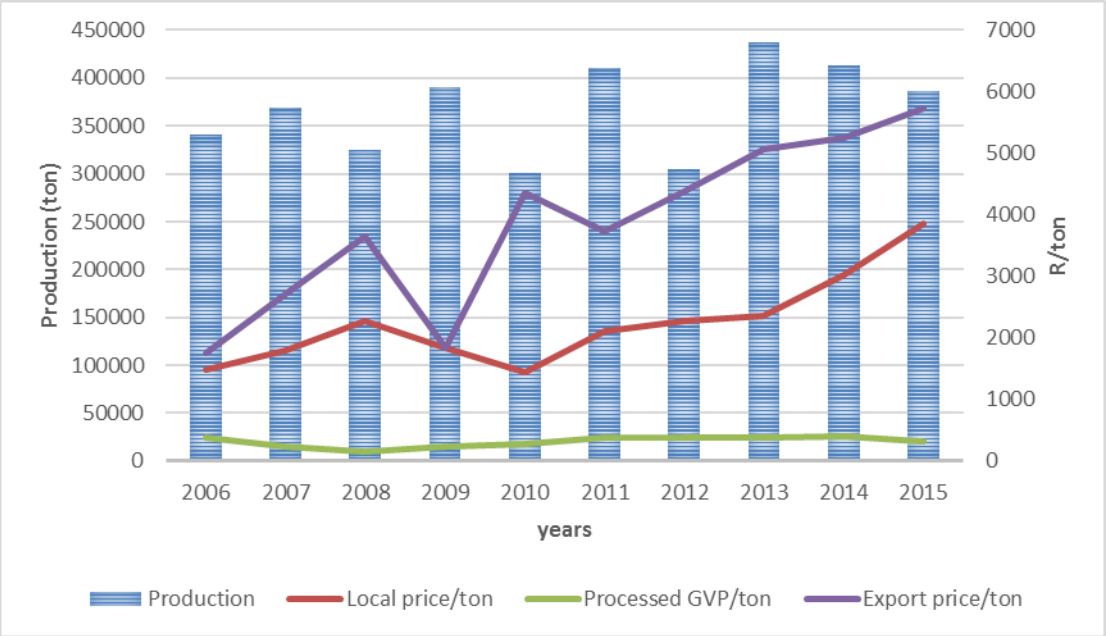

Figure 2.7: Grapefruit production and prices per ton
Source: Own calculations based on CGA data (2016a).
*GVP= Gross Value of Production

2.7.4. Lemon and lime

Prices per ton realised in the lemon and lime export markets fluctuated greatly in the last decade, particularly between 2008 and 2010, when prices decreased from R3 961.00 in 2008 to their lowest, at R2 120.00, in 2009. The prices fluctuated again, increasing from the 2009 figures by 151% to reach R5 329.00 in 2010.

The export market price achieved its highest value in 2015 and it experienced an annual growth rate of 19.4% over the last decade. In 2009 it was more profitable for local producers to sell their lemon and limes in the local market than to export them to foreign markets, as shown by the circle in Figure 2.8. It is also important to note that the net returns per ton obtained from all three market sectors (i.e. local, processed and export markets) were higher than for any other citrus variety.

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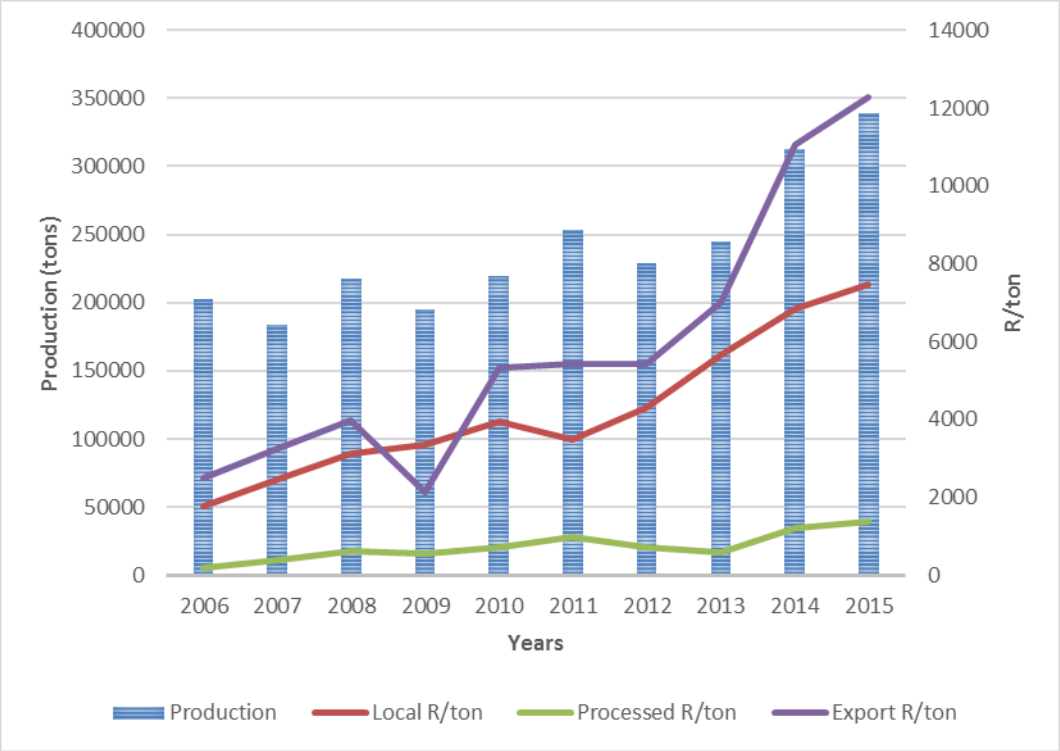

Figure 2.8: Lemon and lime production and prices per tonne.
Source: Own calculations based on CGA data (2016a)
*GVP= Gross Value of Production

The annual growth in the price per ton in the local market averaged 17.5%, with the highest value obtained in 2015, while the lowest was fetched in 2006. In 2015, the price per ton for the local market, processing sector and export market increased by 9%, 14.8% and 11% respectively compared to the 2014 market prices.

2.8. Total trade (imports and exports)

SA is ranked amongst the top three exporting countries (by value) of citrus and has shown impressive and positive trends in competitive performance over the last decade. This is highlighted by the upward positive trend of the export curve in Figure 2.9 below. The supply of citrus fruits by South Africa enjoyed an increase of more than 800% in value in 2016 when compared to the export value in 2001.

South Africa imports a relatively small amount of citrus fruit. Most of these imports come from neighbouring countries, such as Swaziland. The South African imports represent less than 1% of world imports for citrus and the country is ranked number 86 in overall citrus imports. China, Swaziland and Spain are the major suppliers of oranges to the country, with a share of 10%, 5.7 % and 5.1% respectively of the South African orange imports.

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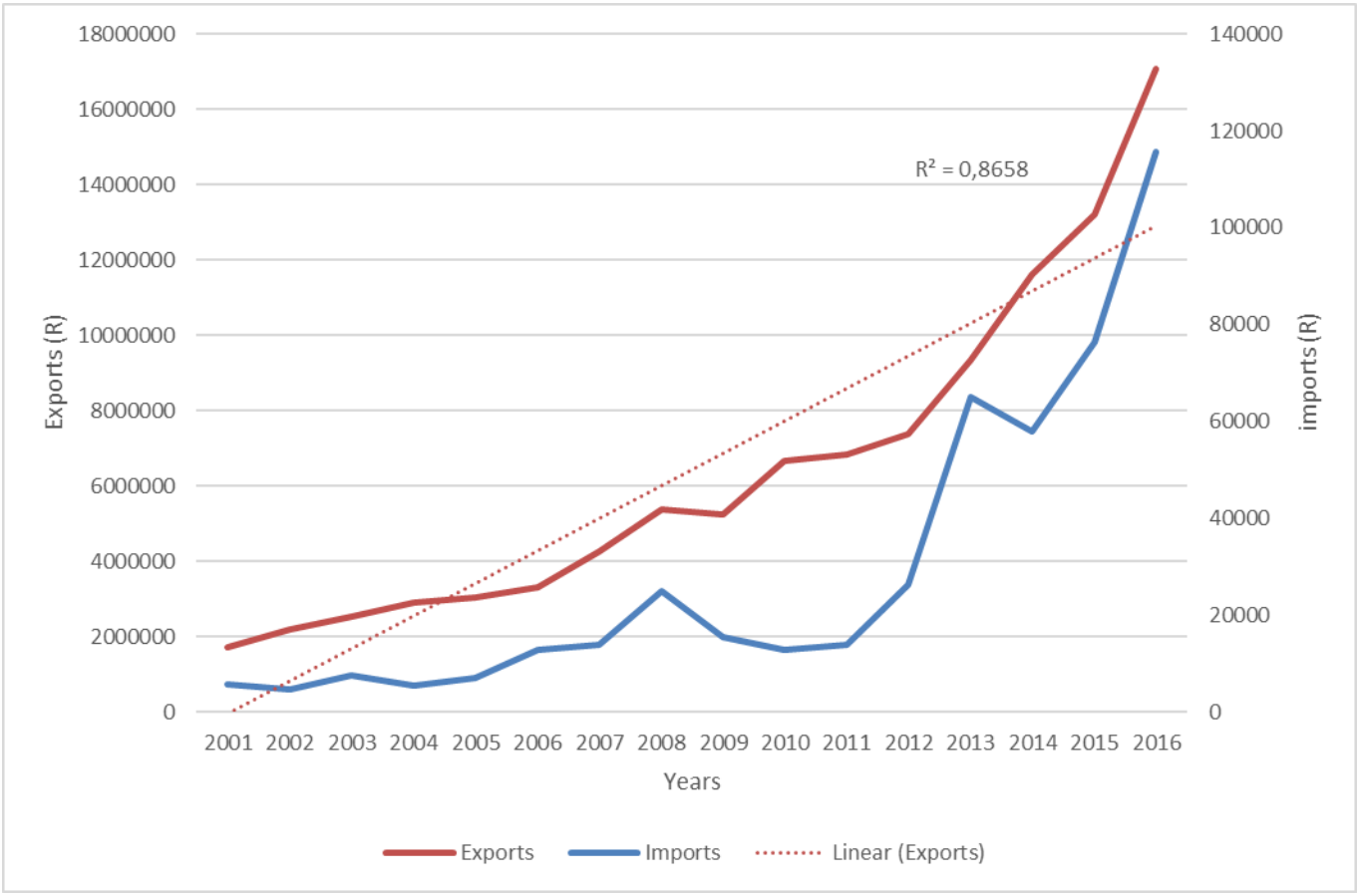

Figure 2.9: SA citrus total trade (imports and exports)
Source: Own calculations based on ITC data (2017)

Soft citrus, on the other hand, is imported from countries such as Spain and Israel. The value of imported citrus increased by 51% from 2015 to 2016, mostly due to the drought that hit the country in that period, resulting in lower quantities of citrus produced. The annual growth in value of imports between 2012 to 2016 has also been showing some positive trends, with an annual growth rate of 34%.

2.9. Distribution of South African citrus

On the demand side, the European market is an extremely important market for most of South African citrus fruit, absorbing a share of than 10% of each of the citrus varieties. The historically excellent quality and the production opposite season play a major role in the continued good performance of local citrus in the European market (Sinngu, 2014). This market is particularly important for orange exports, absorbing more than 30%, even though it is still subjected to full phytosanitary control regulations put in place to combat citrus black spot (CBS) in Europe. However, the new regulations put in place by the EU would now allow the entry of CBS-infected citrus into the EU if the fruit is intended for processing (Sishuba, 2016). In addition, the reviewed regulations will also put the South African citrus industry in a relatively stronger position when compared with citrus originating from Uruguay and Brazil, which will soon be subjected to the same phytosanitary regulations (Creamer, 2016). The EU further absorbs 25% of soft citrus, 34% of grapefruit and 15% of lemons and limes originating in SA, as shown in the table below.

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Table 2.3: Destination of SA citrus exports

	% Share of destination								
	EU	**UK**	**Russia**	**Middle east**	**USA**	**Far East**	**Canada**	**Asia**	**Other**
Oranges	31%	7%	8%	23%	6%	5%	3%	3%	5%
Soft citrus	25%	40%	9%	7%	6%	4%	3%	2%	4%
Lemon and lime	15%	4%	14%	40%		13%	4%	6%	4%
Grapefruit	34%	5%	9%	3%		26%	3%	14%	6%

Source: Adapted from CGA (2016a).

Other important export markets include the Middle East, particularly in the absorption of lemons and limes, growing from 34% exported in 2015 to 40% exported in 2016. The Russian Federation and the Far East are also important markets for lemons and limes. Argentina is the main competitor in most of SA's export destinations concerning lemons and limes. Citrus exports to African markets are very disappointing, with only 1% exported to this region, lagging far behind other fruit industries, such as the apple industry, which exported more than 25% of its exports to the African markets in 2016.

2.10. Processed products

Figure 2.10 below portrays the quantities of processed citrus products over a period of nine years. During this time, oranges had the highest quantities of products that went for processing, reaching the highest in level in 2014, when 485 707 tons went for processing, whilst the lowest quantities were processed in 2007, when around 229 435 tons went for processing. Soft citrus, on the other hand, has the lowest quantities of fruit that go through processing. During the period of 2006 to 2015, soft citrus had an annual growth of 4.48%, which is higher than any annual growth in other citrus fruit that went through processing in the same period.

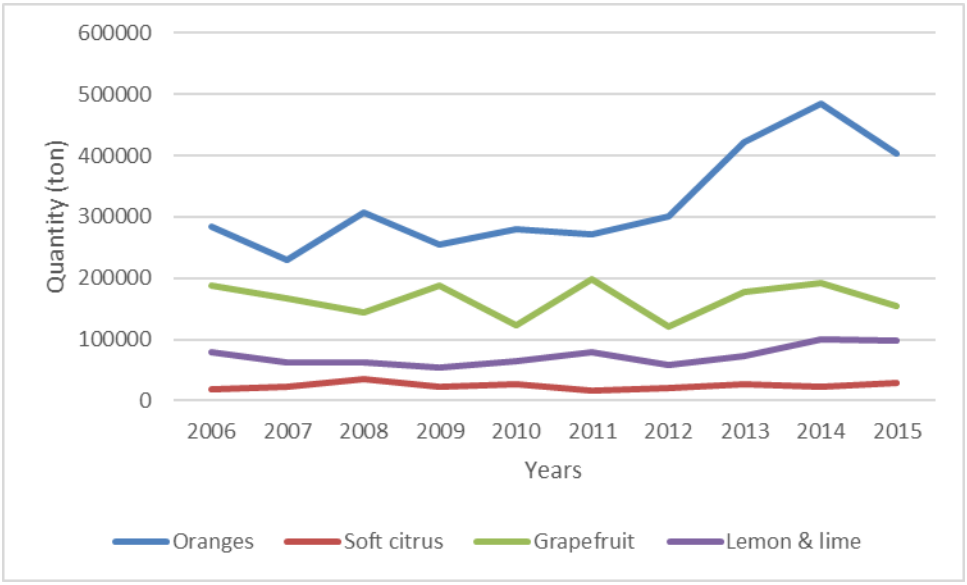

Figure 2.10: Quantity of processed citrus fruit

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Source: Own calculations based on ITC data (2017)

Grapefruit quantities that go to processing have been highly volatile in the last decade, particularly from 2008 to 2012. This is further explained by the 20% decrease in quantities that were processed in 2015 when compared to the 2014 figures. In addition, during the period from 2006 to 2015, quantities of grapefruit processed had a negative annual growth of -2%.

When looking at the supply side, the value of exported grapefruit juice decreased from 2007 to 2010, as shown in Figure 2.11 below. Orange juice exports have also been highly volatile in the last decade.

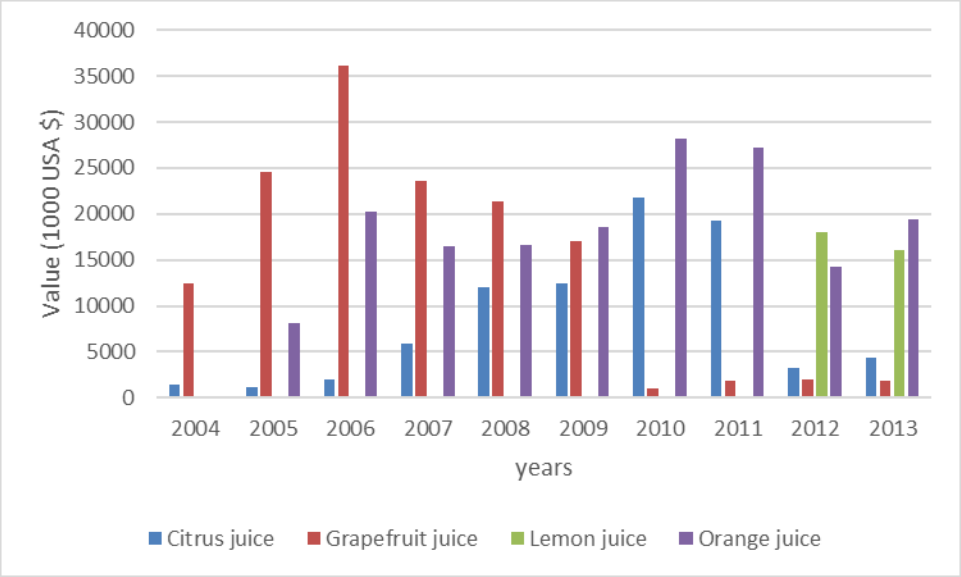

Figure 2.11: Value of exported juices by South Africa
Source: Own calculations based on ITC (2017)

The trade data from the ITC website indicates that South African orange juice exports (under HS code 200911) account for only 0.3% of world exports, lagging far behind countries such as Brazil, Mexico and the USA, which enjoy a share of 54.3%, 15.7% and 11.3% of world exports respectively. Major importers of South African orange juice are the Netherlands, Botswana, Lesotho, the UK and Mozambique.

In the Dutch market, SA orange juice faces competition from Mexico, Austria and Brazil. South Africa has a 100% market share of orange juice exports to Botswana and Lesotho, whilst in the Mozambique market it enjoys a share of 85.7%, facing competition only from Portuguese imports. Citrus juice exports increased in value from 2004 until 2010. In 2011 there was a 12% decrease in the value exported when compared to 2010. The highest export value was achieved in 2010, whilst the lowest was recorded in 2005.

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2.11. Summary of tariffs and barriers applied by key markets for South African citrus and tariffs applied to SA main competitors in these markets.

The table below shows the percentage ad valorem tariff imposed by major markets for South African citrus exports and the tariffs applied to major competitors of SA in those markets. The first block shows the amount of tariffs applied to citrus imports originating from Southern Hemisphere competitors in the key markets for South African citrus. The second block draws a picture of the tariffs applied to Northern Hemisphere counterparts exporting to key markets for SA citrus. These countries were selected based on import shares on South African citrus exports.

Tariffs are taxes imposed on imported or foreign goods for various reasons. Firstly, tariffs are imposed to earn government revenue from imported products; secondly, tariffs are imposed to raise the price of imported goods so as to protect local producers (who might have less comparative advantage compared to the exporting country). Another type of barrier is quota, which restricts the quantity that can be exported to a particular country (e.g. the EU imposes a quota of 110 million litres on wines coming from South Africa). Quotas are intended to protect domestic producers from excessive imports (dumping) from areas with some form of competitive advantage (i.e. producing at a lower opportunity costs). A further form of barrier comes in the form of a non-tariff barrier, which includes product standards (quality), food health and safety issues, labelling, packaging, sanitary and phytosanitary standards (SPS), quality standards and grades. The EU uses this form of non-tariff barrier for most oranges originating from South Africa through the phytosanitary control regulations, which do not allow more than five CBS-infected citrus fruits to enter its market.

South African oranges enjoy preferential access to the EU market and enter this market without being subjected to customs duties or quantity restrictions. South African oranges enter this market through the Economic Partnership Agreement under the SADC-EU EPA agreement, which replaced the Trade Development and Cooperation Agreement that earlier existed between South Africa and the EU. The EPA agreement offers great opportunities for South African exporters, particularly citrus fruit exporters, mainly because their product is not subjected to any form of tariff. Southern Hemisphere competitors such as Argentina, Australia and Uruguay faces a tariff of 5.4% per ton entering this market. This gives South African oranges a great advantage in this market. The only major threat comes from Chilean oranges, which are subjected to a 0% tariff in the EU market, but oranges originating from this country represents only 1.4% of international exports.

Other important markets for South African oranges are the Middle East, particularly the United Arab Emirates and Saudi Arabia, where they also face 0% tariffs. In the USA, South African oranges enter the market through the African Growth and Opportunity Act (AGOA) trade arrangement, which allows preferential tariffs. This agreement allows South African oranges to access the market facing a 0% tariff. Some major competitors in this market face a tariff of 1.49%, except oranges originating from the Chilean

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and Australian markets. The USA absorbs about 84% of oranges originating from the Chilean market and 6.4% of oranges originating from Australia. Lemons and limes are the only citrus fruit subjected to heavy tariffs in the EU market, facing a tariff of 10.63%/ton. Lemons and limes do not have preferential access into this market, meaning lemons and limes did not form part of the products that were granted free access as part of the EPA agreement. The Russian Federation imposes a tariff of 3.75% on almost all citrus fruit imported from South Africa, except for grapefruit, for which it imposes a tariff barrier of 3.8%/ton. South African soft citrus enjoys a tariff advantage compared to its competitors in most of its markets. Grapefruit, on the other hand, is subjected to a 10% tariff in the Japanese market and 30% in the Republic of Korea market.

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Table 2.4: Summary of tariffs applied by major markets for South African citrus and tariffs faced by SA competitors in those markets

	Oranges					**Soft citrus**					**Grapefruit**					**Lemons and limes**				
Countries	**UK**	**EU**	**Middle East**		**USA**	**UK**	**EU**	**RF**	**Saudi Arabia**	**UAE**	**EU**	**Far East**		**UAE**	**RF**	**UAE**	**EU**	**Far East**		**RF**
			Saudi Arabia	**UAE**								Japan	Korea					Japan	Korea	
SA	0%	0%	0%	0%	0%	0%	0%	3.8%	0%	0%	0%	10%	30%	0%	3.8%	0%	10.6%	0%	68%	3.8%
Argentina	5.4%	5.4%	0%	0%	1.5%	16%	16%	3.8%	0%	0%	2.4%	10%	30%	0%	3.75%	0%	12.5%	0%	68%	3.8%
Australia	5.4%	5.4%	0%	0%	0%	16%	16%	5%	0%	0%	2.4%	10%	26%	0%	5%	0%	12.5%	0%	59.1%	5%
Uruguay	5.4%	5.4%	0%	0%	1.5%	16%	16%	3.8%	0%	0%	2.4%	10%	30%	0%	3.8%	0%	12.5%	0%	68%	3.8%
Chile	0%	0%	0%	0%	0%	0%	0%	3.8%	0%	0%	0%	3.8%	30%	0%	3.8%	0%	5.1%	0%	48%	3.8%
Spain	0%	0%	0%	0%	1.5%	0%	0%	5%	0%	0%	0%	10%	10%	0%	5%	0%	0%	0%	6.33%	5%
China	5.4%	5.4%	0%	0%	1.5%	16%	16%	3.8%	0%	0%	2.4%	10%	30%	0%	3.8%	0%	12.5%	0%	68%	3.8%
Egypt	0%	0%	0%	0%	1.5%	0%	0%	3.8%	0%	0%	0%	10%	30%	0%	3.8%	0%	5.1%	0%	68%	3.8%
Netherlands	0%	0%	0%	0%	1.5%	0%	0%	5%	0%	0%	0%	10%	10%	0%	5%	0%	0%	0%	6.3%	5%
USA	5.4%	5.4%	0%	0%		16%	16%	5%	0%	0%	2.4%	10%	6%	0%	5%	0%	12.5%	0%	6%	5%
UK - United Kingdom; EU - European Union; UAE - United Arab Emirates; RF - Russian Federation; Korea - Korea, Republic of																				

Source: market access map (2017).

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2.12. South African citrus value chain

In order to fully understand the competitive performance of any industry, it is important to consider its value chain. The value chain describes the full range of activities that are required to bring a product or service from its conception, through the different phases of production (involving a combination of physical transformation and input of various services), delivery to the final consumer and final disposal after use (European Commission, 2011). This includes activities such as design, production, marketing, distribution and support to the final consumer. Esterhuizen (2006) defines a value chain as institutional arrangements that link producers, processors, marketers and distributors, often separated by time and space that progressively add value to products as they pass along the chain.

Porter argues that individual firms each have their own value chain that is embedded in value networks, each of which have different functions within an industry and influence other actors in the network. This means that, as contained in the Porter (1990) diamond model of competitiveness, the factor relating to related and supporting industries has an impact on an industry's ability to compete in the international market. Min and Zou (2002) concur that the main goal of a value chain is to enhance the operational efficiency, profitability and competitive position of industries and their supply chain partners. This means that any comprehensive statements on competitiveness should take into account value chain relationships.

Given the importance of a value chain in contributing to the success of an industry's competitive performance, the local citrus industry's value chain is highlighted in Figure 2.12 below. The local citrus value chain and supply value chain consist of suppliers of farming inputs (e.g. Oro Agri, River Bioscience), producers, fresh produce markets, retailers, processors, cold storage and pack house operators, transporters, exporters, quality control and certification agents, and terminal and port operators. On arrival in international markets, importing agents, distributors, market agents and retailers then supply the citrus to consumers. Consumer preferences are changing, as consumers are demanding more healthy and natural products. Consumers are also more interested in dietary issues, and in consuming more food that is low in fat and sugar, and this favours citrus fruit consumption. This means there is a space to educate consumers about the health benefits associated with consuming citrus fruit. To shape an improved understanding of the key factors affecting the competitive performance of this industry, this value chain guides the inclusion of relevant experts' perceptions across various disciplines of matters surrounding competitiveness to be included in the Citrus Survey.

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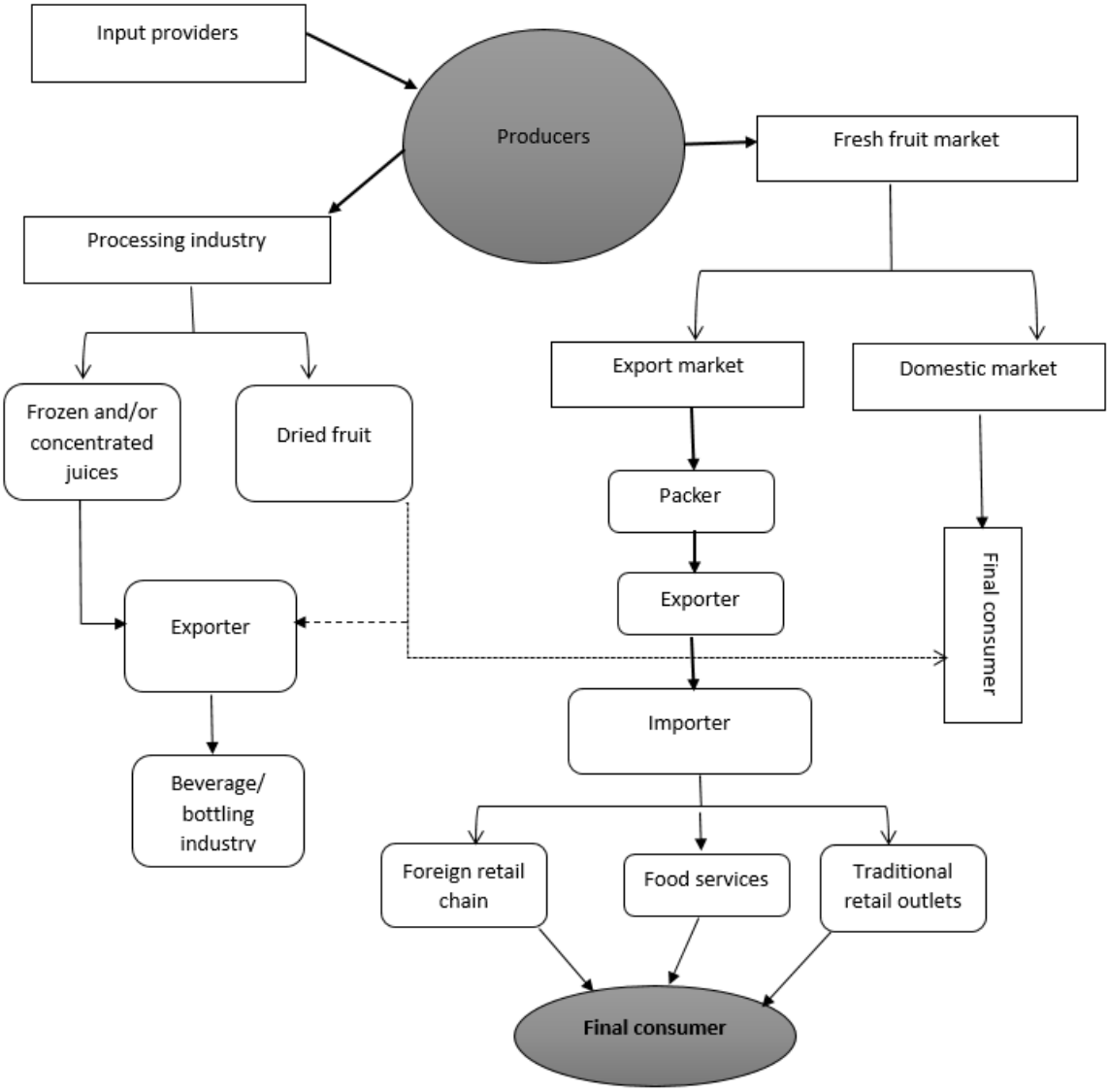

Figure 2.12: South African citrus value chain
Source: Adapted from DAFF (2016)

2.12.1. A view on challenges facing the South African citrus industry

Despite its continued success in the recent past, the domestic citrus fruit industry still faces challenges with a complexity and intensity that cannot be separated from the ever-changing business environment. The identified general challenges, from recent data sources, include, but are not limited to, the following (CGA, 2007, CGA, 2016b; DAFF, 2016).

- ✓ Operating against tariffs and non-tariffs barriers
- ✓ AGOA specifications (in the USA market)
- ✓ Policy uncertainty and leadership concerns (in SA as a country)
- ✓ Slow economic growth and development in general
- ✓ Labour policy uncertainties in the South African context- hidden costs, high administration and red tape compliance.
- ✓ Trade policy changes – Brexit for example

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- ✓ Climate change implications
- ✓ Transportation (cold storage, issues related to costs and capacities costs)
- ✓ Market access and changes regarding policy changes
- ✓ Market development – opportunities, new markets, declining traditional markets
- ✓ Land redistribution uncertainties in South Africa
- ✓ Capital investment requirements in a uncertain environment
- ✓ Government policies (redistribution, trade, tax system, social compliance)
- ✓ Post-harvest treatment and labelling –increasing compliance and costs
- ✓ High input costs- due to a weakening currency and increasing administrative prices – electricity, labour, etc.
- ✓ Transformation uncertainties and changing legislation and score cards.

This study may expand on this from a competitiveness view point. To tackle some of challenges highlighted above, the industry is maintained by the CGA. Other institutions, such as the CRI, Citrus Academy, DAFF, NAMC, Citrus Research Trust, Stellenbosch University, the University of Pretoria, the ARC, the Fresh Produce Export Forum, the Citrus Market Forum (CMF), the Grower Development Company and the SA Fruit Journal, also assist the CGA in various forms.

2.13. Contribution of the sector to the South African economy

The citrus industry is labour intensive and is estimated to employ in the region of 125 000 people, or 14% of the agricultural job market, with large numbers of workers in the orchards and packing houses (CGA, 2016b). An unspecified number of people are also employed throughout the supply chain in services such as transportation, port handing, processing and other services. The industry is a dynamic sector, employing mostly unskilled workers, supplying first-class fruit to a global market with limited resources and assistance. It is estimated by the CGA (2016b) that the industry can, on average, create a permanent job opportunity for every R400 000 capital development compared to a national figure of R2 million. The industry is the mainstay of the rural economy and provides an economic base for significant upstream and downstream jobs and job opportunities. DAFF (2012) estimates that more than a million households depend on the South African citrus industry for their livelihood.

Economically, the citrus industry contributes approximately R6.8 billion to the local gross domestic product and approximately 27% of total agricultural exports (CGA, 2016b; Uys, 2016). The industry also invests in skills development through the Citrus Academy, which is tasked with addressing critical challenges faced by the industry, such as black economic empowerment, provision of bursaries to undergraduate and postgraduate students, employment equity, and equity of skills delivery.

2.14. Conclusion

This chapter reviewed the performance of the citrus industry both locally and internationally. From the reviewed literature it is evident that, in the Northern Hemisphere, Spain dominates in the production of

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lemons and limes, while China dominates the production of oranges and grapefruit. In the Southern Hemisphere, Brazil dominates the production of oranges. On the trade side, the European Union remains an important market for South African citrus exports, absorbing more than a 10% share of each of the citrus fruit varieties. SA faces competition in lemon and limes, originating from Argentina.

From reviewing the industry it was also evident that there is no lack of statistical information on the subjects of areas under production, geographical production zones, cultivars planted and production costs for the local citrus industry. However, aspects surrounding strategic planning and strategic intelligence for the local citrus industry are not widely published (you have to be a member of certain websites) and available to be applied by all the relevant people in functional value chain positions in the formation of industry strategies. The strategic plans for the industry are not easily accessible. There are strategic plans by Fruit SA, such as “getting fruit back to the rail” and the Agricultural Policy Action Plan. However, such strategic plans seem not to directly address individual competitive performance factors. Therefore, there is a need to draw up a clear strategic plan that will specifically target the citrus industry in the midst of its own unique challenges—as highlighted in section 2.12.1. However such strategic ideas and proposals will only be derived based on the findings of this study and not through participative industry sessions.

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Chapter 3: Literature review on competitiveness analysis in the agricultural sector

3.1. Introduction

The goal of this chapter is to establish a broad framework of enquiry regarding competitiveness analysis in the agricultural sector. It starts by reviewing the evolution of competitiveness and related theories. Traditionally, a country's global competitive performance has been explained by the classical and neoclassical theories (Porter 1990;98; Fertő & Hubbard, 2002; Esterhuizen, 2006; Sihlobo, 2016). However, the global market has since developed into a complex system that cannot be explained solely by these traditional theories (Balassa, 1965 Porter, 1990; Vollrath; 1991; Porter, 1998; and also referenced by recent South African agricultural economic studies such as Esterhuizen, 2006; Angala, 2015; Boonzaaier and Van Rooyen, 2017). After reviewing the relevant literature and contextualising in terms of the nature and scope of the South African citrus industry (refer to chapter 2), an attempt is made to provide a definition of competitiveness, techniques and methods used in the measurement and analysis of competitiveness and data requirements and sources are also considered to establish a framework of analysis for the study. This chapter ends by giving views expressed on the competitive performance of the country as a whole, and views expressed on the competitive performance of local agricultural commodities.

3.2. Evolution of classical theories

This section traces back the origin of trade theories and discusses how they have evolved over time. Most importantly, this chapter indicates the relevance of these theories to the agricultural sector.

3.2.1. Mercantilism (15th to 17th century)

Mercantilism is an economic theory that was used by great European powers such as Spain, Portugal, France and England to govern the then unorganised world from the 15th to the 17th century. This theory was one of the first attempts to create an economic theory. Mercantilists assumed that a nation's economic wealth and political influence emanated from its stocks of valuable metals, such as gold and silver. They believed that, for a nation to maximise these stocks, it had to formulate policies that were not in favour of free trade, but instead encouraged policies formulated to discourage imports through quotas and tariffs (Ndou, 2012; Sihlobo, 2016). In other words, they believed that a nation should increase its fortune in precious metals by promoting exports and discouraging imports (e.g. impose heavy tariffs on foreign goods). Thus, the resulting trade deficit between countries will be paid in the form of precious metals. The main goal of these policies was to maximise the wealth of a nation – wealth was defined in terms of gold and silver. This led to countries having the main goal of creating or having a trade surplus. This means that, under mercantilism, trade was a zero-sum game, one country versus the other, with the winners winning at the expense of the losers. Even though mercantilism is one of the oldest trade theories,

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some of its assertions still find resonance in modern-day thinking. For example, China still favour exports and discourages imports via a form of neo-mercantilism.

3.2.2. Adam Smith (absolute advantage – 1776)

The main problem with the mercantilism theory was that it discouraged trade between nations. Adam Smith questioned and challenged this theory in his book titled, *An Inquiry into the Nature and Causes of the Wealth of Nations*, which was published in 1776. Smith argued that the mercantilists' policies favoured the producers and were against the interest of customers. In addition, Smith argued that wealth should not be defined in terms of the amount of precious metals a country has, but rather should be defined in terms of its production and the living standards of its people. His theory begins with the idea that one should never attempt to make at home what is cheaper to buy elsewhere. This was evident in his book where he said, "it is the maxim of every prudent master of a family never to attempt to make at home what it will cost him more to make than to buy" (Smith, 1776).

In its simplest form, Smith theory states that trade should not be discouraged by strict government policies. He believed that trade should happen naturally according to market forces (Atma Global Inc, 2012). In Smith's imaginary two-country world, if nation Z could produce or provide a commodity or service cheaper or faster (or both) than nation X, then nation Z has the absolute advantage in the production/providing of that commodity or service and thus should specialise in producing or providing that commodity or service. Similarly, if nation X was better at producing or providing another commodity or service, it should specialise in it as well. Through specialisation, nations would generate efficiencies (through the division of labour), because their labour would become more skilled and efficient by undertaking the same tasks (Anderson, 2008).

3.2.3. Ricardo David (Comparative advantage – 1817)

The main catch in Smith's theory was that another country may not have any useful absolute advantage, or perhaps that some nations might be better at producing both commodities and therefore would have an absolute advantage in many products. Another problem came when introducing a third country, which is neither efficient in the production of commodity A nor efficient in the production of commodity B (Langdana & Murphy, 2014). To answer this challenge, David Ricardo developed the theory of comparative advantage in his book *Principles of Political Economy* published in 1817. Ricardo argued that, even if nation Z was more efficient in the production of both commodities, specialisation and trade can still happen between two countries. Ricardo Smith argued that all nations have a limited amount of natural resources available, so they always have to choose which commodities to produce. Choosing one commodity to produce over the other is measured in terms of opportunity costs. A nation that has the lowest opportunity costs in the production of one commodity is said to have a comparative advantage. According to Porter (1990), comparative advantage theory states that market forces will assign a nation's resources to those sectors where it is has the lowest opportunity cost. That is, if two nations have different

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opportunity costs in the production of a common commodity, they can specialise and trade. Through specialisation, their output will increase and both of them will benefit from trade (Esterhuizen, 2006).

The main difference between absolute advantage theory and comparative advantage theory is that the former concentrates on absolute productivity whilst the latter concentrates on the variations in relative productivity (Anderson, 2008). Both these theories assume only one factor of production. In real life, however, the economic world is more diverse and comprises numerous nations and commodities. Hence these theories attracted criticism, such as that they force a country into open trade even if they do not want it and that they do not acknowledge exchange rates.

3.2.4. Heckscher-Ohlin (early 1900s) – neoclassical market analysis and optimal resource use.

The earlier classical theories of Adam Smith and David Ricardo did not assist nations in identifying which commodities would give them an advantage. These theories both postulated that free and open markets would direct nations to identify which products they should produce (Carpenter & Dunung, 2011). This led two Swedish economists, Heckscher and Ohlin (H-O model), to focus their efforts in the 1920s on how a nation could obtain a comparative advantage by making products that utilised factors that were in relative abundance. The H-O theory is centred on a nation's optimal use of the factors of production, i.e. land, labour and capital.

The essential presumptions of the H-O model are that production factors cannot be shared between nations and that these production factors are utilised in various groupings in the production of a particular commodity (Atma Global Inc, 2012). A nation is then said to have a comparative advantage in commodity A if that nation has an abundance of production factors that are utilised intensively when producing commodity A. The comparative advantage of a country is thus determined by the amount of production factors available to produce a commodity, and it assumes that the more production factors, the lower the costs of production. Thus, a country should trade commodities that utilise its abundant production factors intensively and import those commodities that utilise its relatively scarce resources intensively. As a result, all nations will enjoy gains from trade concurrently.

3.2.5. Stolper-Samuelson theorem

This theorem describes the association between variations in goods, prices and factor prices such as wages in the context of the H-O model. Stolper and Samuelson argued that, when the price of a capital-intensive product increases, the price of capital will increase, whilst the labour wages decrease (Carpenter & Dunung, 2011). In the view of Nehme and Nehme (2014), the theorem explains that trade between countries will result in equalisation in the absolute and relative returns to similar factors between countries. This theorems informs us why the removal of government restrictions often benefits the comparatively plentiful factor of production (Anderson, 2008; Atma Global Inc, 2012).

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This theorem shows how variations in product prices affect the prices of the production factors when positive production is preserved in each sector. It is helpful in assessing the impact on factor income, either when nations shift from autarky to free trade, or when other government restrictions are executed within the context of H-O model. According to Esterhuizen (2006), the H-O model demonstrates that foreign investments are not necessary in free trade, assuming external investment to be a global transfer of production factors.

3.2.6. Challenges to the comparative advantage theories

In order to prove the assertions made by the Heckscher-Ohlin model, Wassily Leontif conducted an empirical study to test this model using data from the USA. Leontief, just like Heckscher-Ohlin, assumed that the USA would supply capital-intensive goods and demand labour-intensive goods. However, the results from his experiment proved contrary to the earlier assumption; he noted that the USA's exports were less capital-intensive than its imports, and that imports were relatively more capital-intensive than exports, resulting to the name "Leontif Paradox" (Hough, Neuland & Bothma, 2003; Esterhuizen, 2006).

In the early 1960s, Stefan Linder acknowledged the contribution of H-O theory in explaining the supply-orientated theory in the trade of primary products, but it was insufficient to explain demand-orientated theory (Bukhari *et al*., 2005). In order to explain this, Linder developed a theory that is primarily demand orientated. In Linder's view, trade patterns are derived from "overlapping demand". To put this point into perspective, Linder believed that nations produce commodities for local consumers and then trade surplus with foreign countries (Bukhari *et al*., 2005). Furthermore, he assumed that trade in manufactured commodities will be higher amongst countries with common preferences and levels of labour wages than between those with different levels of labour wages (Cho & Moon, 2000; Dakal, Pradhan & Upadhyaya, 2009). This means that a nation would export those commodities for which there was increasing home demand.

In the mid-1960s, Raymond Vernon proposed the theory of "product life-cycle". His intention in developing the theory was to advance trade theory beyond the structure of comparative advantage (Atma Global Inc, 2012). In his theory, Vernon wanted to explain how buying patterns vary over time. His theory points out three stages that manufactured goods go through, namely (1) new product, (2) maturing product and (3) standardised product (Vernon, 1966). Vernon's theory proposes that, during the early stages of a product, all of its production factors come from its area of origin. When the product is exported to foreign markets, its point of production moves away from where it was first manufactured (Hill, 2009). The product cycle presents two technology-based arguments, noting that technical innovation that leads to new and profitable products involves capital and highly skilled labour (Sihlobo, 2016). However, the theory is unable to describe the present trade patterns according to which innovation happens all over the globe.

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One of the main assumption of the H-O theory was the assumption of constant returns to scale, that is, if the input factor were doubled, production would also be doubled. However, in various firms or nations there exist economies of scale (increasing returns), a factor that cannot be explained by the H-O model (Cho & Moon, 2000). This led to Krugman (1979) to develop a theory on economies of scale. They believed that nations or industries with economies of scale would profit through specialisation in the production of a limited range of commodities. That is, a country can become a low-cost producer without possessing large quantities of production factors. Krugman and Lancaster believed that economies of scale and global trade make it realistic for a nation to manufacture goods more efficiently, without forfeiting a variety of commodities. In addition, when there are no market distortions or government interventions between nations, consumers can buy products produced in other countries. However, there are challenges associated with this theory, such as that the exchange of similar products is unpredictable, as the theory does not highlight which nation should produce which commodities (Cho & Moon, 2000).

3.3. New trade theories

The traditional theories believed that trade occurs due to existing comparative advantages between nations. However, over time, trade patterns showed that a significant amount of trade happened between countries with similar factor endowments and technology – an event that could not be clarified by the early trade theories (Rangasamy, 2003; Smit, 2010). This resulted in new trade theories, mostly developed during the late 1970s, in an attempt to address such shortcomings of the traditional theories. The new trade theories put more emphasis on product differentiation instead of assuming homogenous products, assumed increasing returns to scale, opposed the constant returns to scale (assumed under the HO model), and assumed imperfect competition (oligopoly, monopoly) instead of the perfect competition assumed under traditional theories. These theories include the Michael Porter diamond, which serves as a link between comparative advantage and competitiveness.

3.3.1. The Porter Competitive Diamond

The classical, neoclassical and new trade theories give valuable explanation in terms of production, trade patterns and their effect on economic welfare (Esterhuizen & Van Rooyen, 2006). However, these theories alone are not enough to answer some of the frequently asked questions regarding the economy, viz. “when and why do certain industries succeed and others fail in global competition?” To answer these questions, Michael Porter developed a Diamond model, which he published in 1990. The development of this diamond was motivated by a very important question that Porter believed should first be addressed before any efforts can be made to answer the aforementioned questions: “why does an economy achieve international success?” Porter noted that answering this question is more important for understanding when and why some industries succeed in global markets. Porter believed national prosperity is created, not inherited. In his model, he argues that there are integral explanations why some countries and industries within countries are more competitive than others in

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international markets. His thesis was that a nation's competitiveness is not dependent on factor endowment (as previously claimed by the H-O-S models), but largely depends on numerous endogenous and exogenous factors that interact with each other to form suitable conditions that encourage innovation.

Porter noted that there was no lack of explanations justifying why some countries are competitive and others are not. The problem was that the answers that were given to this question were often conflicting. To put this into perspective, several scholars believed national competitiveness is achieved by the availability of cheap and abundant labour. Some believed that the key driver behind national competitiveness is the availability of natural resources, whilst others believed that different managerial skills lead to a country's competitive advantage. Others believed that macro-economic features such as interest rates and exchange rates are driving forces behind a nation's competitive advantage (Nehme & Nehme, 2014).

The varying views led to no common understanding on which theory best describes why some nations are competitive. According to Porter (1990), the answers why nations are competitive lie in four broad attributes, namely demand condition; related and supporting industries; firm strategy, structure and rivalry; and factor conditions. In 1998, Porter added two variables to the attributes, namely the role of government and the role of chance. Together, these variables form a framework of six attributes that interlink (see figure 3.1 below) with one another to form a supporting environment that ensures incentives and facilitations, aiding the industries to achieve a competitive advantage on the global stage. The diamond model operates as a system in which all attributes are interdependent on one another and need to be realised simultaneously (Van Rooyen *et al*., 2000; Esterhuizen, 2006; Nehme & Nehme, 2014), and each plays a major role in achieving an international competitive advantage. Porter (1998) noted these attributes as follows:

- ✓ Factor conditions
- ✓ Related and supporting industries
- ✓ Firm strategy, structure and rivalry
- ✓ Demand condition
- ✓ Role of government
- ✓ Role of chance

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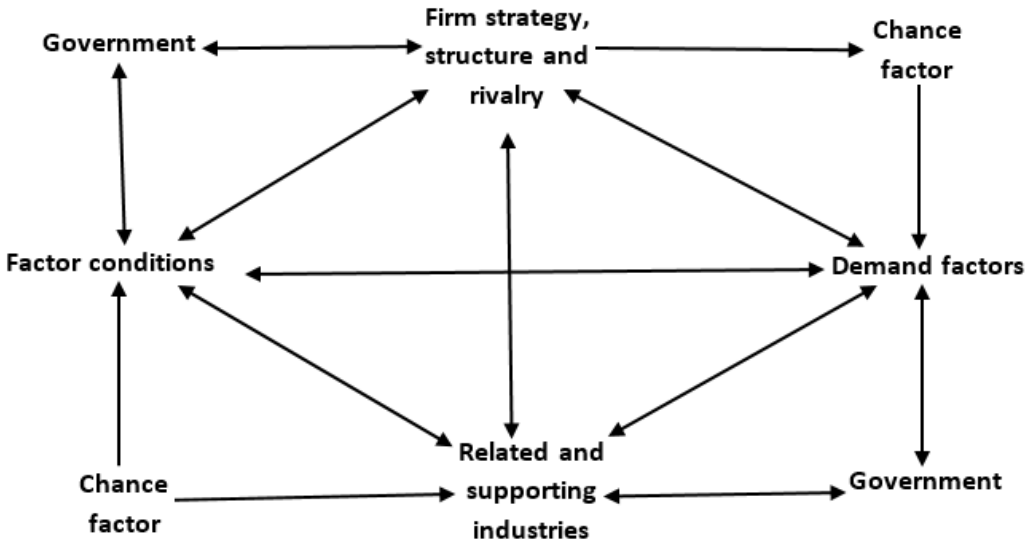

Figure 3.1: Porter diamond model
Source: Porter (1998)

Factor conditions: these are a nation's factors of production, such as labour, natural resources, land, capital and infrastructure. Opposing the earlier assertions of traditional theories) Porter believes that a nation's competitiveness is not inherited, but rather that it creates the crucial factors of production, like skilled labour, physical infrastructure and the availability of new technology. Furthermore, the availability of these factors is not as important as the degree and efficiency at which a nation develops, upgrades and deploys them in a sector (Nehme & Nehme, 2014). Many of the factors are apparent in the South African citrus industry, which uses sophisticated infrastructure, such as small airplanes (offloading chemicals and sterilised moths) in the fight against moths.

Related and supporting industries: these are those industries that share activities within the value chain. Porter (1990) emphasises that the presence or absence of these institutions or industries is extremely important to the competitive performance of a particular firm. These institutions include the availability of input and service providers, national and private research institutions, storage and packing facilities, and transport. Information flow and technical exchange between these industries accelerates the rate of upgrading and innovation (Nehme & Nehme, 2014).

Firm strategy, structure and rivalry: this component deals with a country's competitive advantage by assessing the nature in which sectors are developed, organised and managed, and the extent of domestic rivalry (Porter, 1990). Porter explains that firm structure and managerial skills differ across industries. By this he means that competitiveness in a certain firm results from the convergence of managerial activities and the organisational culture favoured in that particular country (Nehme & Nehme, 2014). In Porter's view, tough competition in local markets is likely to improve efficiency and innovation, resulting in international competitiveness.

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Demand condition: this segment is based on the extent of local demand for a sector's commodity or service and the ability to document this demand. These conditions include the size of the local market, growth in the value of the market, and consumer preferences (Porter, 1990). Porter believes that countries obtain competitiveness in sectors in which the local demand for a commodity gives their industries an earlier hint of emerging consumer needs (in relation to ever-changing consumer needs). These demand conditions can assist in creating a competitive edge when a certain sector is more observable in the local market than in global markets. However, this is quite the opposite when one looks at the consumption patterns of South African citrus. More than 60% of local citrus production is exported to foreign markets, whilst the domestic market only consumes just below 30% of production. This means that the domestic market is too small for the total production. The local citrus industry therefore is driven by foreign markets (particularly the EU) for innovation and product quality standards.

Role of government: government plays a crucial role in industries' global competitive performance because it can affect each of the aforementioned segments either positively or negatively through policy and operational capacity. These policies can be in the form of taxes, subsidies, property ownership and educational policies that affect the level of skills amongst workers (Mashabela, 2007. However, government policy implementation should not be aimed directly at influencing the competitiveness of its industries, but should rather create a good business setting in which industries can obtain a competitive advantage (Esterhuizen, 2006).

Role of chance: this segment deals with occasions whose existence is not influenced by the firm's conditions, but often by the local government (Porter, 2008), that is events that are beyond the control of a firm or national government. These events can be either harmful or beneficial to a firm's global competitive position (Mashabela, 2008). These events include, amongst other things, a large increase in demand (for an industry's commodity), exchange rates (high or low) and political decisions by foreign markets that may affect the firm positively or negatively. In this context, the South African citrus industry is export orientated and operates in an open, global environment, making it prone to some of the aforementioned events. Locally, the domestic market is stable and there is less chance of the events occurring, except for a fluctuation in exchange rates influenced by political decisions.

The above Porter competitive diamond framework offers a more qualitative explanation of determinants influencing the competitive success or failure of a firm in a certain nation. However, quantitative explanations can also be achieved using this model, where different firms' competitiveness in a certain nation are compared (see Van Rooyen *et al*. (2000) and Esterhuizen (2006). Van Rooyen *et al*. (2000) note that this method of using quantitative approach enables one to examine the organisation of the industry so as to identify the strong points and weak points, as well as gaps for improvement.

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3.4. Competitive and comparative advantage

Competitive and comparative advantage are two important concepts that form the basis in trying to understand international trade(Porter 1990; Van Rooyen *et al.*, 1999; Mosoma, 2004; Mashabela, 2008; Angala, 2015) and are often mistaken or confused with one another (Lim, 1997; Mashabela, 2007). Clarifying the confusion or misunderstanding that seems to exist between the two concepts is crucial when one hopes to use the different indexes that measure competitiveness, be it at firm level, industry level or a national level. Looking at national level perspective, comparative advantage is defined by (Lipsey, Courant, Purvis & Steiner, 1993; Serin & Civan, 2008) as the ability of a nation to produce a commodity at a lesser opportunity cost (best alternative forgone) of other commodity forgone, than other nations (i.e. the amount of commodity X forgone in order to produce a certain amount of commodity Y). In addition, assuming free market environment, the concept of comparative advantage could potentially explain how a nation, through efficient use of its factors of production (i.e. land, capital, labour), could benefit from trade (Lipsey *et al.*, 1993; Mashabela, 2007; Du Toit, 2009). Therefore, comparative advantage assists in decision making about whether it is economically rational/viable to continue producing and trading a certain commodity (Pugel, 2004). However, the concept of comparative advantage has received some criticism, notably from (Kannapiran & Flemming, 2000; Serin & Civan, 2008) by stating that it only relevant to inter-and-intra firm comparison inside a nation and is inappropriate for inter country comparisons.

According to Worley (1996) as well as Van Rooyen et al. (1999) on the other hand define competitive advantage as the concept that elucidates current trading patterns given the actual market forces together with all distortions to trade such as product quality, price effects, policy effect and firm's marketing skills, that are all overlooked by comparative advantage. It therefore shows real business opportunities within existing price and policy distortions (Van Rooyen, 2009) and is created and earned via an extremely contained process (Porter, 1990). Thus, the main difference between the two concepts is that comparative advantage advocates for free market economy (i.e. removal of market distortions), whereas competitive advantage takes into account market distortions. The former is concerned with efficient allocation of scarce resources (traditional theories), whilst the latter (competitive advantage) focuses on commercial performance of a nation, firm, industry or sector.

3.5. Defining competitiveness

There are a large number of proposals for a definition of competitiveness in the business and economics literature. This is because competitiveness did not enjoy too much attention in the early economic theories (Siggel, 2006). The literature supplies a wide variety of definitions for competitiveness. From a business perspective, Freebairn (1986) defines the concept as the "ability of an industry to trade its products successfully in order to achieve sustainable business growth within the global environment, while earning at least the opportunity cost of returns on resources employed". At a national level, the

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OECD (1992) defines competitiveness as, assuming free trade, the ability of a country to produce goods and services that meet the test of foreign competition while simultaneously maintaining and expanding domestic real income. Esterhuizen, Van Rooyen and D'Haese (2008) define competitiveness as "the ability of a sector, industry, firm or farm to compete by trading their products within the global environment while earning at least the opportunity cost of returns on resources employed".

From these definitions, Freebairn's (1986) definition of competitiveness will serve as a starting point in this study. Most recently, Boonzaaier and Van Rooyen (2017) provided an updated version of this definition. They define competitiveness as the "sustained ability of the stone fruit industry to attract investment by trading its produce competitively within the global marketplace, whilst continuously striving to earn returns greater that the opportunity cost of scarce resources engaged". This definition places more emphasis on competing in the highly contested and uneven global trade setting, focusing on the "competitiveness advantage" rather than "comparative advantage" analytical viewpoint (Porter, 1998; Esterhuizen, 2006; Boonzaaier, 2015).

3.6. Relevance of trade theories to South African citrus industry trade market

The current trade flows between nations do not reflect the trade patterns predicted by the classical and neo-classical trade theories (Porter, 1990:98). For instance, the classical theories advocate for free trade, but the current market structure is subjected to various agreements, such as the World Trade Organisation agreements, bilateral trade, quotas, tariffs, subsidies and other forms. Also, the classical theories postulated that trade will mostly be between developed nations and developing countries (Nyhodo, 2009). However, the current trade pattern indicate otherwise, as in 2007, trade between industrialised nations accounted for almost half of global trade, with more than 70% of the industrialised countries' exports going to other industrialised nations (Pugel, 2007). In 2015, the share of developing economies in merchandise exports was 42%, representing an increase of 9% when compared to the 2005 figures (WTO, 2016). In reality, the classical theories' assumptions do not hold true due to prevailing distortions in factor and output markets (Nyhodo, 2009). Hence, it becomes significant to review the relevance of these theories to the world trade agreements that currently shape the agricultural products' environment, particularly in the citrus industry.

Trade in agricultural products between nations is subjected to some distortions, which have received much attention since the General Agreement on Trade and Tariffs (GATT), Uruguay Round, Doha Development Agenda and World Trade Organization (Nyhodo, 2009). One of these distortions comes in the form of subsidies. According to Nyhodo (2009), subsidies are funds that farmers/producers receive from government, irrespective of product market conditions. For instance, amongst the top citrus-producing regions in the Northern Hemisphere, some countries and regions, such as China, the EU and the USA, receive producer support of about 21.3%, 18.9% and 9.4% respectively (OECD, 2016). The Producer Support Estimates are the percentage of total agricultural returns to the sector that originate

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from taxpayers in the form of either direct or indirect support measures (Sandrey & Vink, 2006). In the Southern Hemisphere, South Africa's level of producer support is estimated to be around 3.8% of gross farm receipts, in Australia producer support is estimated at 1.3%, in Brazil it is estimated to be at 2.6%, and in New Zealand producer support is estimated at around 0.7% of gross farm receipts (OECD, 2016). A conclusion that may be drawn from this is that some countries might have an unfair competitive advantage (i.e. high RTA values) relative to others, not because of natural endowment (as earlier suggested by the trade theories), but because of government interventions. This leaves one wondering if the same output can be achieved if common levels of support were to be applied across nations.

3.7. Methods used to measure competitiveness

The diversity of measures of competitiveness used by scholars suggests that ideas about this complex concept vary greatly. Some view competitiveness as the ability to perform well, whilst others view it as the generation and maintenance of a competitive advantage in the right way. These differing views on the concept have led to the development of different trade measures in trying to ascertain competitiveness, comparative advantage and product specialisation. Discussed below are some of the internationally recognised indexes that have been widely used in various ways and in various industries to measure the competitiveness of nations or industries.

3.7.1. Revealed Comparative Advantage (RCA)

The method of RCA can be traced back to the conventional trade theories based on comparative advantages principles (Fertő & Hubbard, 2002). Liesner (1958) was the first to apply this concept in his quest to evaluate the potential consequences of British entrance into the EU markets. It was later popularised by Balassa (1965), and hence is famously known as the "Balassa index". Banterle (2005) argues that this index provides answers to the difficulties encountered in testing the H-O theory. Balassa explains that analysing trade patterns that show both relative costs and variations in non-price factors results in revealed comparative advantage. Consequently, the Balassa index amounts to the RCA of a country or sector in the trade of a certain commodity or service, rather than directly evaluating the source of comparative advantage (through for example domestic resource costs, Webber & Lambaste, 2010). It is extensively used to pinpoint weak and strong export industries in a particular country. RCA is simply defined by Balassa (1965) as the ratio of the share of a particular commodity in global trade as it amounts to a nations' export of a commodity or service in relation to its total exports and to the corresponding export performance of a set of nations (Fertő & Hubbard, 2002). In simple terms, it identifies industries for which a single nation has a revealed comparative advantage and comparative disadvantage.

The formula for calculating RCA is as follows:

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$$RCA_{ZJ} = \left(\frac{\frac{X_{zj}}{X_Z}}{\frac{X_{refJ}}{X_{ref}}} \right) \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots . (1)$$

In this formula, X_{ZJ} represents country *Z*'s export value of commodity j, X_{reFJ} is commodity j's export value relative to a set of referenced countries other than Z, and X_{ref} is the total exports of a set of nations other than Z. If the results show a number higher than one, that nation is said to have a revealed comparative advantage, while any value less than one designates a comparative disadvantage. In simple terms, this means that, if the value of RCA_{ZJ} is greater than one, country Z is considered to have a comparative advantage in commodity J, and if the index value is below one, country Z is said to have a comparative disadvantage, since this commodity is not more important for country Z's exports than the exports of the referenced countries. The benefit of Balassa's RCA index is that it only requires trade data and is not dependent on any theory concerning factor endowments and perfect competition, and it measures relative success in exporting (Esterhuizen, 2006).

Havrila and Gunawardana (2003) outline three different ways in which RCA can be interpreted: ordinal, dichotomous and cardinal. In the ordinal interpretation, the index is used to rank industries or nations in terms of comparative advantage; in dichotomous, the index is used in a comparable way to distinguish if there is a comparative advantage in nations or not; and in cardinal, the index is used to assess the dimension of comparative advantage. The RCA index has been a common feature in the trade literature to measure comparative advantage and has gained greater acceptance amongst scholars. A number of researchers have used this method to determine the comparative advantage of nations, industries and services (for example, Porter, 1990a; Van Rooyen *et al*., 1999; Fertő & Hubbard, 2002; Esterhuizen, 2006; Qiang, Yong-Sheng & Xiao-Yuan, 2011; Sihlobo, 2016).

This model, however, has some shortcomings. According to Bender and Li (2002) and Fertő and Hubbard (2002), this concept can be explained in terms of autarkic price relations that are not visible. This means that this concept assumes that real pattern of comparative advantage can be detected from post-trade data (Bender & Li, 2002). Another problem, identified by Batra and Khan (2005), is that the index does not differentiate between developments in production factors and the search for suitable trade policies by a nation. In addition, the existence of government interventions (subsidies, import restrictions, export restrictions or other protectionist policies), particularly in agriculture, pose a threat in the values of RCA. These interventions might distort RCA indices, resulting in misrepresentation of the underlying competitive advantage (RCA values) (Mashabela, 2007). However, even with these mentioned shortcomings, Batha and Jooste (2004) are of the view that this measurement tool is still suitable, since the influence of fluctuations in market distortions can be subtracted from the activities of the RCA.

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3.7.2. Relative Trade Advantage (RTA)

Ever since it was first proposed by Balassa, the concept of RCA has been studied and improved, to such an extent that an excess of similar indexes now exist. Vollrath (1991) modified the original version of Balassa's revealed comparative advantage by proposing a method that will reflect both imports and exports as a better manifestation of global trade. The improved version by Vollrath is thought by many scholars, notably Bender and Li (2002), Batha and Jooste (2004), and Mashabela (2007), to be a more fitting measure of competitive advantage. These authors argue that a collection of nations is expected to have a bigger impact at the global level than a single nation. The new method proposed by Vollrath is called the relative trade advantage (RTA) index. It is computed as the difference between the relative export advantage (RXA), which equates to Balassa's original RCA, and its colleague, the relative import advantage (RMA).

$$RTA = RXA - RMA \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

RXA is the same as Balassa's RCA discussed above.

$$RMA_{ZJ} = \left(\frac{\frac{M_{zj}}{M_Z}}{\frac{M_{refJ}}{M_{ref}}} \right) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots . (3)$$

where "M" represents imports of a commodity or service. In the case of this research, M will represent imports of citrus fruits.

$$RTA = \left[\frac{\left(\frac{X_{zj}}{X_z}\right)}{\left(\frac{X_{refJ}}{X_{ref}}\right)} \right] - \left[\frac{\left(\frac{M_{zj}}{M_z}\right)}{\left(\frac{M_{refJ}}{M_{ref}}\right)} \right] \dots\dots\dots\dots\dots\dots . . . (4)$$

Any value of RTA above one suggests that a nation has a competitive advantage in the considered commodity or service, and an index below zero indicates a competitive disadvantage, whereas index values between zero and one reveal that a nation is marginally competitive in that particular product. The numerators in the model above demonstrate a nation's exports or imports in a particular commodity (i.e. citrus) or service relative to the exports or imports of the commodity or service by all other nations. The dominators, on the other hand, show the exports or imports of all commodities or services by reflecting the product in terms of the percentage of all other nations' exports or imports of all commodities or services. While the RXA and RMA indexes are exclusively calculated using either export or import data, only the RTA considers both export and import activities. This is advantageous when looking at the perspective of trade theory, mostly due to the increase in intra-industry trade (Frohberg & Hartmann, 1997). Several scholars, notably Pitts, Viaene, Traill and Gellynk (1995) and Batha and Jooste (2004) argue that it is crucial to consider both import and export values, because if one takes into account only exports (RXA), for instance, some countries act as a transit and the RXA values might reveal high levels of

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competitive advantage that would be purely false. Thus, taking into account both the exports and imports, the Vollrath RTA is a more complete measure of competitiveness than the RCA.

Esterhuizen and Van Rooyen (2006) explain that RTA allows for the assessment of competitive performance under current global economic conditions, such as export subsidies, tariffs and other trade regimes. However, this measurement tool does not reveal how a sector obtained its competitiveness, since some may be due to government intervention (Esterhuizen, 2006; Banterle & Carraresl, 2007). This means that this technique fails to pinpoint why certain countries or industries are competitive and why others are not, and it also fails to propose new solutions to how industries can maintain their competitive edge or how the industries could gain a competitive edge. Despite all this, competitiveness scholars, such as (Van Rooyen *et al.* 1999); Esterhuizen (2006); Esterhuizen and Van Rooyen (2006); Jafta (2014); Sinngu (2014) and Boonzaaier (2015) argue that this shortcoming can be rectified by combining the model with the Porter diamond to identify enhancing and constraining factors. In addition, numerous scholars have made use of the model to evaluate the competitive performance of agricultural sectors (see Table 3.1 for examples). In this study, the RTA index was used together with the two-round Delphi technique, in which the Michael Porter diamond was used to develop a questionnaire to capture factors that affect the success or failure of the industry.

3.7.3. Domestic resource cost ratio

The domestic resource cost (DRC) indicator is a tool that was created by two scholars, namely Bruno and Kruger, in the 1960s. According to Masters and Winter-Nelson (1995), the DRC method defines the hidden worth of non-exchangeable factor inputs utilised in the production per unit of exchangeable value added. It compares the local social costs of export production to global exchange earned (Yercan & Isikli, 2009). This technique amounts to the economic resource costs of production according to the prices of commodities, which mirror the exact economic value devoid of price distortions from subsidies, taxes or other protectionist policies (Yercan & Isikli, 2009). The numerator shows the cost of domestic non-tradeable factors (labour) used directly and indirectly in the manufacturing and marketing of the commodities. The denominator denotes the cost of tradable inputs, such as seed, chemicals, fuel and fertiliser, which are adjusted to border prices.

The formula to calculate DRC is as follows:

$$DRC_i = \frac{\sum_{j=k+1}^{n} a_{ij} V_j}{P_i^r - \sum_{j=1}^{k} a_{ij} P_J^r} \dots\dots\dots\dots\dots\dots\dots (5)$$

where a_{ij}, j = k + 1 to n denotes the technical coefficient for local resources and non-tradeable inputs, V_j represents the shadow price of local resources and non-tradeable inputs necessary to estimate the opportunity costs of domestic production, P^r_i indicates the reference price of exchangeable product, a_{ij},

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j = 1 to k is the technical coefficient for traded inputs, and P^r_J is the border prices of traded inputs. The results of the DRC model are interpreted as follows: when less than one, local production is efficient and globally competitive, and when equal to one it is said to be in a balanced state, meaning that the nation does not gain, nor does it save foreign exchange through local analysis. Webber and Lambaste, (2010), used this (DRC) method to calculate revealed comparative advantages. The limitations for this model are that the indicators do not take into account substitution and other cross-price effects because it assumes constant input-output coefficients over diverse policy scenarios, and the shadow prices of individual good are calculated independently (Frohberg & Hartmann, 1997). In addition, it has been criticized by Masters and Winter-Nelson (1995) of having biased results if the compared options include divergent combinations of traded and non-tradable components.

3.7.4. Net index

The revealed comparative advantage is widely criticised as being export orientated, ignoring the effects of imports in a sector's total competitiveness (Mashabela, 2007). To solve this problem associated with RCA, Vollrath (1991) proposed a new method called the net export index (NEI). He argues that, with an exchange of products, intra-industry trade results should be taken into consideration. The NEI is calculated to observe whether buying products in foreign markets affects competitiveness (Pitt & Lagnevick, 1998). The formula takes into consideration exports of a certain commodity minus its imports divided by its exports plus imports. The NEI formula can be expressed as follows:

$$NEI_{AJ} = \frac{(X_{AJ} - M_{AJ})}{(X_{AJ} + M_{AJ})} \dots\dots\dots\dots\dots\dots\dots (6)$$

where X_{AJ} represents the exports of industry A from country J, and M_{AJ} denotes imports of industry A from country J. The index values range from negative one (-1)_for imports to positive one (+1) for exports. Then, if a value of zero is obtained, it means that imports and exports are equal. According to Galetto (2003), the main problem associated with the NEI is that it does not take into consideration the total level of trade in a particular product. This suggests that a nation that is somewhat self-dependent, with little tradable surplus and without any imports, would have a positive value, and thus would seem to have a competitive edge even though it hardly exports.

3.7.5. Export market share (EMS)

The export market share (EMS), measured in quantity or value, is a simple measure of competitiveness. The EMS highlights the competitive ranking of a nation in the global markets for a commodity or service (Banterle, 2005). The index measures the export share of a nation in percentages in relation to the exports of a set of nations for a certain industry.

The formula for export market share is as follows:

$$EMS_{AJ} = \frac{X_{AJ}}{\sum_{j=1}^{n} X_{Aj}} \dots\dots\dots\dots\dots\dots\dots\dots (7)$$

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where X_{AJ} shows exports of industry A by nation J, and *n* represents the number of nations studied. The value of the index ranges between 0 and 100, if the value obtained is zero, the nation or industry has no exports for that commodity or service, and if the value obtained is 100, the nation or industry is the only exporter of that commodity or service.

3.8. South African competitive performance measurements

The World Economic Forum ranked South Africa as a country 47th out of 138 economies in terms of the global competitiveness index for the year 2016 (see Figure 3.2 below). This ranking is two places higher compared to the rankings in 2015, when South Africa was ranked 49th out of 140 countries.

	Rank / 138	Score (1-7)	Trend	Distance from best
Global Competitiveness Index	47	4.5		
Subindex A: Basic requirements	84	4.4		
1st pillar: Institutions	40	4.5		
2nd pillar: Infrastructure	64	4.2		
3rd pillar: Macroeconomic environment	79	4.5		
4th pillar: Health and primary education	123	4.3		
Subindex B: Efficiency enhancers	35	4.6		
5th pillar: Higher education and training	77	4.2		
6th pillar: Goods market efficiency	28	4.8		
7th pillar: Labor market efficiency	97	3.9		
8th pillar: Financial market development	11	5.2		
9th pillar: Technological readiness	49	4.7		
10th pillar: Market size	30	4.9		
Subindex C: Innovation and sophistication factors	31	4.2		
11th pillar: Business sophistication	30	4.5		
12th pillar: Innovation	35	3.8		

Figure 3.2: SA competitiveness status
Source: World Economic Forum (2017)

The purpose of the WEF annual report is to serve as an unbiased and impartial tool for nations, firms and society at large to work together effectively and in mutual collaboration (World Economic Forum, 2017). This is achieved by ranking the annual progress of a nation in different aspects and institutions that are relevant for long-term growth.

The report highlights twelve thematic areas on which countries are assessed, namely institutions, infrastructure, macro-economic environment, health and private education, higher education and training, goods market efficiency, financial market development, technological readiness and market size. The report highlights financial market development and goods market efficiency as some of the

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determinants that perform competitively for the nation (both ranked inside the top thirty), while determinants such as health and primary education and labour market efficiency are some the disadvantaging factors to the competitiveness status of the country. The international Institute of Management Development (IMD) ranked the competitiveness of SA 52nd out of 61 countries. In ranking countries, the IDM uses different criteria, such as the GDP, employment growth, real GDP growth, tariffs and food costs, amongst others, which are then grouped into four components, namely government efficiency, infrastructure development, economic growth and business efficiency (Viljoen, 2016). In these four components (mentioned above), SA is ranked 40th, 54th, 54th and 47th respectively.

In 2005, SA was ranked 25th in terms of a competitive business index and 41st in terms of a growth competitiveness index benchmarked against 103 countries (Ortmann, 2005). In 2007, the country ranked 33rd in the business competitiveness index (Porter, 2007). Clearly, this shows a downfall in the competitive performance of the nation. This fall in competitive performance can be attributed to various factors, such as the global financial crisis in 2008, changes in political structures, the high unemployment rate, the poor education system, low productivity levels and low growth rates in gross domestic product. To correct this competitive downfall, government has developed plans such as the ASGISA, the National Development Plan Vision 2030, which is aimed *inter alia* at growing an inclusive economy, improving the business environment, improving the quality of education and developing skills. According to Porter (2007), South Africa was performing better, but well below its potential competitiveness level, when looking at the potential the country had.

South Africa maintained its leadership role in Sub-Saharan Africa in terms of infrastructure, financial markets, competition and education, even with the current challenges originating from exchange rate variation, political worries and policy doubt (World Economic Forum, 2017. South African institutions were ranked 40th, infrastructure ranked 64th, macro-economic environment ranked 79th, labour market efficiency 97th and financial market development ranked 11th – the highest ranked amongst the twelve determinants. The country experienced progress in enhanced competition, both locally and internationally, better use of talent and upgrades in the quality of education. However, the World Economic Forum warns that certain barriers may constrain the country's competitiveness in the future.

The key shortcomings noted by the Forum include infrastructure development that has stalled in key sectors, such as electricity and transport, a lack of trust in politicians, security concerns, and transparency. In 2007, Porter highlighted that the lack of skills, especially amongst the employable workforce, and the lack of infrastructural development were the major weaknesses in the country's competitiveness status. In 2016, the top five factors identified to be constraining business activities in the region were inefficient government bureaucracy (ranked as second-most constraining factor in 2015), restrictive labour regulations (ranked as number one restricting factor in 2015), inadequately educated workforce (ranked 5th in 2015), policy instability and corruption. The IDM 2016 report indicates that

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incompetence by the public sector in service delivery, lack of skills development, government corruption, declining consumer demand, poor education outcomes and low business confidence are some of the factors with a negative influence on the country's level of competitiveness (Viljoen, 2016). On the other hand, the effective and reliable legal system, quality of corporate governance, cost competitiveness, and access to financing were the factors identified by the IDM to be enhancing the competitive performance of the country (Viljoen, 2016). All these factors play a major role in constraining and/or enhancing the competitiveness of South African businesses, including the agribusiness sector.

3.8.1. Competitive performance of SA agricultural commodities

Until recently there have not been many studies on the competitive performance of South African agricultural commodities. Competitiveness studies focusing on agricultural commodities only gained commercial credibility in the late 1990s, when local agricultural researchers started to realise their importance to the sector, particularly after the removal of sanctions imposed on the country. This shift can be associated with the significant changes affecting the sector, such as increased global competition, deregulation of the local agricultural sector, changing consumer demand, improved varieties (in some commodities) and technological advancement. Due to such factors, but not limited to them, the issue of competitiveness has become a global concern for most governments, firms, industries and individual companies (Boonzaaier, 2015). Table 3.1 below highlights the evolution of competitiveness studies on agricultural commodities. The first part of the table gives a brief review of international studies that have focused on the competitiveness of agricultural commodities, while the rest shows the evolution of competitiveness studies on South African agricultural commodities.

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Table 3.1: Previous studies on competitiveness in the agricultural sector

Tittle of the research/paper	**Authors**	**Measurements**	**Findings/conclusions**
		International	
Revealed comparative advantage and competitiveness in Hungarian agri-food sectors	Fertő & Hubbard, 2002	RCA	Hungary is competitive in 11 of the 22 aggregated products. Also enjoys comparative advantage in animal and meat products.
Competitiveness and agri-food trade: An empirical analysis in the European Union	Banterle, 2005	EMS RCA Net Export Index	The three indices were found to be high in the Netherlands, France, Belgium and Spain.
Improving agricultural competitiveness by setting priorities for investments in crop research: Lessons From Zambia	Haankuku & Kirsten, 2012	Dynamic Research Evaluation for Management model	The results reveal that sorghum, soya beans, maize, groundnuts, sunflower and cotton are the crops that should be prioritised in receiving funding for research under the efficiency objective.
Analysing the competitiveness of the agribusiness sector in Swaziland	Dlamini, 2012	Porter Diamond	The results reveal that the competitive environment in which the sector operates is unfavourable and does not enhance competitiveness.
Competitiveness analysis of the tobacco sub-sector in the Republic of Macedonia	Tuna *et al*., 2013	RCA, Porter Diamond	The sub-sector has favourable conditions and a competitive advantage for producing tobacco.
Determining Rwanda's comparative advantage in rice: Eastern Province case study	Nkurunziza, 2015	Policy analysis matrix (PAM)	The Eastern Province has a comparative advantage in rice.
An analysis of the competitive performance of the Namibian date industry - 2001 to 2013	Angala, 2015	RTA, Porter Diamond	The Namibian date industry is generally competitive.

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South African context			
The competitiveness of Western Cape wheat production: An international comparison	Vink, Kleynhans & Street, 1998	Agricultural costs of production	Total variable cost per ha of producing wheat differs greatly between SA and internationally. Lack of competitiveness of wheat from the Western Cape is due to low yields rather than high costs.
Analysis of the competitive nature of the Southern African sheep-meat value chain	Venter & Horsthemke, 1999	Porter diamond	The Southern African sheep meat was competitive. Determinants of meat consumption change from economic to non-economic (in both EU and SA).
Analysing competitive advantage in the South African dairy industry: An integrated approach	Blignaut, 1999	Low cost and differentiation comparisons, RCA, Porter Diamond	Local milk producers are effective. Secondary dairy producers are not globally competitive.
How competitive is agribusiness in the South African food commodity chain?	Esterhuizen & Van Rooyen, 1999	RTA	The selected food chains are marginally competitive except pineapple, maize, apple and wheat. Competitiveness index decreases as one moves down the value chain.
The effects of a free trade agreement on South African agriculture: Competitiveness of fruits in the EU market	Kalaba & Henneberry, 2001	Import demand models - Source-differentiated AIDS model - Restricted SDAIDS models	Chile and USA have a strong competitive advantage over SA in some fruits. Complementary relationships between SA and USA apples.
The competitiveness of the South African and Australian flower industries	Van Rooyen, Kirsten, Van Rooyen & Collins, 2001	Domestic resource cost (DRC), RCA, private cost ratio (PRC), policy analysis matrix (PAM), Porter Diamond	In all three approaches, SA has competitive advantage in the production of flowers. Porter diamond indicates a more competitive advantage for Australian flowers. Both SA and Australia have revealed comparative disadvantages in the flower industries.
Comparative advantage of the primary oilseeds industry in South Africa	Jooste & Van Schalkwyk, 2001	Domestic resource cost	Results indicate that the extent of developing new cultivars with improved yield potential will largely determine the comparative advantage of oilseeds in areas where agro-ecological conditions are poor.

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			Increased efficiency forms the basis of competitive advantage.
The competitiveness of the agricultural input industry in South Africa	Esterhuizen, Van Rooyen & Van Zyl, 2001	RTA	The fertiliser industry is competitive. Pesticide industry has a decreasing competitive performance. Machinery industry is not competitive. Agro-food and fibre industry have shown increasing trends of competitiveness.
Comparative advantage of organic wheat production in the Western Cape	Mahlanza, Mendes & Vink, 2003	Social cost benefit (SCB) DRC, policy analysis matrix (PAM)	Findings shows a comparative advantage for wheat grown under organic practices. Findings further show existence of distortions in the market, even if wheat is grown under organic practices.
Agricultural competitiveness and supply chain integration: South Africa, Argentina and Australia	Mosoma, 2004	RTA	SA agricultural commodity chains are marginally competitive. Argentinean and Australian food chains are internationally competitive. Competitiveness index decreases in all countries as one moves down the value chain.
Relative competitiveness of the South African oilseed industry	Hallat, 2005	RCA, RTA, net index exports (NXi)	SA primary industry is more competitive compared to that of Argentina. In the secondary industry, Argentina enjoys competitive advantage over South Africa.
An inquiry into factors impacting on the competitiveness of the South African wine industry	Esterhuizen & Van Rooyen, 2006	RTA	SA wine has improving competitiveness. Size of domestic market, strong Rand, crime are some of the factors identified to be constraining the industry. Efficient supporting system and intense competition in the market are some of the identified enhancing factors.
Competitive performance of global deciduous fruit supply chains: South Africa versus Chile	Mashabela & Vink, 2008	RTA	Findings show that SA deciduous fruit supply chains are internationally competitive. Chile supply chains for deciduous fruit are strongly competitive internationally.

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			SA deciduous supply chain loses its competitiveness status as one moves from primary to processed products.
An evaluation of the competitiveness of the agribusiness sector in South Africa	Esterhuizen, Van Rooyen & D'Haese, 2008	RTA, Porter Diamond	SA business sector is marginally competitive, but with an increasing trend. Crime and labour policy are some of the factors identified to be constraining the industry, whereas for high-quality products, continuous innovation was found to be enhancing the industry.
Competitiveness of the South African deciduous fruit canning industry	Madima, 2009	RTA, Porter Diamond	EU subsidies negatively affect competitiveness of the SA fruit canning industry in that market. The industry is globally competitive in product quality and labour costs.
The business environment and international competitiveness of the South African citrus industry	Ndou & Obi, 2011	Constant market share	Industry is competitive particularly in oranges and lemons.
Analysing the competitive performance of the South African wine industry	Van Rooyen *et al.*, 2011	RTA, Porter Diamond	SA wines are internationally competitive (with increasing trend). Fluctuating exchange rate and changing market trends play a negative role in the competitive performance of the industry.
Measurement and analysis of the trends in competitive performance: South African agribusiness during the 2000's	Van Rooyen & Esterhuizen, 2012	RTA, Porter Diamond	Findings reveal that the business environment of the sector is constrained, marginally positive but with an increasingly negative trend since 2004.
Competitiveness of the South African citrus fruit industry relative to its southern hemisphere competitors	Sinngu, 2014	Revealed comparative advantage (RCA), RTA, NXi, Porter Diamond	SA citrus is globally more competitive than its SH rivals. However, its competitiveness decreases as one moves down the value chain. BEE policy, labour policy and tax system were found to be some of the factors constraining the industry.
An inquiry into the competitiveness of the South African stone fruit industry	Boonzaaier, 2015	RTA, Porter Diamond	The industry's competitiveness falls behind Chile in the SH, whilst in the Northern Hemisphere it is more competitive than France.

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			Strategy, structure and rivalry factors were identified as enhancing factors.
An evaluation of competitiveness of South African maize exports	Sihlobo, 2016	RCA, agri-benchmark production model, growth share matrix, indicative trade potential index, market attractiveness index (MAI), and relative indicative trade potential index.	SA maize exports are competitive. Competitive advantage falls behind Brazil, Argentina and the USA in the production costs analysis. United Arab Emirates, Japan and Mexico were identified as high-potential export markets for SA maize.
Factors influencing the competitiveness of the South African wheat industry: A hedonic price model	Van der Merwe, Cloete & Van Schalkwyk, 2016	Hedonic price model	Findings show that changes in price are mainly a function of colour, P/L, defects and fall.
Price formation and competitiveness of the South African broiler industry in the global context	Davids & Meyer, 2017	Univariate time series analysis Qualitative approach	Technical efficiency of South African producers is on par with international standards. Domestic price of chicken is more elastic to variations in the import parity price than changes in feed costs.
South Africa's competitiveness against its main competitors in the market of pears imported by EU28	Valenciano *et al*., 2017	Constant market share	SA pears were competitive in the EU market before the global financial crisis. After the crisis, exports of pears from SA to EU grew at a slower rate.

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From the table, it is evident that a range of studies have been conducted on the competitiveness of South African agricultural commodities, with more studies being conducted in the last decade. What can be highlighted from this table is the common use of the trade-based measure of competitiveness, namely RTA, together with the Porter diamond model, as framework to capture views to assess the competitive performance of some local agricultural commodities. However, none of these studies has applied the well-proven conventional framework used by ISMEA (1999), Van Rooyen *et al*. (2000), Esterhuizen (2006), Jafta (2014), Angala (2015) and Boonzaaier (2015) to analyse the competitive performance of the local citrus fruit. In addition, no statements on the validity of the industry survey, its relevance, consensus and variation in opinions, were included in these previous citrus competitiveness studies. In this study, a more refined approach (i.e. applying the conventional framework to the citrus industry), taking into account the relevance of the factors affecting competitive performance, was applied. Furthermore, none of these studies utilized the Delphi technique in their analysis. Thus the addition of Delphi analysis will provide extension of the conventional framework.

3.9. Conclusions

The objective of this chapter was to review trade theories and to understand their relevance by looking at the perspective of the competitiveness of South African citrus industry exports. The common norm amongst these theories is the search for reasons behind countries opening their markets to exporters and why some nations are internationally more competitive than others. The traditional theories (Ricardian, H-O-S models) believe that trade occurs due to existing comparative advantage between nations (factor endowments). However, the new competitiveness theories, such as the Porter diamond, differ from the traditional trade theories by arguing that national prosperity is not inherited (set of factor endowments), but created by strategic choices that a particular firm or country make. In defining 'competitiveness', Freebain's (1986) definition served as a starting point as it gave importance to "competitiveness advantage" rather than "comparative advantage" analytical viewpoint. Several techniques used to assess competitive performance were also studied and their shortcomings outlined. Previous competitiveness studies that were conducted in the agricultural sector to measure and analyse the competitive performance of various agricultural industries were also reviewed, with more emphasise given to their results. The following chapter sheds light on the methodologies that were used to achieve or answer the overall objective of this study.

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Chapter 4: Research methodology

4.1. Introduction

The preceding chapter described the trade theories that form the foundation of the analysis of competitiveness performance in the agricultural environment. Related analytical models and techniques were also considered for application in this study. This chapter starts by giving the analytical framework that was followed and then provides a detailed explanation on how each step was designed to answer the stated research objectives.

4.2. Analytical framework

In order to empirically evaluate the competitive performance of the South African citrus industry, this study made use of the internationally recognised method, namely the Vollrath-Porter method, (1999), in terms of which RTA was used to measure competitive performance, with the analysis of such performance and related trends conducted through the Porter Competitive Diamond model. This Vollrath method was explained thoroughly in section 3.7.2 and the Porter method was explained in section 3.3.1 of Chapter 3. According to Esterhuizen (2006), there are certain characteristics that have to be taken into consideration when drawing up an analytical framework for competitiveness studies. The first aspect deals with defining the term competitiveness; the second aspect requires the evaluation of the competitive performance over time – using trade data (e.g. FAO or ITC). The third aspect requires a critical understanding of the underlying factors that drive the success or failure of the industry – this is done by gathering key information from relevant people in the industry using the Porter Competitive Diamond model. The fourth aspect deals with analysing those underlying factors in order to identify major enhancing or/and constraining factors. The final aspect deals with the sustainability of the industry's competitiveness, i.e. developing strategies that can assist in improving the competitiveness of the industry.

With these attributes in mind, this study adapted the five-step analytical framework that has been popularised by Esterhuizen (2006), Van Rooyen *et al*. (2011), and Van Rooyen and Esterhuizen (2012) and recently used by Jafta (2014), Angala (2015), Boonzaaier (2015) and Boonzaaier and Van Rooyen (2017) in their works on analysing competitiveness in various agricultural industries. This study, however, extends the conventional framework adding new analytical tools, such as Delphi analysis. These steps are sequentially outlined in the figure below.

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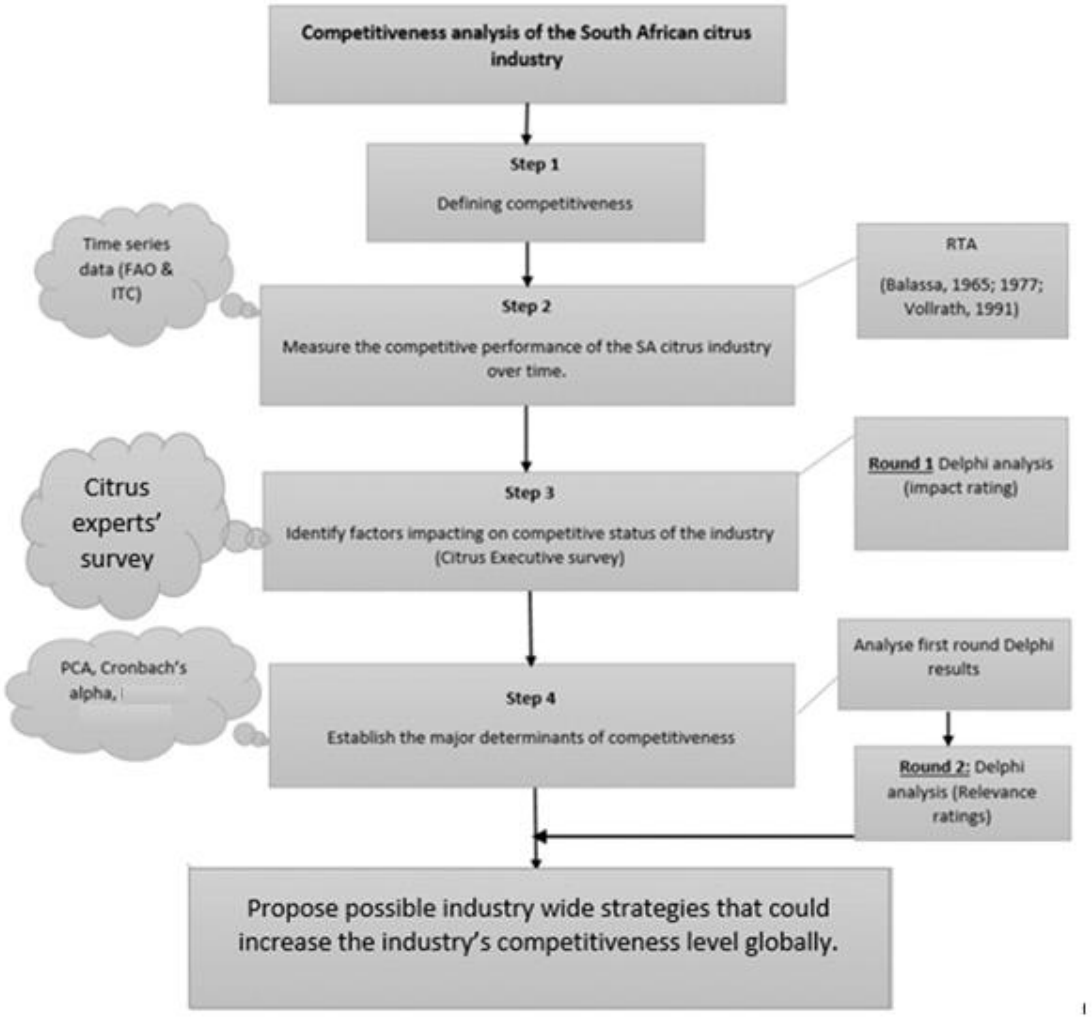

Figure 4.1: Analytical framework.
Source: Adapted from Esterhuizen (2006), Van Rooyen et al. (2011), Van Rooyen and Esterhuizen (2012), Jafta (2014), Angala (2015), Boonzaaier (2015) and Boonzaaier and Van Rooyen (2017).

4.2.1. Step one: Defining competitiveness in the context of the South African citrus industry

Step one set to define competitiveness in the context of the commodity or industry under consideration, viz. the South African citrus industry. As stated in the preceding chapter, the concept of competitiveness has enjoyed much attention amongst scholars, to the extent that a plethora of definitions now exist. Nevertheless, it was important that a fitting and clear definition of competitiveness be adopted within the agricultural trade framework in order to have an appropriate measure to be utilised as a proxy for the evaluation of competitiveness. Freebairn's (1986) definition of competitiveness served as a starting point in this study. Freebairn defines competitiveness as "the ability of a sector, industry, firm or farm to compete by trading their products at the time, place and form within the global environment while earning at least the opportunity cost of returns on resources employed". This definition places more emphasis on competing in the highly contested and uneven

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global trade setting, focusing on the "competitiveness advantage" rather than "comparative advantage" analytical viewpoint (Porter, 1998; Esterhuizen, 2006; Boonzaaier, 2015).

4.2.2. Step two: measure competitive performance over time

Step two set to assess the competitive performance of the South African citrus industry over time in relation to its major global competitors. The different measures that are commonly used in competitiveness studies and that served as the guideline in picking out the appropriate methods were highlighted in Chapter 3, section 3.7.1 to section 3.7.6. After reviewing the relevant literature and the limitations of each measurement tool, the RTA technique of Vollrath (1991) was deemed the most appropriate tool to measure, quantitatively, the competitiveness of the citrus industry. The RTA index is an improved version of Balassa's RCA, as improved by Thomas Vollrath in 1991. It describes the country's share of the world market relating to one commodity (e.g. oranges, soft citrus) over time, relative to its share of all traded goods, and it accounts for imports as well as export (see section 3.7.2). As market prices are used, and not "resource cost calculations" the RTA give a better indication of "competitive performance" than the RCA index (Boonzaaier & van Rooyen, 2017) and is thus preferred in this study.

As argued earlier, the RTA indexes might also be biased due to the size of economies—when comparing countries--, some undisclosed market distortion in the form of tariffs, subsidies and other government forms of protectionism. This is particularly true of the agricultural and food sector, where government interventions are a common feature (Mashabela & Vink, 2008). For example, the OECD (2016) reports that Australia provides producer support of 1.3% of gross farm receipts, SA provides around 3.8%, the EU is estimated to provide about 18.9%, the USA is estimated to provide 9.4% and China is estimated to provide producer support of 21.3% of gross farm income. Therefore, some citrus-producing countries might have an unfair advantage (higher RTA values), not because of factor endowments (as previously assumed by traditional theories), but because of government interventions. It is therefore for amongst these reasons that a cautious stance is advised when reading the RTA results in the next chapter. It must however be noted that such conditions influence global trade directly, hence the more useful to agribusiness concept of "Competitive Advantage" rather than the academic/policy analysis view of "Comparative Advantage".

Data used for measurement

This study used secondary trade data from two internationally recognised sources, namely the ITC, which can be accessed on www.trademap.org, and the FAO, which can be accessed on http://www.fao.org/faostat/en/#data. The ITC database provides trade statistics for all products for most countries registered with the World Trade Organisation, starting from the year 2001. The FAO,

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on the other hand, is a United Nations organisation that provides trade statistics of agricultural commodities only for over 245 countries and territories. These time-series databases provide the necessary trade data required to analyse the competitive performance of a commodity over time. They provide data for imports and exports of citrus fruits needed to compare the competitive performance of the local citrus industry against its global competitors. The utilisation of both these databases helped control the system for measurements, since the available data of the FAO runs only from 1961 to 2013, whereas the ITC data runs from 2001 to 2016 (the time of this study's analysis). Therefore using these two databases provides a historical and more updated picture of the competitive performance of the industry over time. Furthermore, since the FAO trade database uses only agriculture-related data, it is important to highlight that the agricultural industries not only compete within the agriculture spectrum, but also compete with the whole economy for scarce resources such as land, credit and water. Hence using both these databases provides competitive performance in the agricultural spectrum and competitive performance at the level of the economy.

4.2.3. Step three: Establish the determinants of competitiveness in the South African citrus industry

Step 3 involved determining the factors that influence (positively or negatively) the competitiveness of the local citrus industry. This step involved participative methods by obtaining views and opinions from leading experts in the citrus industry in order to gather key information regarding the exogenous and endogenous factors that enhance and/or constrain the competitive performance of the industry. This methodology of gathering and analysing such information is discussed below, in sections 4.2.3.1 to 4.2.3.3.

4.2.3.1. Delphi method

The Delphi technique, largely credited to Dalkey and Helmer (1963), is a commonly used and globally accepted method for achieving convergence of opinion relating to real-world knowledge sought from experts relating to a certain topic (Hsu & Sandford, 2007). According to Ludwig (1997), this method, by design, is an iterative multistage communication process that intends to conduct detailed examinations and discussions of a specific issue for the purpose of goal setting (strategies), policy effect investigation, or predicting the occurrence of future events. It involves the use of techniques that intend to develop, from a group of informants, an agreed view or shared interpretation of an emerging topic (i.e. factors affecting the competitive success of the citrus industry) (Day & Bobeva, 2005). This Delphi technique is also utilised in order to aid the enhancement of effective decision-making in various industries (Mkhabela, 2013).

In contrast to common surveys, which try to identify "what is", the Delphi technique attempts to also extend the discussion to address "what could/should be" (Miller, 2006). Therefore, it is

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sufficient to say that the Delphi technique is based on the underlying principle that "two experts" are better than one, or a certain number of heads are better than one" (Dalkey, 1972). Generally, the key features of the Delphi technique include the use of experts, different rounds, controlled opinion feedback and giving participants the chance to change their opinions (De Vet, Brug, De Nooijer, Dijkstra & De Vries, 2005). In the light of this feedback, individuals are then permitted to amend their judgements until an acceptable measure of consensus is reached (Jones, McFarlane, Park & Tranter, 2017). The Delphi technique has become a well-accepted means of using expert opinions, and has been used to explore a wide range of issues in the realm of food and agriculture, such as food supply chain management (Kenyon *et al*., 2008, water resource management (De Lange & Kleynhans, 2007), and pricing policy option (Mkhabela, 2013), to mention a few.

To maximise the quality of the data derived from the survey of experts, this study employed the Delphi technique, because it has the ability to generate consensus on policy options to deal with complex problems among various interest groups. In the case of this study, it was intended to generate consensus amongst different experts in the citrus value chain on factors that influence (positively or negatively) the competitive performance of the industry. Mamaqi, Miguel and Olave (2010) suggest that two or three iterations of the Delphi method are sufficient for most research. They argue that the process only ends if the research question has been answered, e.g. when consensus is reached. In this study, a two-round Delphi analysis was deemed sufficient to achieve the results.

4.2.3.2. Delphi technique round one: identification of factors impacting competitive performance

Selection of experts (sample frame)

The first step in Delphi analysis studies requires the identification of experts to act as representatives of the industry in solving a particular problem. The focus group in this study comprised experts in the industry, whether as input providers, producers, packers, exporters, processors and/or marketers. According to Hsu and Sandford (2007), there are no specific guidelines to be followed concerning the selection of expert panellists for Delphi studies; the selection decision is often based upon available funding, logistics and exclusion criteria. With the support of the Citrus Growers Association executives (Mr Justin Chadwick and John Edmonds) and a focus group gathered in Citrusdal (research feedback: in citrus production, date: 26/July/2017), a list of 60 experts was drawn up. These participants were selected on the basis of their experience in their particular fields of expertise. The selection of experts was "custom-made" to ensure representation across the typical citrus-based value chain and to represent diverse geographical regions. Witkin and Altchuld (1995) highlight that the approximate size of a Delphi panel is generally under 50, although more members have been employed. Ludwig (1997) concurs that the majority of Delphi studies have used between 15 and 20 respondents. However, Hsu

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and Sandford (2007) caution that non-response can be a problem for such studies, since a large time commitment is usually involved and some in the selected framework may drop out before the study is completed.

In this study, a panel of 60 experts was drawn up as a means of increasing the response rate. An explanatory recruitment letter, consisting of RTA graphs, was sent via email to these experts, accompanied by a questionnaire. A total of 13 questionnaires were returned, representing a relatively low response rate of 22%.

Table 4.1: Number of experts who participated in the Delphi method and their position in the citrus value chain

Number	**Location**	**Position in the value chain**
1.	Kirkwood, Sundays River	Producer, processor, exporter, input provider
2.	Weenen/Umtshezi	Producer, packer
3.	Warrenton	Producer, packer, exporter
4.	Berg River	Producer
5.	Kirkwood	Producer
6.	Groblersdal	Producer, packer, exporter
7.	Gamtoos Valley	Producer
8.	Paarl	Input provider
9.	Clanwilliam	Producer
10.	Western cape	Input provider, exporter
11.	Stellenbosch	Producer, processor, packer, exporter
12	Swellendam	Producer, packer,
13.	Stellenbosch	Producer, packer, exporter

Source: Based on Citrus Experts Survey (2017)

This relatively low response rate was not left unattended and was viewed from within a scientific research approach. The questions were addressed and assessed by envisioning the identification of possible weaknesses that could have reflected an unclear framework for the questionnaire. This was however determined not to be the case, again in collaboration with the Citrus Growers Association. The questionnaire was also sent soon after the end of the harvest season, which is a time when most experts are on holiday break or preparing for next year's production season. It was thus decided that the obtained response rate would be enough to draw meaningful first round consensus on the expressed opinions i.e. factors impacting on competitive performance. The full list (location & position in value chain) of experts who participated in the first round is shown in the table above.

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4.2.3.3. Questionnaire design and data collection

After the experts were identified, questionnaires—designed and piloted in collaboration with the CGA—and structured in the form of the Porter Diamond Model, were sent via email to these experts to give opinions by means of rating the factors that influence (negatively or positively) the competitive success of the industry (see APPENDIX A). The questionnaire was categorised into six sections, namely (i) production factors, (ii) firm strategy, structure and rivalry, (iii) demand factors, (iv) supporting and related industries, (v) government support and policies, (vi) and chance factors (see section 3.3.1). In this questionnaire, the selected experts were asked to express their opinion by scoring their results on a Likert scale of 1 to 5, with 1 being constraining, 3 being neutral and 5 being enhancing (see Appendix A). Numerous kinds of rating scales have been established to analyse attitudes and opinions directly, but the Likert scale was selected for its popularity and acceptability. The Likert scale uses a fixed-choice response format and is designed to measure attitudes or opinions (Coughlan, Cronin & Ryan, 2007). A Likert-type scale assumes that the strength/intensity of experience is linear, that is, on a continuum from strongly agree to strongly disagree, and makes the assumption that attitudes can be measured (Coughlan *et al*., 2007).

4.2.3.4. Round two Delphi technique

In the second round these experts were shown the results from the first round of the Delphi (i.e. the high-consensus factors with a high degree of internal consistency) and were asked to rate their 'relevance' as determinants of the competitiveness of the industry. This round gave a future view of these determinants, since the first round gave ratings based on their current impact. This is because one needs to know and understand how the specific factors are currently performing (i.e. round 1 – impacting), and whether it is important that these factors perform well towards the success of the industry's competitiveness (i.e. round 2 – relevance in general), hence aiding the formulation of step five (strategies). In order to further analyse the most critical factors affecting the industry, an X-Y scatterplot (or a two-dimensional impact and relevance analysis) was compiled for the 'impact' ratings (X-axis) plotted against the 'relevance' rating (Y-axis) (see Figure 4.2 below).

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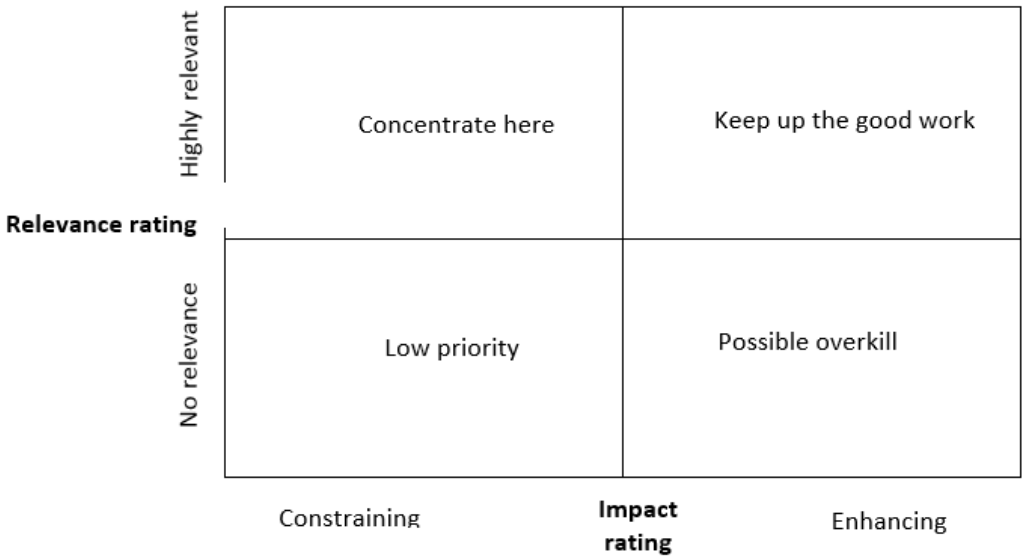

Figure 4.2: X-Y scatter plot for impact and relevance ratings

This analysis enables one to identify the performance gap between 'what is' the status of performance now and 'what ought' to be the status – hence fitting the requirements of a Delphi study. In the second round, a relatively high response rate of 76% was obtained, with only two choosing to drop out. One of the respondents could not be reached due to a non-functional email address.

4.2.4. Step four: data analysis (used in steps 3 and 4)

4.2.4.1. Principal component analysis (PCA)

PCA is a type of factor analysis that reduces dimensions within data by extracting linear combinations that best describe the co-variance among all elements (Vyas & Kumaramayake, 2005). It analyses a data table representing observations described by several dependent variables, which are, in general, intercorrelated (Abdi & Williams, 2010). According to Abdi and Williams (2010), the purpose of this analysis is to extract important information from the data table and to express this information as a set of new orthogonal variables called *principal components.*

PCA was applied for data-reduction purposes in order to distinguish between highly correlated variables, that is determinants for which the experts' views on ratings were very similar, and uncorrelated variables, that is the determinants for which the experts' responses on ratings were more varying. In statistical analysis, the uncorrelated variables could undergo further analyses, such as detailed cluster analysis, to identify groups within the dataset with similar opinions. However, such analysis can also be limited by the size of the available data.

This PCA analysis was used to pinpoint highly correlated variables in the dataset in terms of factors related to the six main Porter Diamond determinants. Responses to the impact of the determinants within the various sets were subjected to PCA using 1 as prior communality estimates.

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The principal axis method was used to extract the components, and this was followed by a varimax rotation. Meaningful components had Eigen values larger than 1 and were retained for rotation. Following the approach of Angala (2015), an item was interpreted as loading on a given component if the factor loading was 0.40 or greater for that component, and less than 0.40 for the other.

4.2.4.2. **Cronbach's alpha**

Alpha was developed by Lee Cronbach in 1951 to provide a measure of the internal consistency of a test or scale; it is expressed as a number between 0 and 1, with a number close to 1 representing high levels of internal consistency (Tavakol & Dennick, 2011). Internal consistency refers to the extent to which all the items in a test measure the same construct, and hence it is connected to the interrelatedness of the items within the test. Tavakol and Dennick (2011) further advise that internal consistency should be determined before a test can be employed for research purposes to ensure validity. If the items in a test are correlated with each other, the value of alpha is increased. However, a high coefficient alpha does not always mean a high degree of internal consistency. It should also be noted that, while a high value for Cronbach's alpha indicates good internal consistency of the items in the scale, it does not mean that the scale is unidimensional (Gliem & Gliem, 2010).

This test is most commonly used when one wants to assess the internal consistency of a questionnaire that is made up of multiple Likert-type scales (Gliem & Gliem, 2010). Accordingly, the questionnaire, which was designed within the Porter diamond model framework, was reorganised and restructured to fit the above-mentioned models, and substantiated with Cronbach's alpha. The Cronbach's alpha reliability coefficient was used to determine the extent to which the questions asked were validly grouped together into the six determinants, and was used to assess the internal reliability of the factors identified to be correlated in the PCA analysis.

The data analysis process involved identifying and retaining only the most enhancing and constraining factors, then reducing these factors by combining only the correlated factors into principle components, and then retaining only those factors that displayed statistically acceptable reliability to aid the process of strategy development and the formulation of the round two Delphi analysis. The three techniques mentioned above were used within Microsoft Excel 2016 and the International Business Machines: Statistical Package for Social Scientists (IBM: SPSS for Windows 23.0), and were applied to run the data collected by the questionnaires.

4.2.5. Step five: proposing strategies to enhance the industry's global competitive performance

The preceding steps provided a viewpoint on the issues of competitiveness and contributed to greater understanding of the competitiveness of the local citrus industry. Based on the data analysis process

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in the previous steps (i.e. PCA, Cronbach's alpha, scatter plot), this step suggests industry-level strategies to be considered to increase the industry's global competitive performance. Ideally such proposals should be developed as a response on the findings in steps 3 and 4 and in collaboration with relevant industry role players. In this study such participation was not conducted and the proposed strategies can at best be viewed as recommendations to be considered by the industry.

4.3. Conclusions

The purpose of this chapter was to describe the analytical framework used in this study in order to reach conclusions on the overall objectives. This chapter provided a description of the technique to be used in the next chapter in order to measure, quantitatively, the competitiveness of the local citrus industry. The internationally recognised technique of Vollrath (1991), namely the relative trade advantage (RTA), is used in the next chapter to measure the competitiveness of the local citrus industry. For the purpose of identifying and analysing the factors that affect the competitive performance of an industry, a two-round Delphi analysis was deemed sufficient to achieving convergence of opinions sought from the citrus industry experts. In the first round of Delphi technique, a questionnaire, designed in the form of Porter diamond model will be sent to selected citrus industry experts in order to capture the determinants of competitive performance. Principal component analysis and Cronbach's alpha were also discussed as methods to be used in the next chapter for detailed statistical analysis. The next chapter provides the empirical findings from the methods discussed above.

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Chapter 5: Findings and discussion

5.1. Introduction

This chapter consider the findings of the analysis as per the applied analytical framework. The first part confirms the definition of the term "competitiveness" as it applies to the trade oriented South African citrus industry (step 1). The second part (step 2) measures the sector's competitive performance since 1961, highlighting the competitive trends over time and comparing this competitive performance with that of other citrus-trading nations. The competitive performance of individual citrus fruits are also considered. The chapter then provides an identification and empirical analysis of factors that negatively and/or positively affect the competitive success of the industry through the two-step Delphi analysis and the application of the Porter competitive diamond (steps 3 and 4).

5.2. How can competitiveness be defined in the context of the South African citrus industry?

This was the starting point for this write-up. The main question here was to define the term "competitiveness" as it applies to the strongly export directed South African citrus industry. Having reviewed the relevant literature and situating the industry, in particularly as it is as highly integrated into global trade, competitiveness in this research was conceptualised as the:

"Ability of the South African citrus industry to produce and trade citrus fruit on a maintainable basis in the global markets given the current economic structures and trade regimes, whilst earning returns that are equal or greater than the opportunity cost of scarce resource engaged."

5.3. How competitive is the South African citrus industry in global markets?

This section deals with the second question of the analytical framework. It seeks to evaluate, quantitatively, the competitive performance of the South African citrus industry. To answer this question, this study considered use of the internationally recognised techniques, and selected the RTA, which was developed by Thomas Vollrath in 1991, to describe such performance best as it embodies the concept of "competitive" rather "comparative" advantage; competitive advantage serves agribusiness considerations best as it uses current market prices as value indicators. As described earlier, in section 3.7.2, the RTA index is an improved version of Balassa's RCA (section 3.7.1), which was modified to include both imports and exports and gives a stronger effect to the concept of competitive advantage rather than comparative advantage.

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5.3.1. Competitiveness trends in the South African citrus industry

The competitive trend of the South African citrus industry was calculated using the RTA method for the period from 1961 to 2013 for data obtained from the FAO (agriculture-based dataset) and from the ITC (whole economy) for the period from 2001 to 2016 (see figure 5.1 below). These RTA results can be interpreted as follows: the higher the value of the indicator (RTA) the greater the competitiveness of the country or industry over a set of reference countries. A value between zero and one indicates that this industry is relatively marginally competitive, and a value less than zero indicates a competitive disadvantage (i.e. that country depends largely on imports for that commodity).

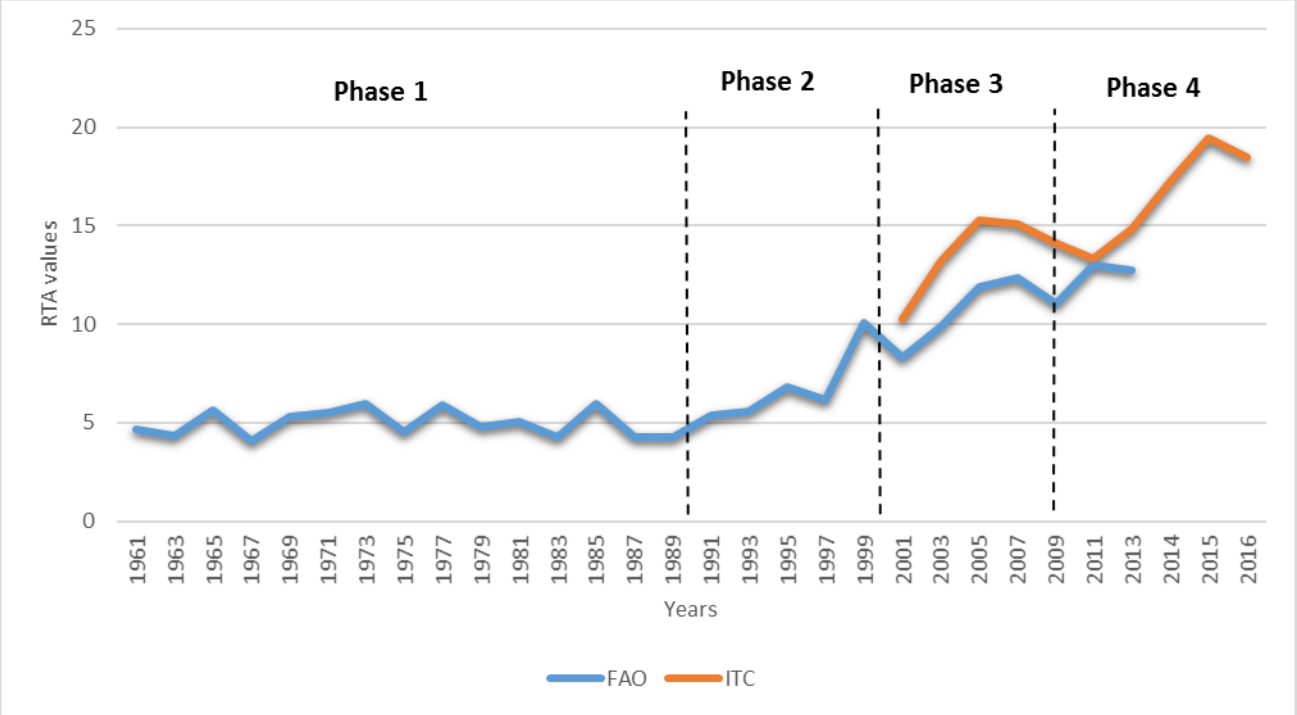

Figure 5.1: RTA values for the SA citrus industry
Source: Own calculations based on FAO and ITC datasets

Both FAO and ITC data sets are used, although the ITC data better describes the 'opportunity cost' status of an industry/commodity as per the definition of competitiveness, used in this study. This is so because the ITC database includes all industries and commodities, whereas FAO only consists of agri-commodities. The only use of FAO trade data is its longer time frame, allowing interesting trend analysis opportunities; although it is only available until 2013. Therefore, the study will give preference to the use of ITC data.

A correlation factor of 0.81 between the RTAs of both datasets was obtained when calculations were made for the period 2001 to 2013. This implies a higher linear relationship between these two RTAs, which both follow similar trends during this period. However, the local citrus industry is relatively marginally less competitive using the more focused agriculture-based dataset (FAO) than

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the broader multi-sector-based dataset (ITC). There are numerous reasons why this is the case, ranging from the high competition for scarce resources within the seasonally based agricultural sector, and the related competition for labour and availability of farming substitutes within the citrus industry. These findings are similar to those of Boonzaaier (2015) for the South African stone fruit industry.

A closer inspection of both the FAO and ITC lines shows that the industry had high positive figures throughout the studied years. This implies that the local industry performed competitively in international markets and maintained these positive figures since the 1960s (RTA of 4.6 in 1961-FAO), with the period from 2005 (RTA 15.2- ITC) onwards being comparatively more positive than other periods, and with a gradually increasing trend during recent years (RTA 18.6 in 2016). The figure also reveals considerable variations in the competitiveness performance of the local citrus industry during certain periods of the studied years. After reviewing the relevant literature, these variations were grouped into four periods showing trends in the local industry's competitive performance. These phases are explained in detail below.

Phase 1 (competitiveness in a highly regulated agricultural economy, 1961 to 1990)

The competitiveness status of the citrus industry during this period can be viewed as somewhat "artificial" due to subsidised support and regulated prices (a DRC /Policy Matrix analysis will show such distortions).The citrus industry was under the control of the Citrus Board, which was established in 1939 and controlled the amount of citrus exported through a quota system. Production was thus not driven by market forces, but rather by centrally regulated interventions such as controlled export prices (usually kept high) and subsidies received by farmers (i.e. financing of export losses) (Vink, 2004; Vink & Van Rooyen, 2009). The improvement in competitive performance during the mid-1970s was fuelled by the opening of the Middle East markets and the enlargement of markets in the European region (CGA, 2007). In addition, South Africa had a preferential status for exports destined to the United Kingdom, giving it an advantage over competitors in the Southern Hemisphere region (Ndou, 2012). The disadvantaging factor during this period was the declining economic growth during the early 1970s. The annual real growth in GDP averaged 5.5% in the 1960s, fell to 3.3% in the 1970s and fell again to 1.4% in the early 1980s (Ndlovu & Strydom, 2016).

Furthermore, this period was also marked by political and economic trade sanctions imposed on the country by the international community, which resulted in political and economic instability. The anti-apartheid sanctions imposed by global communities on SA had a negative influence on the trade performance of the republic. These sanctions restricted South African agricultural exports to certain markets, bringing about occasional drops in the performance of the industry and consequently

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disadvantaging the ability of the sector to compete in global markets. Severe climatic conditions also played a negative role during this period, particularly the 1981 floods, which resulted in huge losses in production, damaging rail links and roads and thereby cutting producers off from accessing markets (Kirsten, Van Zyl & Van Rooyen, 1994). The quantity of citrus exported also declined by 2.2% per year (Kirsten *et al*., 1994).

During this period, the rate of job creation, which averaged more than 3% in the early 1960s, had dropped to almost zero at the start of the 1980s and was negative from 1986 onwards (Ndlovu & Strydom, 2016). In spite of these global sanctions, economic and political instability, the quality of local agricultural output, together with its marketing reliability, enabled the industry to uphold its export position in the global market during this period by managing to retain positive RTA values, indicating a well-connected and resilient agricultural sector.

Phase 2 (Democracy and economic deregulation- access to global trade, 1990 to 2000)

This phase represents a period of the first democratic elections in the country and, ultimately global movements to free-up markets and a period of deregulation of the South African fruit sector. Before the deregulation, South African citrus exports were advertised under the single 'brand', whereby growers had to station their output into a pool looked after by the statutory monopoly empowered by citrus control boards (Vink, 2004; Vink & Van Rooyen, 2009). Sandrey and Vink (2008) as well as Vink and van Rooyen (2009) state that the main positive aspect of the single station was its ability to manage the price of exports and having the sole power in keeping prices higher. The main disadvantages were that producers had little incentive to explore new markets, save on marketing costs and produce fruit of a higher quality (Sandrey & Vink, 2008; Vink & Van Rooyen, 2009).

The outcome was that local production lagged behind that of its competitors, and the industry also lagged behind in innovative cultivars (Vink, 2004). This is particularly true for the citrus industry. Before 1997, the industry's competitive performance was hovering around 6, partly reflecting the impact of cutting all economic sanctions enabling SA citrus to be traded globally and with free economic freedom, but after the deregulation (which happened in 1997) the industry's competitiveness started to increase somewhat dramatically, reaching figures above 10 in 1999 – indicating that this industry was starting to be strongly globally competitive.

Also fuelling this rise in competitive performance was the formation of bodies such as the CGA, which was tasked, amongst other things, with finding new markets and conducting research for the industry. This meant that, at the end of this phase (phase 2) and the beginning of the following phase (phase 3), farmers were gaining a better understanding of the changing consumer demands in terms of citrus types and varieties. In addition, finding new markets for their produce meant that

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growers were becoming better prepared to withstand shocks that may occur in the previous, traditional individual markets, such as the EU. This phase also included the lifting of sanctions on the country imposed by the international community, and presented unrestricted access to lucrative export markets, exposure to profitable international business and increased investment (BFAP, 2016). The level of investment directed to the agricultural sector was also relatively higher during this phase when compared to the 1980s (Kirsten, 1999).

Phase 3 (Becoming a global player in an increasingly deregulated environment, 2000 to 2009)

In this period the global trade increasingly moved towards broader based deregulation and increasing freedom to trade, with less policy and support distortions (Sandrey & Vink, 2008). Further organs such as the Deciduous Fruit Producers' Trust (DFPT) and the Fresh Produce Exporters' Forum (FPEF) were formed during this period to assist the CGA (CGA, 2007). Despite disastrous citrus production seasons during the early 2000s (CGA, 2007), the industry's competitive performance continued to rise, reaching its highest point during the 2006/07 production season. This rise in competitive performance was driven by the increase in the quantity of citrus exported, which amounted to 72 million cartons in 2006, when SA became the second largest exporter of citrus, overtaking the USA (CGA, 2007). With increased experience and better understanding of business strategies being mandatory to compete at the global level, the industry was able to withstand the 2007/08 'economic meltdown' globally, even though there was drop in competitiveness performance during that season.

Phase 4 (Towards sustaining competitive performance, period from 2010 onwards)

At the start of this period, most industries were still recovering from the effects of the 2008 global economic crisis and melt down (van Rooyen and Esterhuizen, 2012). This resulted in some instability in the competitive performance of the industry. The fluctuations during this period were also due to increased regulations in the international markets, particularly in the EU market, where citrus originating from SA was banned during the 2012/13 harvest season due to the threat of CBS. Exporters exporting to the EU were forced to meet the increasingly stringent technical and environmental standards, as this market required compliance with external certification of standards. With support from other institutions (e.g. the CRI, CGA and ARC), the industry was able to tackle the challenge posed by the CBS. This was further evident when the industry increased in global competitiveness up until 2015, when the industry reached its highest competitive performance (the ITC line). During the 2016 harvest season, the country was faced with severe droughts that resulted in poor production and consequently a drop in competitive performance.

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Growth prospects for the future will be attained by producers, input suppliers and processors etc. who can position themselves correctly in a position from which they can be truly globally competitive. This will include export strategies that are implemented, along with some that are currently being developed for the future. Clear strategies that engage relevant personnel, maintaining existing markets and negotiating better trade deals, and innovative ideas in terms of production (e.g. shade netting) will be critical to maintain and enhance competitive performance of the industry going forward (BFAB, 2016).

One issue of concern may be the "voices" calling for a more restricted trade environment again- Brexit type of arrangements, possible USA trade policies, etc. Such possible impacts where however not considered in this study.

5.3.2. Comparison with global competitors

The aim of this section was to evaluate the competitive performance of the local industry relative to other citrus trading countries competing in the global market. With this in mind, the RTA method was again used to compare the relative competitive performance of the South African citrus industry to that of major citrus-trading nations. Measuring competitiveness using the RTA method allows for comparison amongst nations, because it measures the exports and imports of a nation in relation to global exports and imports. However, Valentine & Krasnik (2000) as well as Esterhuizen (2006) notes that the RTA values of certain nations may be affected by the different sizes of economies.

In the case of this study, citrus may be relatively more competitive in one country, for instance in Morocco (see figure 5.2) than in Chile because the opportunity cost of citrus would make this industry less competitive (lower value) in Chile while the opportunity cost of Citrus in Morocco would make it relatively more competitive. A comparison of the RTA values enables one to determine the relative importance of the traded commodity (citrus fruit) against different trading competitors, also not only for citrus. Such comparisons could also be conducted in terms of competitive trends. Therefore, RTA values provides a relative measure, not an absolute competitiveness measure. Comparisons made below (figure 5.2 and figure 5.3) therefore relates to the relative competitive position of SA citrus in the context of the total SA trade situation; compared to competing citrus countries; each in the context of their particular trade situation.

Observations from the graph reveal that the Morocco is relatively more competitive and has, by far, the strongest competitive advantage in terms of citrus fruit—when using the agricultural based trade dataset (i.e. FAO). This sustained competitiveness performance of that nation's citrus has mostly been due to favourable conditions, such as the special treatment of Moroccan fruit in European markets (since the early 1960s), the availability of cheap labour, and favourable climatic conditions

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(Aloui & Kenny, 2005). Other favourable conditions include its dependable macro-economic management, growers' aptitude to transfer and adopt new machineries, and the good reputation the sector has built in foreign markets due to the serious public implementation of mandatory SPS regulations (Aloui & Kenny, 2005).

However, the formation of a single European market and the addition of Spain into this common market in the mid-1980s brought about a decline in Morocco's share of the global citrus market and subsequently brought about an accelerated drop in the country's competitive performance.

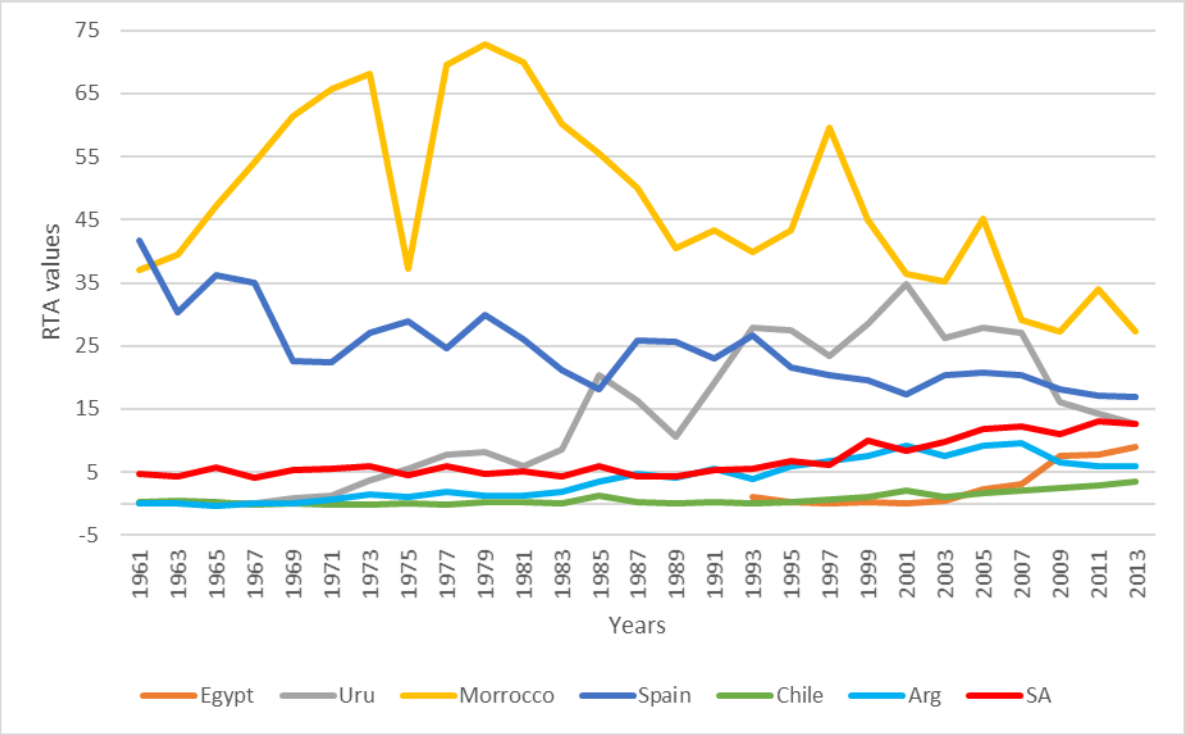

Figure 5.2: RTA values for selected nations' citrus industries
Source: Own calculations based on FAO data

Also, export volumes to the EU market dropped by almost half from 1985 to 2005 due to seasonal reference pricing and countervailing tariffs imposed (like quotas imposed on oranges), supposedly to protect the citrus industry of Spain (Aloui & Kenny, 2005). At present, Moroccan citrus supplies to the European markets are not limited by any trade barriers. Morocco's citrus exports represent only 2.7% of world exports and are the country is ranked as only the tenth largest exporter of citrus (ITC, 2017). The Dutch and other European markets, such as France, have for a long time been traditional destinations for Moroccan citrus fruit exports. Morocco enjoys a market share of 30.2% in the French market, a share of 28.3% in the Russian Federation market and a share of 16.9% in the Dutch market.

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In the Southern Hemisphere, SA, since 1974, been outperformed by Uruguay (refer to figure 5.2) in relative competitive performance of citrus. However, data from 2013 shows that these two industries have relatively performed evenly, with competitive performance figures just above 12. SA outperforms other countries such as Argentina and Chile. The competitive performance of Spain, Uruguay, Morocco and Argentina dropped in the years leading up to 2013, whilst those of South Africa, Chile and Egypt all experienced an increase in the years leading up to 2013.

Looking at whole economy perspective, based on trade data from ITC (2017), results indicate that Egypt is relatively more competitive and has by far the strongest and most globally competitive status in terms of citrus fruits, see figure 5.3 below. Egypt's RTA values have been ranging above 25 in the period starting from 2009 onwards. Egypt obtained this status as a global leader in citrus competitive status in 2014 when it leapfrogged Morocco as global leader.

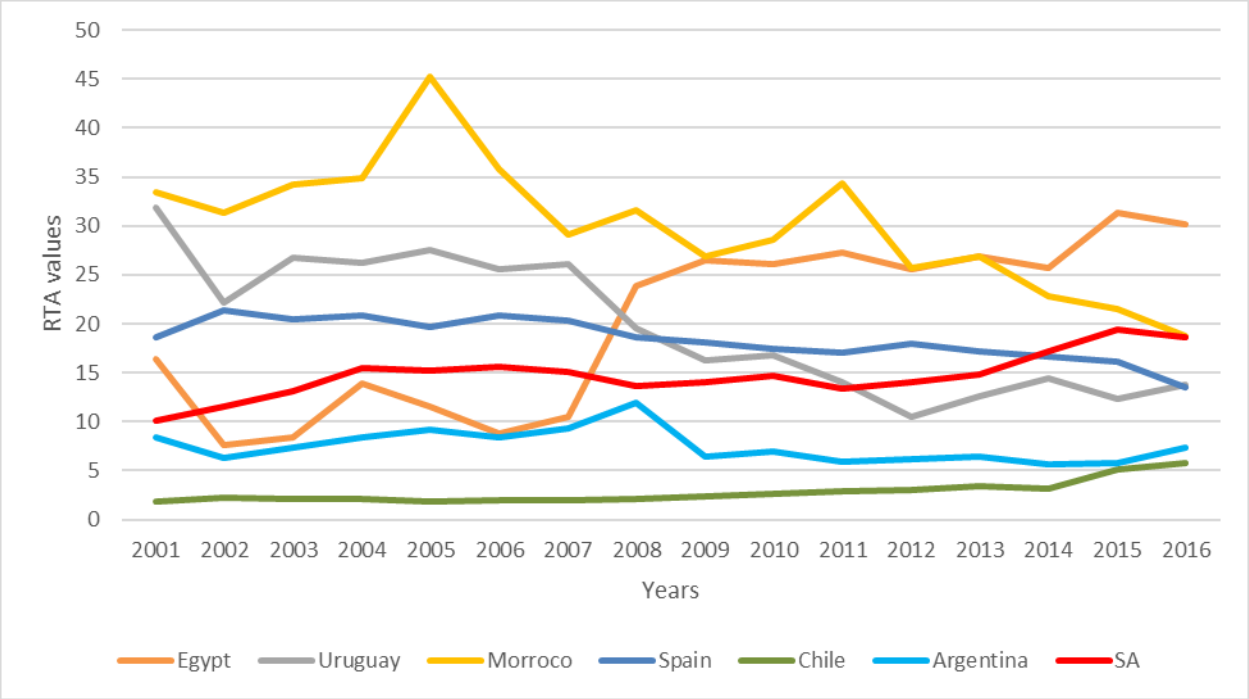

Figure 5.3: RTA values for selected nations citrus industries (ITC data)
Source: Own calculation based on ITC data (2017)

The reasons for the increase in this country's citrus competitive performance lie in the combination of suitable climate (Nile River and fertile grounds), low labour costs, low prices, quality and an early harvest season (Buitenland, 2016). Furthermore, the large concentration of citrus production in the recent land reclamation areas, which are mostly located on the western side of the Nile river further aid this competitive performance—this is shown by the overproduction of citrus of more than 2 million tonnes in 2016 (Buitenland, 2016). Also, in its part of the world, it is the only producer of consequence, and has a comparative advantage (in terms of transportation costs) for

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exporting to the Middle East, Russia and Asian markets that usually absorbs more than 60% of the country's citrus exports (Buitenland, 2016).

Morocco, South Africa, Uruguay and Spain are also highly competitive effectively as "second league", with Morocco rated best and leading competitor in this category. Other countries such as Chile and Argentina are also generally competitive, but clearly have a "third league" status with RTA values below 10 and with Argentina being the constant leader. Compared to the Southern hemisphere citrus trading regions, the local citrus industry (with RTA of 18.6) is by far the most globally competitive and is challenged by the Uruguayan citrus industry with RTA of 13.8 in 2016. These results reveal that, the local citrus industry is being challenged globally by the most powerful nations, particularly in the first and second league, and this indicates the need for the industry to develop meaningful strategies that can enhance the industry's competitive performance and further maintain its status as one of leading citrus exporting countries.

5.3.3. Oranges

This study calculated the RTA values for oranges using multi-sectoral (taking into account all sectors in the economy) trade data obtained the Trade Map website. The local orange industry features prominently in relation to its Northern Hemisphere counterparts. In counter-production seasons it is outclassed only by Egypt, while it outperforms countries such as Spain (see figure 5.4). SA is relatively more competitive and is a clear global leader when compared to the Southern Hemisphere countries that enjoy similar production seasons. The competitive edge of South African oranges started increasing after the deregulation period, with a decrease recorded only in 2008 due to world financial crisis, in 2011 due to the citrus black spot issue in the EU market, and in 2016, when the country was faced with severe droughts.

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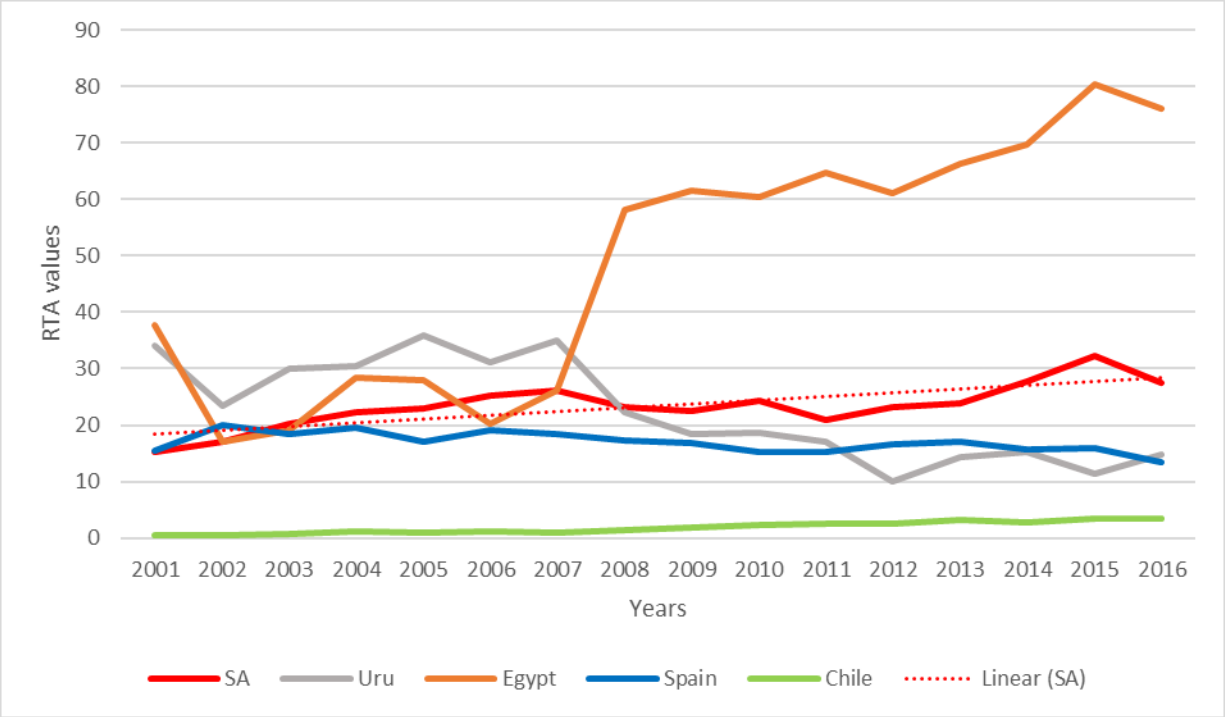

Figure 5.4: RTA values for selected nations' orange industries
Source: Own calculations based on ITC data (2017)

Overall, the local orange industry's competitive advantage has shown some positive trends in the last five years. The competitive advantage of oranges for the 2016/17 production season might experience a decrease due to the reported abnormal weather patterns that have hit the Sundays River farmers, where 50% of navel oranges have been reported to have dropped off (Van Aardt, 2017) and this will have a major impact on the quantity of navels exported.

5.3.4. Grapefruit

The RTA values for grapefruit calculated from both the FAO and ITC datasets are put into perspective in table 5.1. The RTA values obtained from the FAOSTAT calculations show that China had a competitive disadvantage from 2001 to 2005, whereas the calculations obtained from the multi-sectoral (ITC) dataset shows that China was marginally competitive during the same period, in terms of grapefruit. This shows the comparatively greater sensitivity of competitive advantage measurements of an agricultural commodity when only agricultural trade data are taken into account.

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Table 5.1: RTA values for major grapefruit-trading nations

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Trend
SA FAO	12.4	16.6	18.3	24.5	32.0	21.3	23.9	19.9	21.4	20.0	25.4	20.2	27.7				
ITC	***14.6***	***22.3***	***21.5***	**31.2**	**35.6**	**24.0**	***25.6***	**21.8**	**23.5**	**21.1**	**23.2**	***20.7***	27.7	***24.5***	***22.9***	***26.8***	+
ARG FAO	3.7	3.0	3.9	4.4	5.1	2.9	3.6	5.1	2.2	1.0	1.0	0.01	0.2				
ITC	**5.3**	***3.5***	**4.3**	**5.1**	***5.4***	**3.0**	***3.7***	***5.5***	***2.5***	***1.7***	***1.3***	***0.2***	***-0.3***	***-0.3***	***-0.3***	***-0.5***	-
Uruguay	5.4	3.6	2.0	2.8	2.4	3.6	1.6	0.3	0.3	0.03	0.2	-0.004	-0.06				
ITC	***5.7***	***3.7***	***2.8***	***3.1***	***2.4***	***3.7***	***1.6***	***0.3***	***0.4***	***0.04***	***0.2***	***-0.002***	***-0.06***	***-0.09***	***-0.3***	***-0.4***	+
Israel FAO	17.0	12.5	14.2	14.5	18.9	15.1	16.0	14.7	20.0	19.8	18.6	23.7	20.8				
ITC	***17.4***	***12.9***	***14.4***	***14.0***	***19.1***	***15.4***	***15.8***	***14.8***	***19.3***	***19.9***	***18.7***	***24.2***	***20.8***	***25.5***	***18.3***	***16.8***	-
Spain	1.3	1.4	1.8	1.9	2.1	2.0	2.3	1.9	2.2	2.5	3.0	2.7	3.1				
ITC	***1.4***	***1.6***	***1.8***	***2.2***	***2.1***	***2.0***	***2.3***	***2.0***	***2.2***	***2.6***	***3.1***	***2.8***	***3.2***	***2.9***	***3.7***	***2.8***	+
Turkey	8.6	10.0	9.4	12.0	11.1	11.5	8.2	12.0	13.4	15.2	16.8	15.2	12.9				
ITC	***8.9***	***11.8***	***9.9***	***13.5***	***11.7***	***14.8***	***11.2***	***12.2***	***13.0***	***15.3***	***17.1***	***15.7***	***13.0***	***13.8***	***11.3***	***11.6***	+
China	-0.28	-0.28	-0.11	-0.10	-0.01	0.097	0.31	0.54	0.59	0.50	0.47	0.65	0.77				
ITC	***0.01***	***0.02***	***0.04***	***0.05***	***0.15***	***0.30***	***0.61***	***0.89***	***0.94***	***0.82***	***0.73***	***1.02***	***1.11***	***0.96***	***1.07***	***1.05***	+

Source: Own calculations based on FAO and ITC datasets.

*ARG - Argentina

*SA - South Africa

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On the subject of SA's relative competitive performance of the grapefruit sector, calculated within the macro-economic spectrum from 2001 to 2016, average scores of 24.2 and 21.8 were recorded on the basis of the ITC and FAO calculations respectively. In the context of the agricultural environment (FAO), the local grapefruit industry is considered relatively less competitive than in the multi-sectoral environment. However, both these datasets (FAO and ITC) follow similar trends with similar movements (with a correlation factor of 0.90 from 2001 to 2013), but with varying immensity. This shows that the SA is comparatively more competitive within the multi-sectoral economy than in only the agriculture-based sector. Overall, what can be drawn from these variations is that, comparatively, more competition is faced by local grapefruit amongst agricultural commodities, there is tough competition for scarce resources (e.g. water), and this might also be due to the availability of alternatives within the citrus sector, such as oranges, tangerines, mandarins, etc. These results also reveal that SA is the leader in terms of relative competitive performance of grapefruit, it outperforms countries from both the Southern hemisphere and Northern hemisphere.

5.3.5. Soft citrus

Figure 5.5 presents a snapshot of the relative competitive performance of SA in relation to selected nations in terms of soft citrus. The findings from this figure are quite revealing in several ways. Firstly, unlike the results from other citrus varieties reported above (oranges and grapefruit), the local soft citrus industry is outperformed by a country from the Southern Hemisphere, namely Uruguay. However, the relatively strong competitive advantage that Uruguay has in relation to its Southern Hemisphere counterparts has been decreasing in the last decade, from a RTA value of 43.3 in 2001 to a modest value of 18.6 in 2016. Secondly, this is the first time (in comparison with RTA values for grapefruit and oranges) that a local citrus variety is dominated by more than two countries in the competitive performance of a citrus fruit – Morocco, Spain and Uruguay all have higher RTA values for soft citrus than SA. This warrants a thorough study to identify the specific causes of such performance, lessons that can be learnt from other countries and options available to increase the competitive advantage of this citrus variety.

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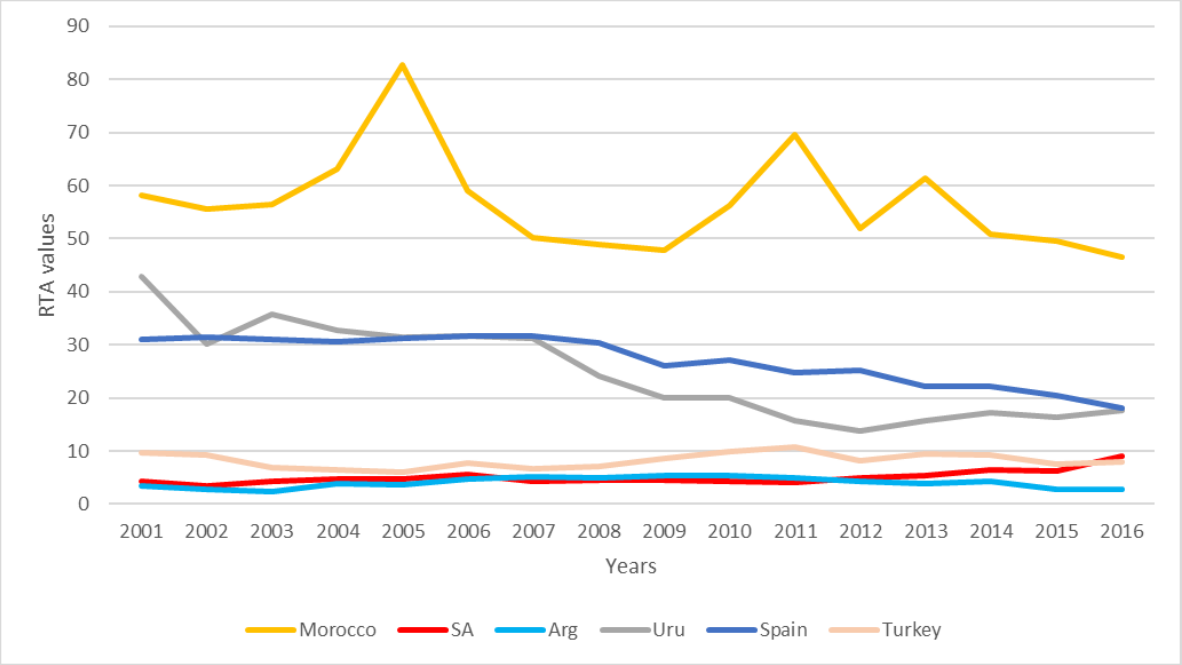

Figure 5.5: RTA values for major soft citrus-exporting countries
Source: Own calculation based on ITC data (2017).

Overall, Morocco is relatively more competitive and, by quite a distance, has the most powerful and most universally competitive status in terms of soft citrus. Morocco mostly supplies its soft citrus to markets like the Russian Federation, France and the Netherlands, where it holds market shares of 32.4%. 29.5% and 14.2% respectively. Further analysis shows that South Africa had a relatively stronger competitive advantage than that of Turkey in 2016, while being outperformed by nations such as Spain and Uruguay.

5.3.6. Lemons and limes

SA faces direct competition in the Southern Hemisphere from lemons and limes originating from Argentina. The Trade Map website highlights that Argentina has a share of 8.4% of world exports, while SA has a share of 7.7% in total world exports. This is further evident in the relatively higher competitive advantage that the Argentina has over that of SA (see figure 5.6). For most of the years studied, Argentina had a relatively strong global competitive advantage in the export of lemons and limes, with RTA values higher than 20; the only exceptions were in 2011, 2014 and 2015. More than 60% of Argentine lemons and limes are absorbed in the EU market by countries such as Spain, the Netherlands and Italy. In competitive performance status, it is closely followed by SA, which has had RTA values above 10 in years starting from 2012 onwards. The relative competitive performance of SA has been increasing since 2013, and this increase can be associated with the growing demand for lemons in markets such as the Middle East and Far East (see CGA, 2014:15 & 16). The perceived health benefits associated with lemons and no entry barriers to these markets play a big part in this regard.

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Overall, the relative competitive advantage of countries such as Argentina, Turkey and Spain has been highly volatile in the last decade. Argentina reached its highest competitive advantage in 2008, when it had a RTA value of 41, whilst its lowest was achieved in 2014, when it had a competitive value of 16. South Africa, on the other hand, had an average competitive advantage of 11 for the years studied. This average was the second highest among countries from the Southern Hemisphere behind Argentina during similar years.

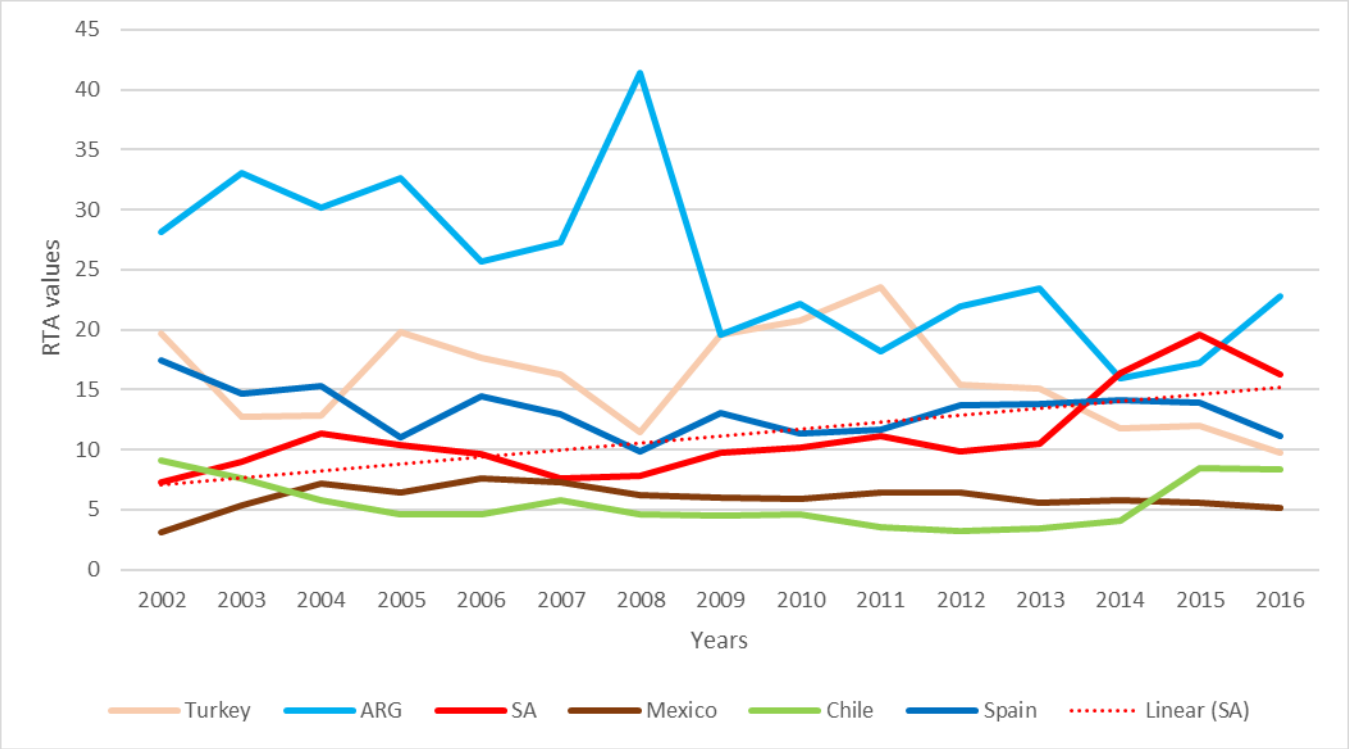

Figure 5.6: RTA values for major lemon- and lime-exporting countries
Source: Own calculations based ITC data (2017)

What is also striking about these results is that, since 2013, SA has had a relatively higher competitive advantage than any country in the Northern Hemisphere. From 2015 to 2016, SA experienced a 3% decrease in competitive advantage. This can be associated with the drought that hit many of the producing regions, resulting in smaller quantities being exported and higher quantities being imported.

5.3.7. Citrus value chain trends compared to other countries

This next sub-section presents the findings on the competitive performance of the South African citrus-based value chain. These value-adding activities were measured using RTA. The figure and table below illustrates the RTA values of citrus juice under HS code 200931 for selected countries from 2002 to 2016

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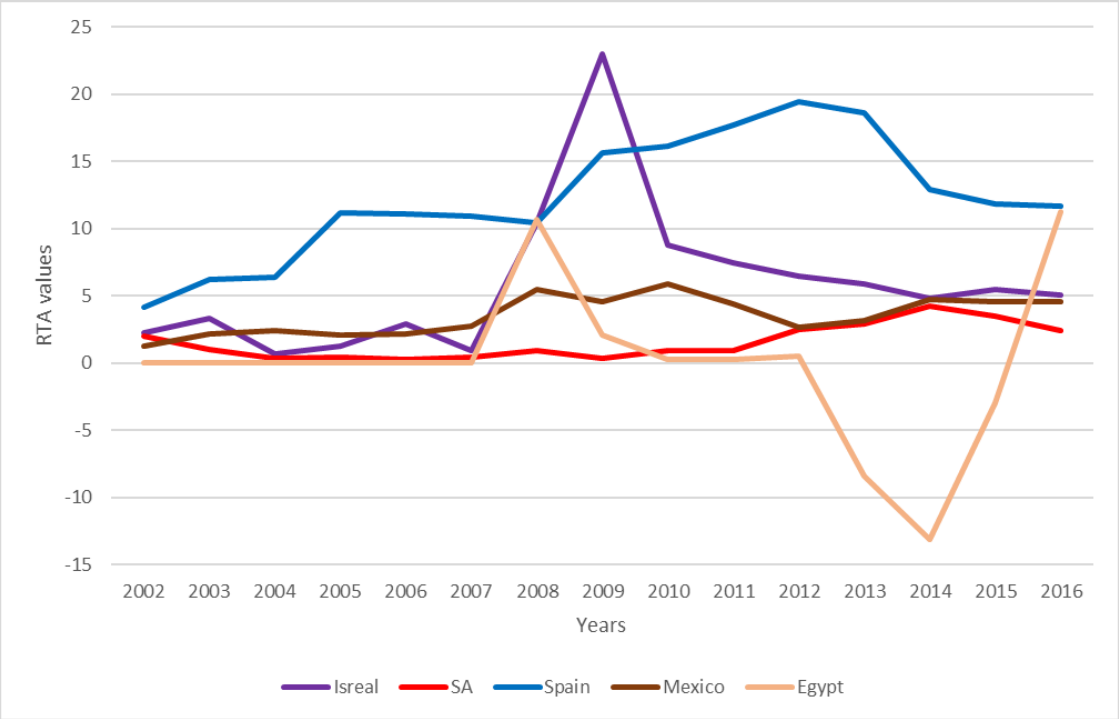

Figure 5.7: RTA values of citrus juice compared to other countries

Source: Own calculation based on ITC data

Table 5.2: RTA values of citrus juice compared to other countries

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Chile	0.86	0.55	0.82	0.28	0.32	0.04	0.19	0.29	0.01	0.00	0.04	0.00	-0.15	-0.10	-0.31
Argentina	2,17	0	-0,07	-0,01	0	0,03	0,42	0,11	0,42	0,11	0,68	0,04	0,69	0	0,06
Netherlands		-0.24	-0.18	-0.12	-0.49	-0.23	0.22	-0.10	-0.03	-0.11	-0.07	0.06	0.13	0.24	0.46
Morocco	-0.47	-0.10	-0.02	-0.01	-0.03	-0.18	-0.13	0.16	-0.12	-0.03	0.31	-0.04	0.34	0.05	-0.02
Brazil	2,06	3,69	7,25	0,48	0,31	1,14	2,52	0,56	0,01	0,08	0,32	0,25	0,25	0,74	0,48

Source: Own calculation based on ITC data (2017)

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With reference to the figure above, SA's relative competitive advantage for citrus juice was less than 5 throughout the studied years. This suggests that unprocessed oranges have a higher competitive advantage than processed oranges, thus indicating a decline in competitive edge as one moves down from primary products to value-added activities. This finding is in line with the findings observed in competitiveness studies by Esterhuizen (2006), Mashabela and Vink (2008), Van Rooyen *et al*. (2011) and Sinngu (2014), who all found that competitiveness decreases as one moves down the value chain of the agricultural commodities they studied. This decline in competitive performance of processed agricultural commodities has been associated with certain factors (see Esterhuizen & Van Rooyen, 2001; Esterhuizen, 2006; Mashabela, 2007: Jafta, 2014). The reasons for such a decline in competitiveness are explored in section 5.5 below, where the Delphi analysis (through the application of the Porter Diamond model) was applied to identify the constraining and enhancing factors of the global competitiveness of the industry.

Spain is currently the country with a relatively higher global competitive advantage in citrus juice. It has had such a relative strong global competitive advantage since 2005 with RTA figures above 10. Israel, on the other hand, had the highest global competitive advantage in 2009, whilst Egypt had competitive disadvantages in 2013, 2014 and 2015. Countries such as the USA, the Netherlands, Morocco and Argentina are all relatively marginally competitive in citrus juices with RTA values below 1. Chile had a relative competitive disadvantage in the 2014, 2015 & 2016 years, whereas China had a competitive disadvantage in the last thirteen years, in terms of citrus juice.

A similar decrease in competitive performance from primary product to processed product can also be observed in the orange chain (HS200919). Regarding primary oranges, SA has a relatively strong competitive advantage with figures above 10, whereas in processed oranges the country has RTA values below 10 (see 5.8 below). Although there is a decline in competitiveness along the value chain of oranges, SA is second only to behind Brazil as a country with the second highest relative competitive advantage for this product. Brazil, which clearly dominates the scene, can be seen as the only country in "first league" in having the strongest global competitive performance in terms of orange juice. Brazil is a global leader in orange juice production and exports, accounting for more than 50% of global production and more than 80% of global exports of the product (Abrahao 2015). According to Mendes (2011) Brazil exports about 99% of its processed oranges because the country's locals mainly drink fresh squeezed orange juice. Europe is the principal market for fruit juices in the world, representing 55% of total world imports and absorbing more than 50% of orange juice originating from Brazil. The import growth for this product continues to grow in EU, in spite of the decreasing consumption of retail packed juices (Centre for the Promotion of Imports CBI, 2017). This is associated to the fact that juices are increasingly used as ingredients in different types of beverages and in other food industries, not only for the production of 100% fruit juice (CBI, 2017). Large orange juice importing and consuming markets such as Belgium, the Netherlands, France, Germany

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and the United Kingdom continue to offer opportunities for developing country exporters, such as Brazil. Belgium and Netherlands together absorbs more than 90% of Brazil's orange juice exports (ITC, 2017).

Interestingly, the relative competitive performance of countries such as Spain and Morocco, which are also highly competitive in unprocessed oranges, also decreases as one moves down the value chain. Of all the countries selected for the analysis of this product, Brazil and SA are the only countries that have never experienced a relative competitive disadvantage for this product during the studied years. It is also important to highlight that, for SA, the trend in orange juice is similar to that in unprocessed oranges.

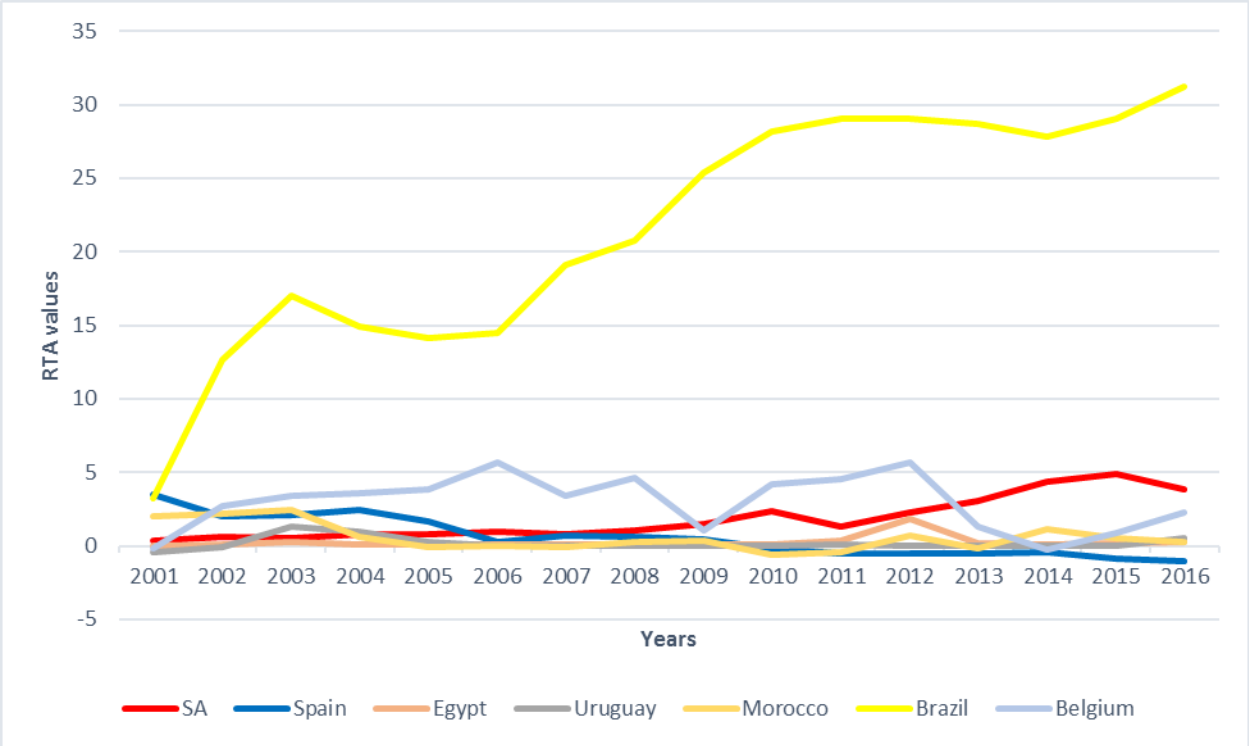

Figure 5.8: RTA values of orange juice compared to other countries
Source: Own calculations based on ITC data

In the grapefruit value chain, SA had the highest relative competitive advantage from the period 2002 to 2007 (see Figure 5.9). An important observation made from the analysis of this value chain is that, unlike other juices (i.e. citrus juice and orange juice), grapefruit juice shows a rise in worldwide competitiveness performance when shifting from primary to processed commodities.

This result is similar to that of SA apple chain, which was studied by Jafta (2014). This result also complements the findings made by Sinngu (2014) in his analysis of South African citrus in relation to that of its Southern Hemisphere competitors. This prompts the need to evaluate thoroughly why this chain—processed grapefruit juice—is relatively more competitive than primary grapefruit in order to unearth lessons that may be helpful in other citrus juice chains to improve their global competitiveness.

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The industry recorded its highest relative competitive performance in 2006, when it had an RTA value above 50. Currently, SA is outperformed only by the Israel in the relative competitive performance of grapefruit juice– a status it has held since 2008, when it overtook SA. During the early 2000s, SA faced competition from grapefruit juice originating from Uruguay. However, the Uruguayan grapefruit juice sector has since had a five-year global competitive disadvantage.

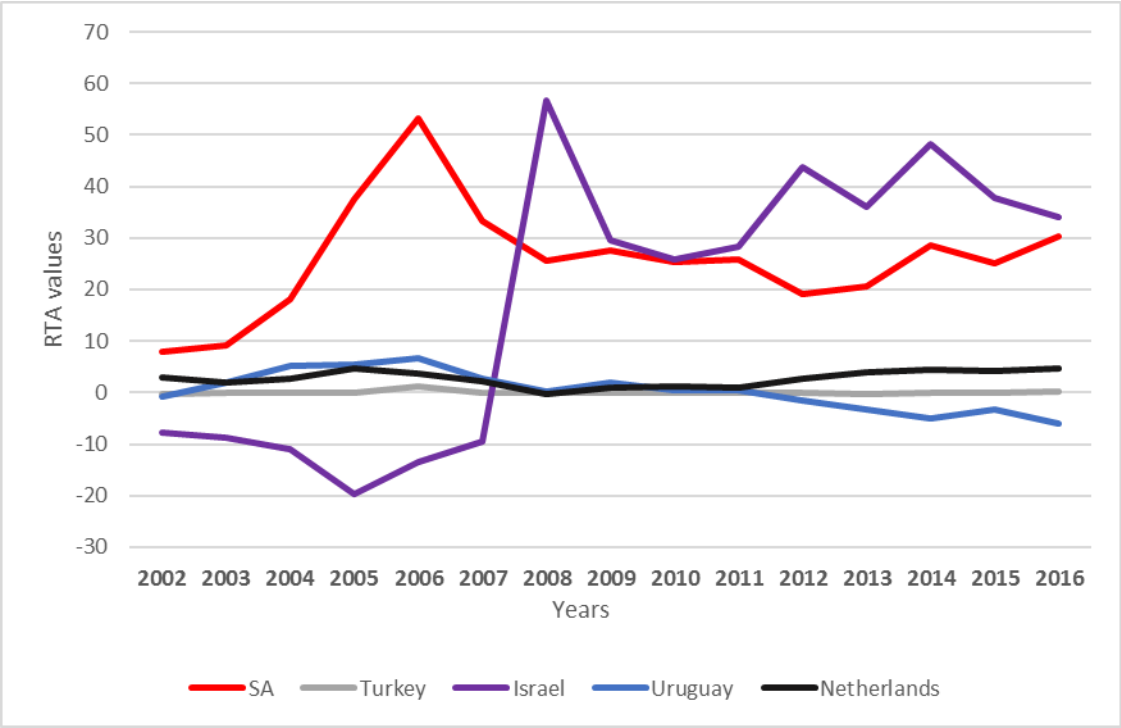

Figure 5.9: RTA values for grapefruit juice compared to other countries
Source: Own calculations based on ITC data

The Netherlands and Japan are the major absorbers of South African grapefruit juice, with a share of 50% and 21% of SA grapefruit juice exports respectively. Israeli exports are mostly absorbed by Japan (37.3%) and China (16.8%). Both these countries (SA and Israel) face similar total ad valorem equivalent tariffs of 24.35% (in Japan) and 15.00% (in China) when exporting to these countries. Overall, SA outranks all of its competitors from the Southern Hemisphere that enjoy similar production periods, and it is only outranked by Israel among competitors from the Northern Hemisphere who enjoy counter-production periods.

5.4. Identifying and analyzing the factors influencing the competitive performance of the South African citrus industry (step 3).

The above analysis confirms that the South African citrus industry is globally performing at high and sustained competitive levels, albeit with some variations in the level of competitiveness as one moves across individual citrus fruits. However, the RTA method applied in the above analysis does measure the competitive performance, but does not point out why the local citrus industry is globally competitive and

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why others are not (other citrus-producing countries), and it fails to propose new solutions on how the industry can gain, maintain and/or improve its global competitiveness status—it only measures and point to trends; both useful in strategic assessments. In order to extend the analysis to accommodate such strategic dimensions, a Delphi technique was applied in which a questionnaire (CES, see APPENDIX A) – designed in the form of a Porter Diamond Model – was used to gather information from experts on factors that enhance and/or constrain the competitive performance of the industry. The interest group here was experts in the citrus value chain, whether they be input producers, packers, processors, exporters and/or marketers. These experts were asked to rate the current impact of the various factors based on their views.

5.4.1. Descriptive analysis

The first step in Delphi studied involves the identification of experts to act as representatives of the industry. In this study this was done with the support of the Citrus Growers Association executives and a focus group gathered in Citrusdal. A list of 60 experts was drawn up and they were selected on the basis of their experience in their particular fields of expertise. After the selection process, questionnaires—designed in the form of Porter diamond model, were sent out to the selected experts to give their views in terms of rating the impact of the identified factors as determinants of competitive performance of the industry. A total of 13 questionnaires were returned, representing a relatively low response rate of 22%. This relatively low response rate was not left unattended and was viewed from within a scientific research approach. The questions were addressed and assessed by envisioning the identification of possible weaknesses that could have reflected an unclear framework for the questionnaire. This was however determined not to be the case, again in collaboration with the Citrus Growers Association.

The first part of the questionnaire required experts to indicate, amongst other things, their location is SA, type of citrus fruit produced together with their form of distribution, their position in the value chain, and the quantity exported in order to provide a demographic view of the experts. From the table below, it is evident that the majority of the experts are involved in more than one functional role in the citrus value chain. These range from being a producer only or input provider only, to being a combination of producer-packer-exporter and a combination of producer-processor-exporter-input provider. These results also reveal that “primary form” is the most preferred method of distributing citrus products.

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Table 5.3: Demographic overview of the experts

Location	**Position in the value chain**	**Citrus fruit type produced**	**Distribution type**	**Exported quantity (cartoons)**
Kirkwood Sundays river	Producer, Processor, Exporter, input provider	All	Fresh and processed	>1000 000
Umtshezi	Producer, packer	Oranges, lemons	Fresh	
Warrenton	Producer, packer, exporter	Oranges, lemons, soft citrus	Fresh	100 000-500 000
Berg river	Producer	Oranges, lemons, soft citrus	Fresh	
Kirkwood	Producer	All	Fresh	
Grblersdal	Producer, packer, exporter	Oranges, lemons, soft citrus	Fresh and processed	100 000-500 000
Gamtoos vallei	Producer	Lemons, soft citrus	Fresh	
Paarl	Input provider			
Clanwilliam	Producer	Oranges	Fresh and processed	<100 000
Western cape	Input provider, Exporter	All	Fresh	>1000 000
Stellenbosch	Producer, packer, exporter	All	Fresh and processed	>1000 000
Swellendam	Producer, packer,	Lemons, soft citrus	Fresh	100 000-5000
Stellenbosch	Producer, packer, exporter	All	Fresh	>1 000 000

Source: Citrus Experts Survey (2017)

These results also indicate that about 54% of the experts exports more than 100 000 cartoons of citrus fruits. This indicates that most of these experts are operating at a large scale commercial farming.

5.4.2. Identification of factors affecting competitiveness

The list of factors as rated by citrus industry experts based on their impact is illustrated in figure 5.10, each with its rating out of five. The blue lines indicate factor impact ratings, with 5 representing most enhancing factor, and 1 most constraining. The results indicate that, from the total of 101 identified factors, 47% were rated as enhancing and 46% as constraining the local citrus industry's competitive performance, whilst only 7% of the factors were viewed as neutral. These factors were rated based on their current impact on the competitive status of the industry. The fact that only 7% of the factors were viewed as either irrelevant or neutral indicates that most of the questions asked were relevant to this analysis and thus valid.

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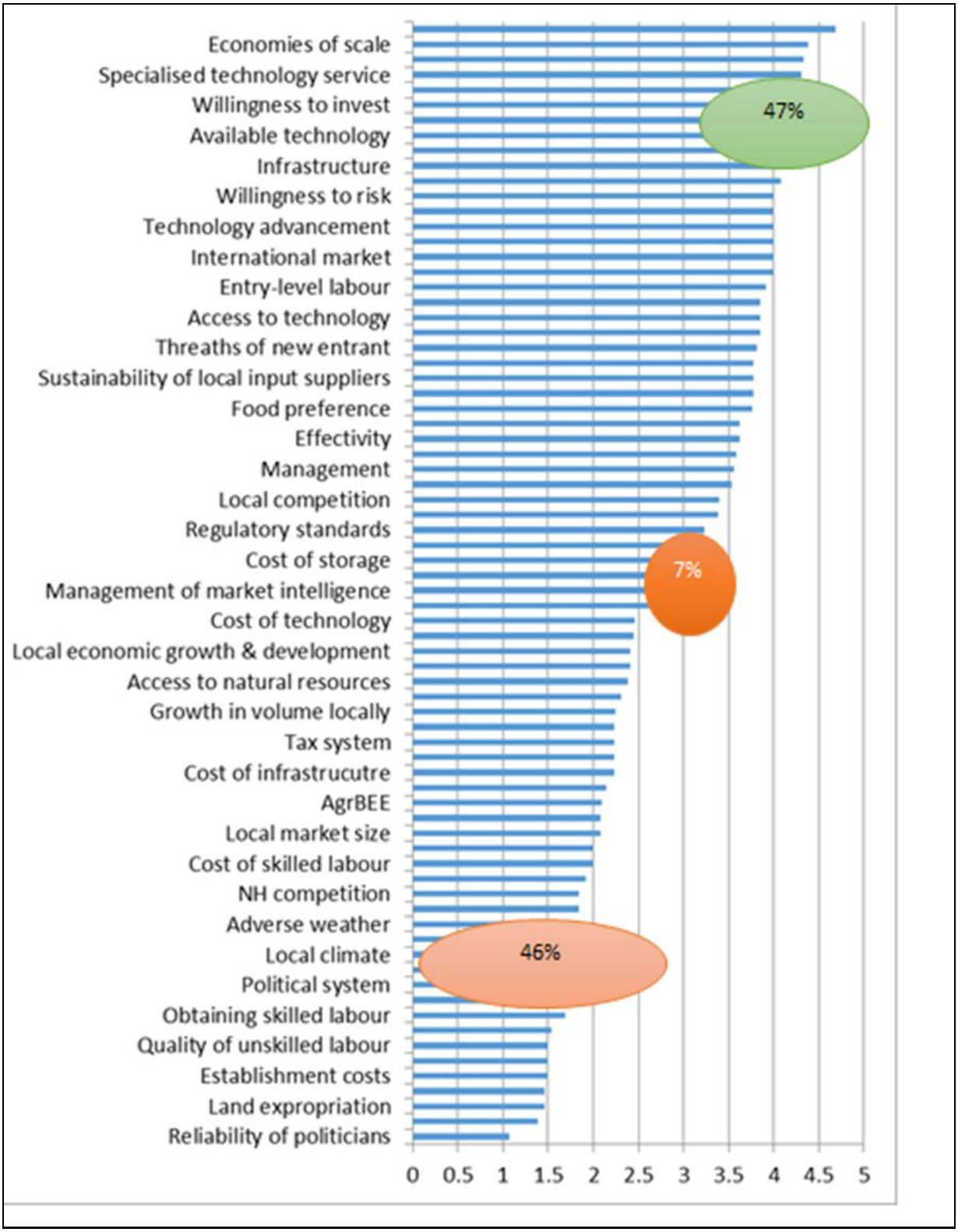

Figure 5.10: Impact rating of factors influencing the competitive performance of the South African citrus industry.
Source: Own calculations based on CES (2017)
Ratings: 1= most constraining; 3= neutral rating; 5= most enhancing

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5.4.3. Overall top ten enhancing and constraining factors

The top ten enhancing and constraining factors to the competitive success of the local citrus industry are highlighted in Table 5.4. For the purpose of this study, a rating closer to 5 highlights a more enhancing impact on competitive performance, whereas a rating closer to 1 represents a more constraining impact on competitive performance. Chief amongst these were the availability of input suppliers, economies of scale, quality of available technology and quality of local input suppliers, which were identified as playing an uplifting role in the competitiveness performance of the sector. These findings complement the findings of Esterhuizen and Van Rooyen (2006) in the local wine industry and Boonzaaier (2015) in the stone fruit industry.

Table 5.4: Top ten enhancing and constraining factors directing the competitive performance of the industry

Major enhancing factors	***Ratings***	***Constraining factors***	***Ratings***
Availability of local input suppliers	**4.69**	Support and reliability of politicians.	**1.08**
Economies of scale	**4.38**	Global recession	**1.38**
Specialised technology services	**4.31**	Political system uncertainty	**1.46**
Global competition/access to market	**4.31**	Land expropriation policies	**1.46**
Current exchange rate levels	**4.23**	Quality of unskilled labour	**1.50**
Willingness to reinvest in citrus	**4.23**	Crime in general	**1.54**
Technology innovation	**4.15**	Opportunism in trade	**1.69**
Current resource base/Southern hemisphere location	**4.08**	Availability of skilled labour	**1.69**
Quality of input suppliers	**4.08**	High establishment cost	**1.75**
Available infrastructure support, transportation and export logistics	**4.08**	Adverse weather conditions	**1.85**

Source: Citrus Experts survey (2017)
Notes: 1= most constraining; 3=neutral; 5= most enhancing

Availability of skilled labour and quality of unskilled labour are amongst the major constraining factors. This can be related to the 2016 Global Competitiveness Report, which ranked South Africa's labour market efficiency low at 97 out of 138 countries. Most of these factors identified to be constraining are beyond the control of a single firm or farm, as they fall within the spectrum of industry and government interaction. Again, these factors are in line with the global competitiveness report of 2016, which identified inefficient government bureaucracy, the inadequately educated workforce, corruption, crime and government instability as some of the most problematic factors of doing business in the South Africa.

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5.4.4. Cronbach's alpha reliability test (validation of questionnaire)

The validity of the data collected, i.e. the applicability of questions asked in the first round of the Delphi analysis, is important for this analysis as it signifies whether or not such questions in the citrus experts' survey represent relevant issues. A reliability analysis (Cronbach's alpha) was carried out on the factors affecting the competitive status of the industry, comprising the six Porter determinants, to test the consistency in the experts' responses. The alpha results are expressed as a number between 0 and 1, with values close to 1 indicating a high level of consistency.

Cronbach's alpha showed the questionnaire reached an acceptable reliability, with all the determinants scoring alpha coefficients above 0.6. Under the production determinant, with $\alpha = 0.705$, most questions appeared to be worthy of retention, resulting in a decrease in the alpha if deleted. The only exceptions were question 4, question 11 (short-term finance) and question 18 (labour-saving machinery), which appeared to be increasing alpha if they were deleted. As such, these questions were removed from this determinant and resulted in an increase in alpha from $\alpha = 0.653$ to the reported 0.705 (see table 5.5). In all other determinants, most questions appeared to be worthy of retention, resulting in a decrease in the alpha if deleted, and hence no other question was eliminated.

Table 5.5: Results of Cronbach's alpha on validity of questionnaire

	Cronbach alpha α coefficient	**Interpretation of Cronbach alpha coefficient**
Production factors	0.705	Good internal consistency
Demand factors	0.684	Acceptable internal consistency
Related and supporting industries	0.774	Good internal consistency
Firm strategy, structure and rivalry	0.858	Greater internal consistency
Government support and policies	0.673	Acceptable internal consistency
Chance factors	0.636	Acceptable internal consistency

Source: Own results based on CES (2017).

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Overall, these results highlight that the responses in the citrus survey (even though from a small sample) provide a high level of internal consistency – proving that the questions asked in the first round of Delphi analysis can be confirmed as highly relevant, and consequently proving the validity of the questionnaire.

5.5. Applying Porter competitive diamond (step 4)

This section deals with the application of the Porter diamond model to group and identify the determinants of competitive performance of the South African citrus industry. The six core determinants of competitiveness, according to the Porter diamond framework, are production factors, demand factors, related and supporting industries, firm structure, strategy and rivalry, government support and policies, and chance factors.

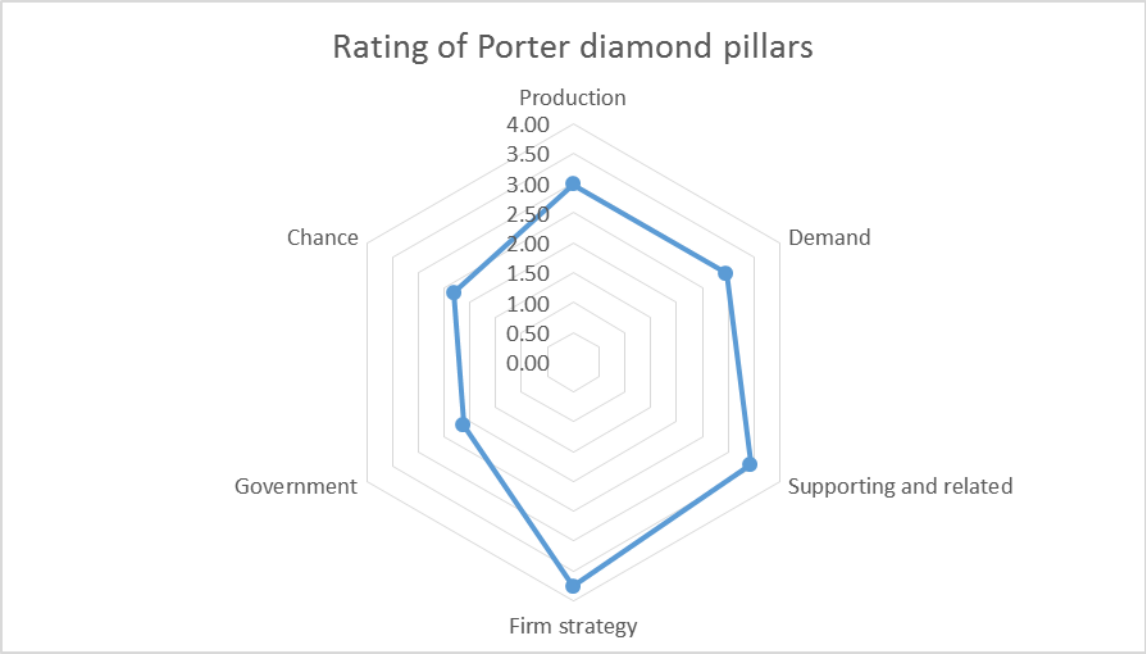

Figure 5.11: Rating of Porter diamond determinants
Source: Own calculations based on Citrus Experts Survey (2017)
Notes: 1= most constraining; 3= neutral; 5= most enhancing

The results from figure above indicate that firm strategy and structure (rated as most enhancing factor at 3.76 of 5) and related and supporting industries (at 3.44 out of 5) are viewed as strongly enhancing the competitive status of the local citrus industry. This generally reflects the strong management and alignment between global markets and various institutions along the citrus value chain. However, an area where government is involved (i.e. government support and policies- rating of 2.12 out of 5) was rated as the most constraining factor. This reflect a lack of positive contribution of government towards enhancement of South African agricultural trade in general in the wine and fruit industries (see Esterhuizen & van Rooyen, 2006; van Rooyen, Esterhuizen & Stroebel, 2011; Jafta, 2014; Boonzaaier, 2015). Neutral views (rating of 3 out of 5) were expressed towards the overall impact demand factors have on the competitive success of the industry. Furthermore, the experts viewed the overall impact of chance factors

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(rating of 2.31) as strongly constraining the competitive position of the industry. A more detailed analysis of each of these determinants is presented below.

5.5.1. Determinant - production factors

The competitive status of an industry is determined by the availability of factors of production within the industry or nation (Porter, 1990). Porter categorises these production factors required by industry in order to compete into two types. These are basic factors and advanced factors. Basic factors include, *inter alia*, the state of national resources, endowments and their location, capital, availability of raw material and labour—generally referred to as 'comparative advantage factors'. Advanced factors include innovative infrastructure (including advancement in technology, pesticides, etc.) and the presence of highly educated personnel within the industry. Both these factors, rated by the citrus experts on the basis of their influence on competitiveness performance, are highlighted in table 5.6 and figure 5.12.

The major statistics used in Delphi studies are measures of central tendency (mean, median and mode) and level of dispersion (standard deviation and inter-quartile range) in order to present information concerning the collective judgment of the respondents (Hsu & Sandford, 2007). The use of means and standard deviations is favoured, and was applied in this round. The 2016 Global Competitiveness report ranks local (South African) technological readiness 49th out of 138 countries, with an average score of 4.7. This finding is almost similar to the views expressed by the citrus experts, who reported that local technology advancement and availability, and access to that technology, play a crucial enhancing role in increasing the competitiveness status of the local citrus industry. An example of this technological advancement can be seen in an article by Gaspar (2016) titled "IAEA impact: How a nuclear technique helped save the Western Cape's orange industry".

In terms of access to natural resources such as land and water, the experts rated access to these factors as playing a negative role in the competitive performance of the sector. These responses are not surprising, given the status the country has as a water-scarce nation, and given the national political issues regarding ownership and distribution of land. Locally, the agricultural sector is the largest user of water, at 63%, much of which is used for irrigation and livestock (World Wide Fund for Nature [WWF-SA], 2017). There has also been some growing national concern that, given the current consumption rate, together with the continued demand for water, the country will be faced with water shortages by 2025 at the latest. This then brings a challenge for the agricultural sector, particularly in the wake of the 2016 drought, for how it can produce more with less water. This will require the introduction of new, environmentally friendly technologies to improve efficiency and yields.

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Table 5.6: Determinant production factors affecting the industry, ratings out of 5.

Factors	Mean	Std. deviation
Quality of technology	4.15	.899
General infrastructure	4.08	.641
Technology advancement	4.00	.816
Location	4.00	.913
Obtaining unskilled labour	3.92	.954
Access to technology	3.85	1.144
Storage	3.38	1.387
Cost of technology	2.46	.967
Transportation	2.92	1.441
Access to natural resources	2.38	1.325
Competency skilled labour	2.31	.855
Cost of infrastructure	2.23	.725
Cost of entry unskilled labour	2.14	1.127
Establishment cost	2.08	.760
Cost of hiring skilled labour	2.00	.913
Local climate	1.75	.866
Obtain skill labour	1.69	1.109
Quality unskilled labour	1.50	.792

Source: Citrus industry survey (2017)

Notes: 1= most constraining; 3= neutral; 5=most enhancing

The results also reveal that the availability and quality of skilled labour are key challenges facing the citrus fruit industry, while unskilled labour is available in abundance. It is not surprising to notice that entry-level labour (3.92) is not constraining, since the country is currently faced with an abundance of surplus labour due to the high levels of unemployment, which currently stands at 27.7%.

The CES also indicated that the cost and quality of low-skilled labour are constraining the industry's global competitiveness status. This finding contradicts what one would expect from economic theory, which is that a high supply of low-skilled labour would make low-skilled labour cheap. The reason for this contradiction lies in the minimum wage bill set by the department of labour for farm workers. The minimum wage bill was first issued to the local agricultural sector in 2003, and the evidence suggests that it led to a decrease in employment, at least in the short run (BFAP, 2015).

According to the Department of labour, the weekly minimum wage for employees in the farm and forestry sectors is R692.62, which equates to R3 001.13 per month. This represents an 8% and 24% increase when compared to the monthly minimum wage that was set for 2016 and 2013 respectively.

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Figure 5.12: Determinant production factors directing the competitive status of the industry
Source: Own calculations based on citrus experts survey (2017)
Notes: 1= most constraining; 3= neutral; 5=most enhancing

The citrus industry currently employs roughly about 10% of the total number of agricultural employees (CGA, 2016). This wage bill increase is likely to have a positive effect in flooded labour markets, where demand for a new workforce is likely to match supply, and is likely to have a negative impact on citrus value chain sectors, where demand for skilled labour is a necessity. The establishment cost was found to be constraining, and this limits the threat of new entrants. This finding is not surprising given the high risk involved (i.e. weather conditions, high input costs) when investing in farming and the long waiting periods before profits can be accumulated.

Principal component analysis

Principle component analysis (PCA) was used to identify highly correlated variables, that is factor ratings in the dataset for which individual views were very similar, as well as uncorrelated variables, that is factors on which experts' ratings varied more. This was done with the purpose of yielding a dataset containing information to ease strategic planning processes (i.e. step 5). The yielded data (correlated factors) underwent further analysis, which is Cronbach analysis, to assess internal consistency so as to further assist with the process of strategic planning. The uncorrelated variables – those with 'variation in opinion' – could be considered in further analyses (clustering) to reach greater clarity on the distribution of opinions and to further determine possible consensus clusters. However, in the case of this study, the small sample size

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(due to the low response rate) eliminated such detailed cluster analysis from a statistical point of view. The scoring of factors was based on their individual scores in the citrus survey, and they were not clustered. The scoring of some factors may represent a higher consensus rating, with many respondents agreeing, or it may show a lower consensus rating, i.e. not many agreeing on the same score.

A factor was considered as loading on a given component (i.e. not being highly correlated) if the factor loading was 0.40 or greater for that component and less than 0.40 for the other (see shaded values in Table 5.5). Similarly, an item was interpreted as highly correlated (consensus) if the factor loading for it was 0.40 or greater for that component and also greater than 0.40 in any other component (i.e. unshaded rows in table 5.5). The results reveal that, regardless of the respondents' position in the citrus value chain (i.e. without clustering), they perceived a few highly correlated variables (those not shaded yellow), with other variables being less correlated, that is having greater variation in opinion (those shaded yellow). It should be noted that 'variation' in this case does not imply that these factors are not valid, but rather that there are differences in views on them and they may require further analysis (through clustering of respondents and using a large dataset).

The highly correlated variables indicate that the respondents mainly agree on the rating of these factors, and they would provide a sound basis for immediate collective industry action. These correlated factors included cost infrastructure, obtaining skilled labour, general infrastructure, and the cost of entry-level labour. These highly correlated factors also underwent further analysis using the Cronbach's alpha reliability coefficient to assess the internal consistency of these variables. The uncorrelated factors included factors such as access to quality technology, obtaining long-term finance, etc. and, as stated earlier, these factors would require further analysis (i.e. cluster analysis), although in this study such attempts were limited by the lack of availability of data.

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Table 5.7: Results of principal component analysis for determinant production factors

	Rotated Component Matrix[a]							
		Component						
		1	2	3	4	5	6	7
Establishment costs	Q21	.880	.383	-.004	.141	.001	.125	-.049
Cost of hiring unskilled labour	Q17	.819	.184	.077	.357	-.169	.092	.063
Quality of unskilled labour	Q16	.806	.069	.117	.380	.040	-.168	.219
Cost of infrastructure	Q2	.775	.309	.021	.168	-.123	.416	.016
Quality of technology	Q5	-.266	.930	-.120	.028	.081	.069	-.155
Access to quality technology	Q6	-.202	.889	.018	.035	.027	-.350	-.010
Local climate	Q22	.305	.844	-.050	.154	.064	-.019	.074
Access to natural resource	Q19	.328	.729	-.073	.283	-.039	.097	.514
General infrastructure	Q1	.030	.603	-.253	.545	-.114	-.246	-.075
Storage	Q27	-.032	-.113	.944	.124	-.057	-.139	.056
Productivity level	Q23	.212	.240	.811	-.066	.307	-.063	-.287
Changing structure of citrus environment	Q9	-.208	.081	.756	-.004	.165	.352	.303
Transportation	Q26	.129	-.011	.735	-.231	.297	.099	.084
Location	Q20	-.244	.111	.095	.845	.203	-.224	.096
Availability of skilled labour	Q12	.523	.174	-.150	.748	.191	-.103	-.006
Cost of hiring skilled labour	Q14	.599	.335	-.081	.694	.066	-.010	.053
Quality of skilled labour	Q13	.461	.208	.326	.646	.033	-.283	.298
Cost of technology	Q7	-.022	-.141	.335	-.090	.912	-.050	-.114
Cost of doing business	Q3	-.042	-.110	.119	-.008	.905	.170	.299
Effectivity level	Q24	.192	.161	.326	-.039	-.185	.844	.160
Availability of unskilled labour	Q15	.494	-.243	.321	-.295	-.156	.688	.067
Obtaining long-term finance	Q10	.199	.247	.069	.184	.359	.317	.781

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Extraction method: Principal component analysis Rotation method: Varimax with Kaiser normalisation a. Rotation converged in 15 iterations

Source: own calculation based on Citrus Experts Survey (2017)

5.5.2. Determinant - demand conditions

Demand conditions (rating of 3 out of 5) refer to the nature of demand for an industry or nation's products and services and the ability to capture this demand through marketing and sales. The most essential component that determines these demand conditions are the composition of the demand, its size and patterns of growth, and the internalisation of domestic demand (Porter, 1990). Porter places more emphasis on demand in the local market rather than demand in the global market, as industries are more mindful of the local market than the global market and react to changes in local demand more quickly. The increase in the demand of the firms' product or service encourages them to espouse new technology or cultivars with less fear that all the facilities will be utilised or consumed. Hence, Porter explains that these demand factors play a crucial role in improving the competitive status of an industry or nation. This view however does not necessarily apply to the South African citrus market, as it does have a long tradition of supplying Northern Hemisphere markets in Europa and recently African and Eastern markets too. The local market however does remain important, as confirmed below.

In table 5.8 as well as in figure 5.13, demand conditions, as factors of the competitiveness of the South African citrus fruit industry, are rated by CES in terms of having a constraining, enhancing or neutral impact on the competitiveness of the industry. The local market size, together with its growth in volume, was reported to be negatively affecting the competitive status of the local citrus industry. This is concurrent with the available literature, because the local market consumes less than 30% of citrus production. The slow growth in volume locally requires the industry to educate local consumers in terms of taste, quality and health benefits associated with citrus fruit in order to fuel local demand for citrus and expand local consumption.

On the other hand, new markets (rating of 4.33 out of 5), together with global market size (rating of 4.0 out of 5), were highlighted by the experts as factors enhancing the competitive status of the industry. This is also not surprising, because more than 60% of local citrus products are absorbed by foreign markets and the diversity in foreign markets plays a helping hand in this regard. This also reflects that the industry easily accesses lucrative foreign markets, aided by its ability to produce quality citrus fruit that are demanded in various markets. Another factor favouring the local industry in this regard is that it is a dominant player in citrus exports in the Southern Hemisphere (see section 5.3.2.) and supplies most of its products when some of its competitors in the Northern Hemisphere are off-season.

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Table 5.8: Determinant demand conditions directing the competitive status of the industry

Factors	Ratings out of 5
Emerging markets	4.33
International market size	4.00
Diversity in foreign markets	3.85
Food preference	3.77
Seasonality	3.58
Likelihhod of Brexit impact	3.42
Consumer education	2.45
Relationship with major retailers	2.45
Foreign politics (USA)	2.42
Growth in volume locally	2.25
Local market size	2.08
Adverse weather	1.85
NH competition	1.85

Source: CES (2017)
Notes: 1= most constraining; 3= neutral; 5=most enhancing

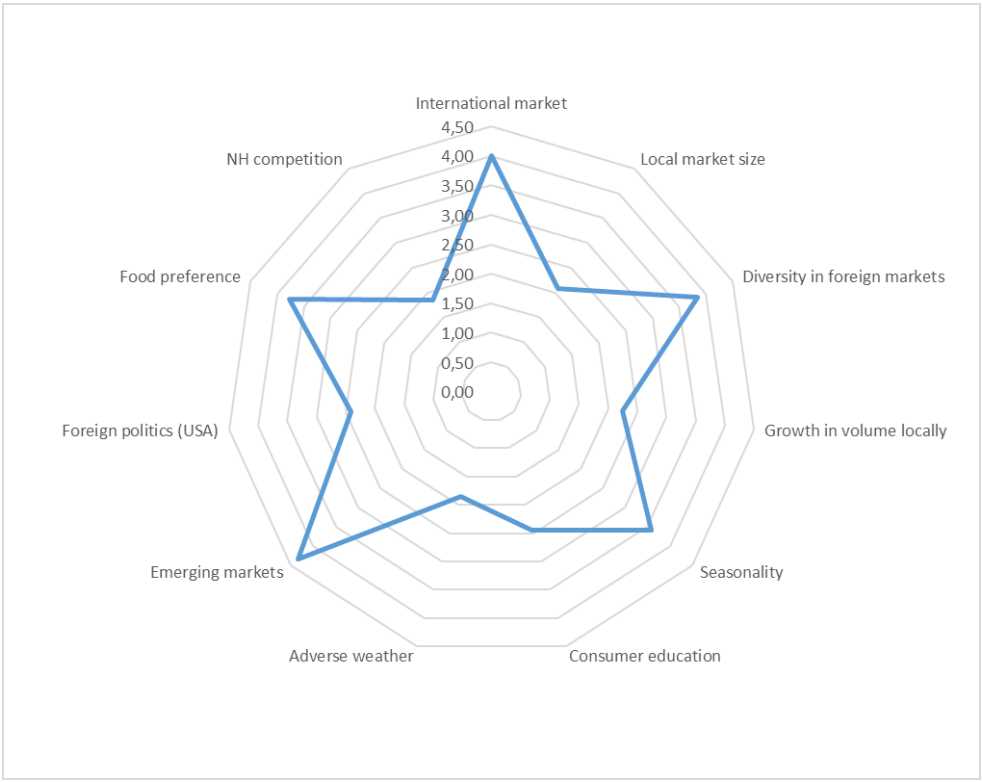

Figure 5.13: Determinant demand factors directing the competitive status of the industry
Source: Citrus survey (2017)
Notes: 1= most constraining; 3= neutral; 5=most enhancing

The changing consumer preference (rating of 3.77 out of 5) was considered as one was of the characteristics encouraging the growth in the competitive performance of the sector. The adverse weather conditions were considered to play a negative role in the buying patterns of consumers, hence negatively affecting the competitiveness position of the industry.

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Principal component analysis

Similar to determinant 1 (i.e. production factors), a PCA was applied to identify variables under the demand factors on which individual responses were very similar or where there was consensus on the rating amongst experts, as well as uncorrelated variables. The first component (i.e. PC1) explains about 33.9%, the second component explains 22.3%, the third component explains 14.7%, and the fourth component and the fifth components explained 7.8% of the total variation (see Appendix B1). The rest of the components were subsequently eliminated by SPSS based on the rule of Elgin values greater than one and were not investigated further. The uncorrelated factors identified included growth in value in local market (Q4), expansion in existing markets (Q12), changing food demand (Q14), seasonality and availability of local citrus (Q9), Brexit impact (Q15), international citrus markets (Q6), and local market size (Q1) (see Appendix B2). This reveals that there were quite significant differences in the views expressed on the impact the demand factors have on the competitive success of the sector. A detailed analysis of such differences, in this case looking at a large sample size and clustering respondents based on their size and position in the chain, will be required to determine what can be achieved collectively.

Only few factors were indicated as highly correlated 'consensus factors' under this determinant, namely growth in volume in the local market, consumer education and availability of information, relationship with local retailers, and local consumer preference for citrus fruits.

5.5.3. Determinant- related and supporting industries

The robust related and supporting industries play a crucial role in the competitiveness performance of a firm or nation (Porter, 1990). According to Mashabela (2007), the presence or absence in the nation of internationally competitive industries (e.g. input providers, research institutions and financial institutions) has an impact on the competitive performance of its industries. The fundamental components for more efficient production and improved competitiveness lie in the availability of local supply of more competitive inputs and the application of improved production technology (Porter, 1990). Innovative agricultural research, training and extension, and affordable financial institutions are therefore critical for the competitiveness of the South African citrus fruit industry.

Privately funded research, with an average score of 3.83 out of 5, was viewed as more enhancing to the competitive performance of this industry, whilst an area in which government is involved, viz. government-funded research (average of 2.15), was viewed as more constraining (see Table 5.9 and figure 5.14). This means that the experts rate highly scientific research done by private entities such as the Citrus Research Institute (CRI) more than the government-funded research conducted by institutions such as the Agricultural Research Council.

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Table 5.9: Influence of related and supporting industries on the competitive success of the industry

Factors	Mean	Standard deviation
Availability of input suppliers	4.69	.480
Specialised technology innovation	4.31	.630
Quality of input suppliers	4.08	.760
Testing of new varieties	4.00	.913
Packing and product handling	3.85	.987
Privately funded research	3.83	1.536
Sustainability of input suppliers	3.77	.927
Cold chain management	3.77	1.013
Collaboration with research institutions	3.54	1.198
Export facilities	3.18	1.537
Cost of storage	3.00	1.279
Government-funded research	2.15	1.144
Electricity supply	2.32	1.387

Source: Citrus Experts Survey (2017)
Notes: 1= most constraining; 3=neutral; 5=most enhancing

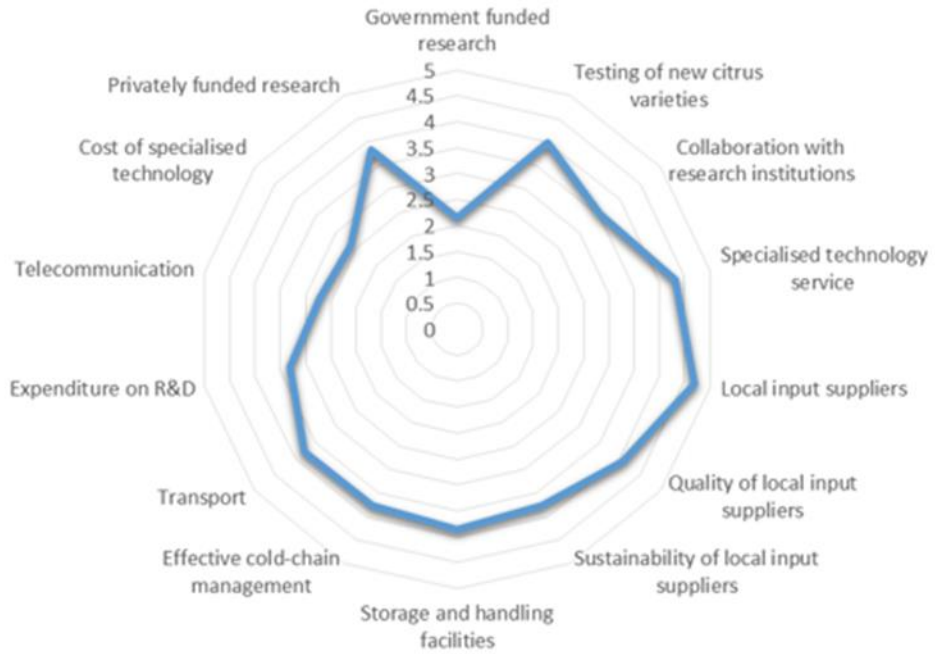

Figure 5.14: Related and supporting institutions directing the competitive status of the industry
Source: Citrus Experts Survey (2017).
Notes: 1= most constraining; 3= neutral; 5=most enhancing

This raises concerns, particularly because this trend is apparent throughout the evaluation of the ability of government to contribute positively to the competitive status of the sector. Collaboration with research institutions, such as Stellenbosch University and the University of Pretoria, was considered by the

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experts to play an enhancing role in the competitive status of the industry. Scholars such as Van Rooyen *et al.* (2001), Esterhuizen (2006), Mashabela (2007), Jafta (2014), Sinngu (2014) and Boonzaaier (2015) all found a positive association between private scientific research and competitiveness in the respective industries they studied.

Citrus fruit are highly perishable products and therefore require cold storage. The experts seemed to be neutral about the influence of the cost of storage (score 3.0) facilities on the competitive status of the industry, but they viewed the effectivity of the cold-chain management (score 3.77) as a factor enhancing the competitive advantage of the industry. The availability of local input suppliers, together with their quality, was also viewed by the experts as playing an enhancing role in the competitiveness of the sector. Only two constraining factors were found under this determinant, namely electricity supply and government-funded research, and these will have to be addressed in collaboration with government, as the industry is limited in the extent to which it can facilitate these two factors.

Principal component analysis

The related and supporting industries factors were subjected to PCA, and the results showed that, irrespective of their position in the value chain, the respondents perceived a few highly correlated variables, with other variables less correlated.

The identified uncorrelated factors include, amongst other factors, electricity supply, testing of new varieties, government-funded research, specialised technology services, expenditure on research and development, quality of local input suppliers, and availability of storage. The variation in opinion expressed towards the rating of electricity supply might be explained by the fact that municipalities (electricity suppliers) have varying population densities and size, and provide different services to different mixes of low, medium, and high income and usage domestic customers (Yelland, 2016). Furthermore, municipalities have diverse combinations of domestic, commercial, and industrial customers embedded within their geographic areas of supply. All of this results in a wide variance of electricity tariff rates and structures between municipal electricity distributors, and with Eskom Distribution (Yelland, 2015). Therefore, the geographical location of each of these experts might have played a part towards the rating of this factor.

On the other hand, factors commonly agreed upon (correlated) include privately funded research, availability and reliability of transport, effective management in cold chain, and availability of local input suppliers (e.g. fertilisers, pesticides).

5.5.4. Determinant - strategy, structure and rivalry of the firm

The fourth determinant of competitiveness deals with the conditions that determine how companies are created, organised and managed, as well as the nature and extent of domestic rivalry. The impact of the

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Strategy, structure and rivalry determinant is rated at an average score of 3.76 out of 5- the highest and most enhancing of the Porter Competitive Diamond determinants. Porter explains that no managerial methodology can be viewed as the best for the development of an industry or nation, but that it rather depends on how efficiently an industry's practice matches the competitive advantage of that particular industry.

Economies of scale with a rating score of 4.38 and global competition with a rating score of 4.31 were rated as the top two enhancing factors in this determinant. Global citrus competition being considered to be among the enhancing factors correlates well with the mind-set of competitive attitude conveyed by the experts. Most of the factors under this determinant were rated as enhancing, with no factor reported to be constraining (see table 5.10 and figure 5.15). This is mostly due to factors such as that the industry personnel have actual control over many of these factors, and hence they can make adjustments to any that they find to be constraining. The good management of information (rating score of 3.62) between various points in the value chain was considered to be an enhancing factor to the competitive status of the industry. Knowledgeable strategy developments and product development processes are based, *inter alia*, on the flow of information from the end user back to the producer. This includes understanding various aspects, such as technology developments, new cultivars and market information and responding to the end user's needs and expectations.

Table 5.10: Determinant firm strategy, structure and rivalry directing the competitive status of the industry

Factors	Mean	Std. deviation
Economies of scale	4.38	.650
Global competition	4.31	.751
Willingness to reinvest	4.23	1.013
Current resource base	4.08	.760
Willingness to take risk	4.00	.816
Competition for resources	4.00	.913
Flow and use of info	3.62	1.136
Local competition	3.45	1.036
Threat of new entrants locally	3.36	1.629
Market intelligence	3.00	1.279

Source: Citrus Experts Survey (2017)
Notes: 1= most constraining; 3= neutral; 5=most enhancing

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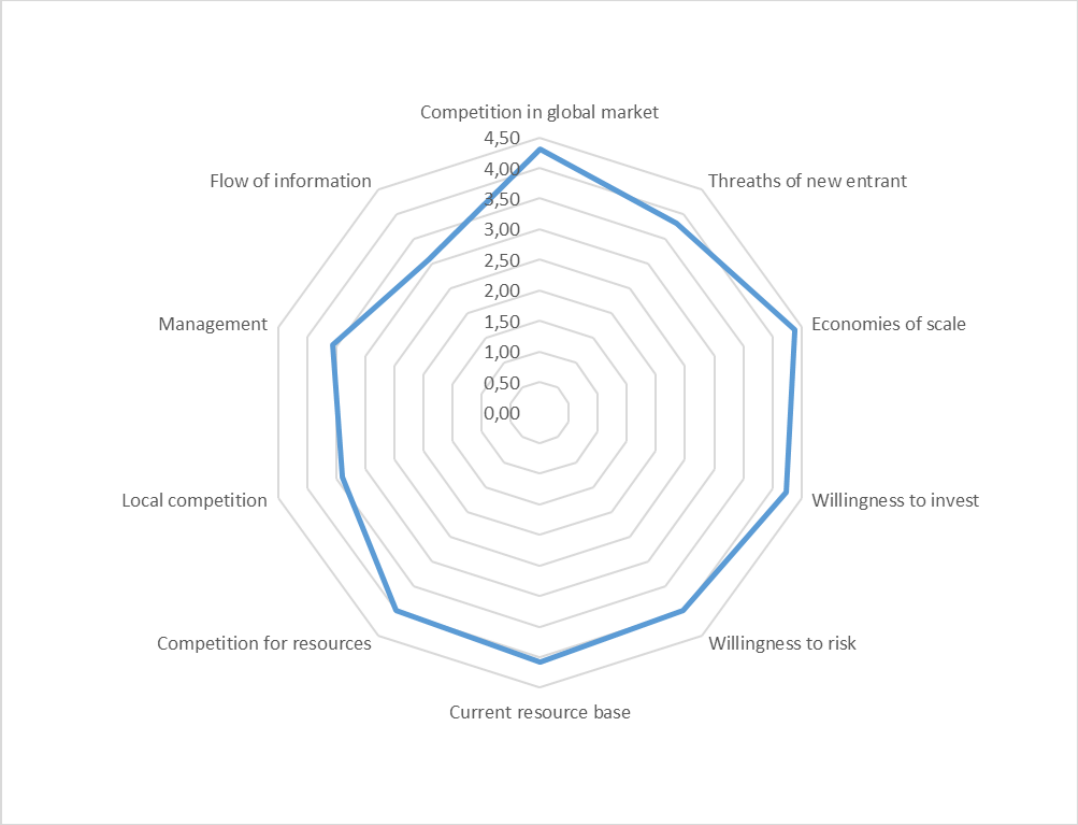

Figure 5.15: Determinant firm strategy, structure and rivalry directing the competitive status of the industry
Source: Citrus experts survey (2017)
Notes: 1= most constraining; 3= neutral; 5=most enhancing

Mashabela (2007) and Jafta (2014) noted that domestic rivalry enhanced the competitiveness of the deciduous fruit and apple industries respectively. Sinngu (2014) also confirmed the positive link between strong domestic rivalry and competitive status in his study on the competitiveness of the local industry in relation to Southern Hemisphere counterparts. The results of this study also confirm that domestic rivalry enhances the competitive status of the industry. Porter explains that there is a strong association between vigorous domestic rivalry and the development and persistence of competitiveness in any industry. He highlighted that vigorous domestic rivalry creates pressure on sectors (producers, processors, input providers etc.) to improve quality and service, to innovate (i.e. create new cultivars) and to create new processes that are necessary to gain and improve competitive status. Therefore, the pressure from different citrus industries provides inspiration to the others to search for innovation, efficiency and new markets and, in turn, to improve their competitiveness.

When asked to rate the threat of new entrants, the experts seemed to be unanimous in their view that new entrants would enhance the competitive status of the sector. Overall, the results in this section indicate that most of the determinants under this determinant play an enhancing role in the competitive status of the sector.

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Principal component analysis

The uncorrelated factors were identified as aspects such as current resource base, competition in global markets, threat of new entrants – both locally and globally, willingness to take risks, management of market intelligence, management of flow of information, flow of information from customers to industry, and competition in the local market. This reveals that there were quite significant differences in the views expressed on the impact the demand factors have on the competitive success of the sector. A detailed analysis of such differences, in this case looking at a large sample size and clustering respondents based on their size and position in the chain, will be required to determine what can be achieved collectively—especially with regards to management of market intelligence and flow of information between various players in the citrus value chain. Those with mutual agreement on the ranking of their influence on competitive performance of the industry were factors such as willingness to reinvest in citrus operations, economies of scale and competition for resources (e.g. land, capital).

5.5.5. Determinant - government support and policies

The choice of government policies can directly and/or indirectly influence each of the four determinants mentioned above. Porter makes it clear that government policies (rating score of 2.12 out of 5) are not necessarily a "fifth force" affecting an industry, but stresses the importance of analysing how government policies affect each of the other forces individually. This is because government, through its policies, assists in the development of new clusters or the strengthening of those already existing. Boonzaaier and Van Rooyen (2017) point out that prosperous government policies work in those sectors in which fundamental determinants of national advantage are present and reinforced by government actions. An unwavering and predictable macro-economic environment, in particular a stable exchange rate policy (that favours export-orientated industries like the citrus sector), is seen as one of the necessary conditions in order to facilitate the development of a sustainable competitive industry (Mashabela, 2007; Boonzaaier, 2015). These government policies have the potential to raise the odds of acquiring a competitive advantage and can play an enabling role in the competitive status of industries.

Macro-economic environment conditions, sometimes the result of government policies, may put an industry or nation in an unfavourable competitive position (Porter, 1998). The WEF global competitiveness report of 2016 places the South African macro-economic environment at number 97 out of 138 nations, signifying a slight deterioration when compared to the 2015/16 global competitiveness report, which ranked the local macro-economic environment 85th out of 140 countries. This implies that the current macro-economic environment plays a hindering role in the competitive performance of this country. The results from the Citrus Experts Survey (CES) are in line with this report.

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Table 5.11: Determinant government support and policies directing the competitive performance of the industry.

Factors	Mean	Std. deviation
Competition Act	3.38	.650
Regulatory standards	3.23	1.235
Water Regulation Act	2.23	1.092
Tax system	2.23	.725
Admin regulations	2.23	0.738
Macro-economic policy	2.08	.954
AgriBEE	2.08	.996
Labour policy	2.00	1.080
Trade policy	1.92	.954
Legal and political factors	1.75	1.055
Corruption and opportunism	1.69	.947
Land reform policies	1.50	.798
Reliability of current political system	1.46	.967
Land expropriation	1.46	1.198
Credibility of politicians	1.08	.277

Source: Citrus Experts Survey (2017).
Notes: 1= most constraining; 3= neutral; 5=most enhancing

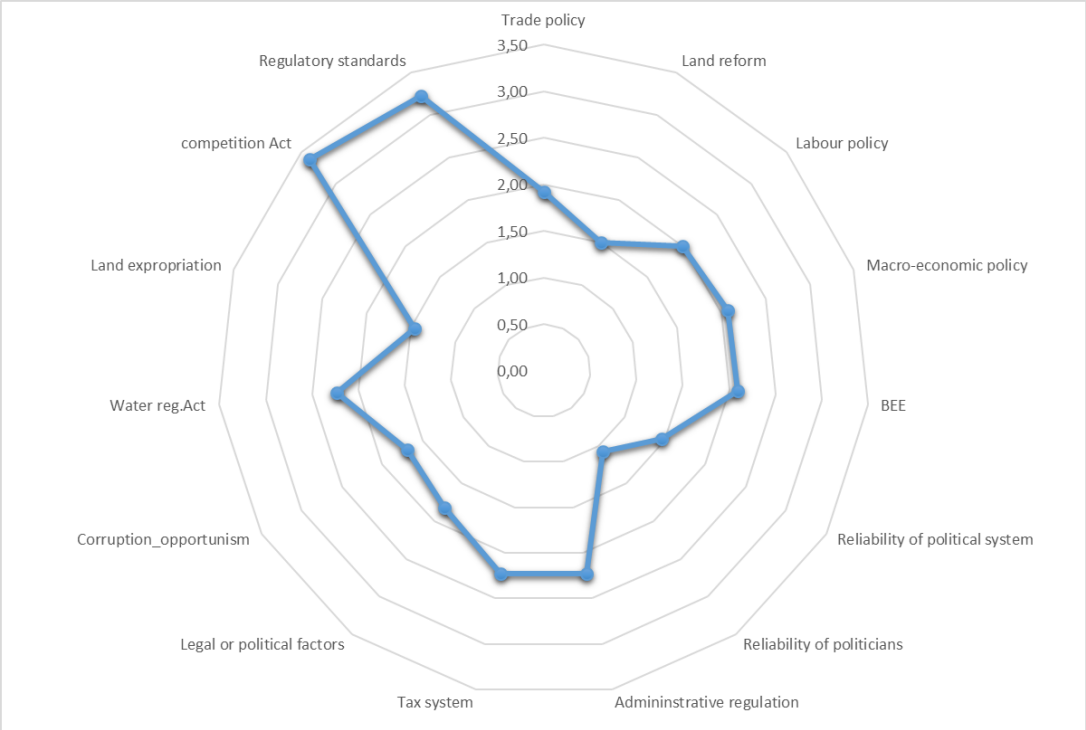

Figure 5.16: Determinant government support and policies directing the competitive status of the industry
Source: Citrus experts survey (2017)
Notes: 1= most constraining; 3= neutral; 5=most enhancing

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The experts highlighted that the current local macro-economic policies with a rating score of 2.08, are hindering the competitive position of the citrus industry on global platforms. Most of the factors under this category were rated by the experts as having a negative impact on the competitive status of the industry (see Table 5.11 and figure 5.16). These include the land reform policies (rating score of 1.46 out of 5), which plans to redistribute about 30% of the land to previously disadvantage groups, corruption, labour policy (score 2.0), AgriBEE policy (score 2.08) and the tax system (score 2.23).

The threat of land expropriation (score of 1.46 out of 5) for local citrus producers, exporters and processors in South Africa (the majority of whom are white) is reported as one of the factors that hinders the competitiveness performance of the sector going forward. According to Chadwick (as cited by Partida, 2011), some farmers have developed a short-term outlook on their farms since land reform policies were introduced – shorter term than farming should be. This is likely to have an adverse impact of the competitive performance of this industry in the near future. The main reasons highlighted by the BFAP (2017) for the slow implementation or success of land reform in the local agricultural sector are the: policy uncertainty and misalignment between various departments. Hence, sooner successful completion of the land reform programme will be necessary to ensure a stable and growing citrus industry.

AgriBEE is a key policy objective developed by the current government and is aimed at supporting previously excluded black farmers to participate in mainstream economic activities with a view to enhancing the transformation agenda in the sector. This programme is aimed largely at economically transforming the racially biased commercial agricultural sector, and making it more inclusive and representative of the demographics of South Africa. While compliance with this programme is not compulsory, many organisations in the agricultural sector largely recognise that AgriBEE is a strategic imperative that is required to contribute to the transformation, growth and stability of the agricultural sector. Obtaining a BEE scorecard is essential for individuals who wish to do business with an organ of state, and companies that buy from them will request the BEE scorecard in order to improve their own preferential procurement score. Scorecards may also be required to obtain various permits and licences, such as water rights and export permits, and when applying for finance from institutions such as the Land Bank. Under the 2012 amended sector codes, every enterprise in the agricultural sector is required to report on its BEE compliance annually to the Sector Council – even if it has not completed a BEE scorecard. Notwithstanding these good AgriBEE policy intentions, and with it being one of the cornerstones of building an inclusive agricultural sector, it is discouraging to see that more than 60% of the experts agreed wholeheartedly that the Agri-BEE policy is a constraining factor to the industry's competitiveness performance. This on its own requires a thorough investigation to establish which components of this Agri-BEE policy hinder the competitive status of the agricultural sector, particularly the citrus industry.

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Principal component analysis

PCA was applied to identify correlated and uncorrelated factors under this determinant. The factors with varying opinions in their ranking were current political system, land reform policy, complying with regulatory standards, macro-economic policy, regulatory standards, Water Regulations Act, land expropriation, AgriBEE policy, and the Local Competition Act.

It is also important to highlight that, there is a high number of uncorrelated factors (varying views on rankings), and this also requires a further detailed analysis, this time using a large sample.

The correlated factors (those with consensus) under this determinant include the local trade policy, labour policy, taxation system, and corruption and opportunism.

5.5.6. Determinant - chance factors

Porter (1998) defined chance factors (rating score of 2.31 out of 5) as happenings that are beyond the control of industries or governments. These events may create forces that reshape the structure of an industry, allowing it to improve its competitive position and/or allow in new players who exploit the opportunities arising from a reshaped industry structure. These events include, amongst other things, new varieties, new technology, political instabilities, war, etc. The likelihood that these external events affect or benefit the citrus industry's competitive performance was rated by the citrus experts and the findings from their ratings are displayed in table 5.12 and figure 5.17 below.

The experts highlighted the exchange rate with rating of 4.23 (the current low value of the Rand against major currencies such as the US Dollar, the EURO and the British Pound) as the most enhancing factor under this determinant. However, although the declining value of the local currency supports export trade (more is earned by exporting), it also increases certain production costs for those who import their inputs. It is important to highlight that Esterhuizen and Van Rooyen (2008) found that a strong Rand was one of the factors constraining the competitiveness success of agribusinesses in SA.

Table 5.12: Determinant chance factors directing the competitive status of the industry

Factors	Mean	Std. deviation
Current exchange rate	4.23	.725
Exchange rate fluctuations	2.85	1.463
Unfavourable weather conditions	2.67	1.435
Economic growth and development	2.42	1.505
Global events	1.85	.899
Social unrest (strikes)	1.75	.866
SA political system	1.69	.751
Cost of crime	1.54	.776
Global recession	1.38	.650

Source: Citrus Experts Survey (2017).
Notes: 1= most constraining; 3= neutral; 5=most enhancing

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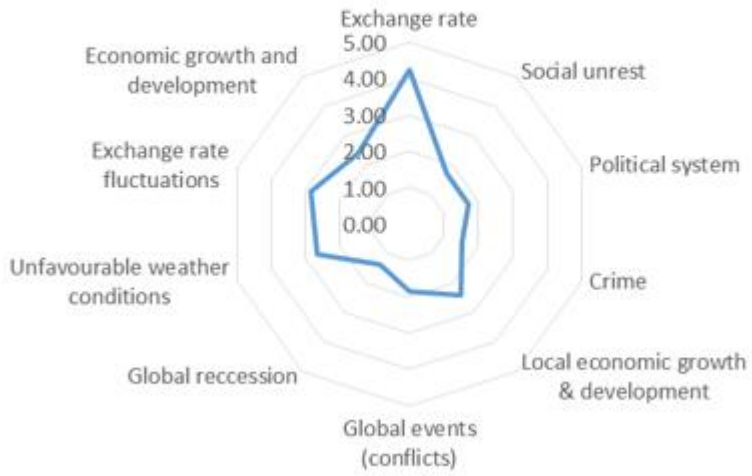

Figure 5.17: Determinant chance factors directing the competitive status of the industry
Source: Citrus experts survey (2017)
Notes: 1= most constraining; 3= neutral; 5=most enhancing

The current political system (in general) with rating score of 1.69 and the cost of crime with rating score of 1.54 were amongst the factors that negatively influence the competitive status of the local citrus industry. Slow economic growth and development (rating score of 2.42) are also not assisting in boosting the competitive status of the sector in global markets.

Principal component analysis.

PCA was also applied to the chance factors in order to identify correlated and uncorrelated factors. The results were similar to those of other determinants, i.e. a fewer number of correlated factors. The uncorrelated factors include factors such as the impact of the global recession (Q10), social unrest (strikes, land grabs) (Q4), as well as the political system (Q5). It is important to highlight again that 'variation' in the case of this study does not imply that these 'uncorrelated factors' are not valid, but rather that there are differences in views on them and they may require further analysis i.e. through the application of cluster analysis using a larger sample size.

The only correlated factor identified under this determinant was the impact of global conflicts on the industry's competitive success.

5.5.7. Cronbach's alpha applied to correlated factors

The PCA results on correlated factors were further used to assess levels of internal consistency or reliability, using the Cronbach's alpha reliability coefficient. Assessing the reliability of the instrument is one of the final hurdles in arriving at operational strategies (step 5), since it assesses the ability of the instrument to measure consistently and allows for adjustment of the instrument to ensure acceptable reliability.

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Employing an iterative process, the 29 correlated factors (consensus factors on PCA analysis) were assessed and factors that would improve the reliability of the strategic framework through their omission were deleted from the group of factors (see table 5.9). Accordingly, a further five factors were rejected from the strategic framework, leaving only 24 factors in the final strategic framework (see table below). In the final framework, the Cronbach's alpha coefficient was 0.761 across all factors, indicating a higher level of internal consistency.

Reliability Statistics

Cronbach's alpha	Cronbach's alpha based on standardised items	N of Items
.761	.781	24

Table 5.13: Results of Cronbach's alpha on correlated factors

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's alpha if Item deleted
Cost of Industry infrastructure	63.000	78.444	.239	.709
Access to natural resources	62.900	74.322	.273	.707
General infrastructure	61.100	85.433	-.320	.733
Obtaining skilled labour	63.500	66.944	.744	.662
Competency of skilled labour	63.000	72.667	.567	.685
Cost of hiring skilled labour	63.200	69.511	.670	.673
Entry-level labour	61.200	86.178	-.293	.740
Growth in volume local	63.100	76.322	.197	.714

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Consumer education	62.900	80.544	.025	.727
Relationship with retailers	62.700	73.789	.459	.692
Willingness to reinvest	62.200	70.844	.589	.680
Privately funded research	62.100	79.656	-.008	.745
Availability of input suppliers	60.600	78.933	.349	.706
Transport	61.600	80.711	.004	.731
Cold chain management	61.600	83.822	-.131	.737
Economies of scale	60.800	88.178	-.477	.745
Competition for resources	61.300	84.011	-.143	.736
Trade policy	63.300	76.900	.259	.707
Labour policy	63.200	74.178	.346	.700
Administrative regulations	62.900	71.878	.705	.679
Tax system	63.000	72.667	.677	.682
Legal and political factors	63.400	69.600	.608	.676
Corruption and opportunism	63.700	72.011	.670	.680
Global events	63.300	71.122	.613	.680

Source: Own calculation based on CES (2017)

These final factors were sent back to the experts for the second round of Delphi analysis and, based on their relevance ratings, some of these factors were used to construct a strategic framework aimed at increasing the competitive position of the industry, with special focus on those factors that constrain the industry.

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5.5.8. Rating of relevance: round two Delphi analysis

The above results from the Cronbach's alpha on correlated factors concluded the analytical steps for the first round of Delphi analysis. The task now was to send these results back to the experts to rate the degree of relevance of these factors as determinants of competitiveness in the local citrus industry. A Likert scale of 1 to 5 was again used, with 1 signifying no relevance of the factor and 5 representing high relevance of the factors to the competitive status of the sector. Of the total of 13 panel members, 10 responded to the second round, representing a 76% response rate. One of the respondents could not be reached due to a non-functional email address.

While more than two iterative discussion rounds are allowed in the Delphi approach, a third estimation round was not considered useful in this study because, as expounded by the standard deviations in Table 5.14, the standard deviation scores associated with the experts' rating means did not change significantly between rounds one and two, suggesting that further significant reductions in the heterogeneity of the estimates would be very unlikely. In addition, when scores for changes in standard deviation are generally negative, it implies that the standard deviation of the variable estimates (i.e. the extent of variation between individuals) is decreasing between rounds as the panel closes in on consensus. When the estimates of change in standard deviation are also small, it suggests that there is relatively little change in the standard deviations estimates between rounds, i.e. convergence has already largely been reached and further iterations would only yield very small marginal reductions in variation. Among the most commonly used statistical significance tests applied to small datasets is the Student's t-test. Consequently, statistical testing using the paired comparison Student's t-test at the 5% level confirmed no significant difference ($p > 0.05$) in the variability between the mean estimates of the two rounds, thus also signalling no need for a further round of consultation.

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Table 5.14: Impact and relevance rating of factors in round two Delphi analysis

	Round 1		**Round 2**		
	Impact rating	**Std. deviation**	**Relevance rating**	**Std. deviation**	**Change in SD[a]**
Cost of infrastructure	2.23	0.725	3.7	0.4369	-0.2881
Access to natural resources	2.38	1.325	3.8	0.9342	-0.3908
General infrastructure	4.08	0.641	3.6	0.6325	-0.0085
Obtaining skilled labour	1.69	1.109	3.8	0.9342	-0.1748
Competency level	2.31	0.855	3.9	0.792	-0.063
Cost of skilled labour	2.00	0.913	3.5	0.6396	-0.2734
Entry-level labour	2.54	1.127	3.7	1.0488	-0.0782
Transport	2.92	1.441	3	0.7385	-0.7025
Establishment cost	2.08	0.76	3.7	0.4369	-0.3231
Q. unskilled labour	1.50	0.792	4.1	0.674	-0.118
International market size	4.00	0.816	3.8	0.5721	-0.2439
Growth in vol. locally	2.25	1.288	3.9	0.6674	-0.6206
Consumer education	2.33	1.073	3.7	0.7447	-0.3283
RLTNSHP. Retailers	2.45	0.934	3.5	0.977	0.043
Emerging markets	4.33	0.778	4.2	0.7135	-0.0645
Diversity in foreign markets	3.85	0.899	3.9	0.5135	-0.3855
Gov. research	2.15	1.144	3.8	0.5721	-0.5719
Private research	3.83	1.536	3.9	0.6674	-0.8686
Local input suppliers	4.69	0.48	3.7	0.6105	0.1305
Cold chain management	3.77	1.013	3.2	0.5721	-0.4409
Q. local input suppliers	4.08	0.76	3.8	0.3814	-0.3786

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Willingness to reinvest	4.23	0.816	3.5	0.6396	-0.1764
Economies of scale	4.38	0.65	3.7	0.4369	-0.2131
Competition for resources	4.00	0.913	3.6	0.4671	-0.4459
Flow of information	3.62	1.136	3.2	0.5721	-0.5639
Local competition	3.62	1.036	3.6	0.6325	-0.4035
Trade policy	1.92	0.954	4.3	0.7447	-0.2093
Labour policy	2.00	1.08	4.5	0.6396	-0.4404
Admin regulations	2.23	0.7385	4	0.725	-0.0135
Tax system	2.23	0.725	4.1	0.6674	-0.0576
Legal & political factors	1.75	1.055	4.7	0.4369	-0.6181
Corruption and opportunism	1.69	0.947	4.4	0.6325	-0.3145
Global events	1.85	0.899	2.8	1.0269	0.1279

*SD - standard deviation
*Change in SD[a] = SD value in the second round minus the value in the first round

Displayed in Figure 5.18 is a X-Y scatterplot of 'impact ratings, based on first-round results' and 'relevance scores, based on the second-round results', for all determinants that had a degree of internal consistency in the Cronbach's alpha analysis. This figure provides a visual identification of determinants that are critical to the industry based on their current impact and their relevance to the industry's competitive performance. The quadrant in the top left corner shows determinants that are relevant to the industry but that are currently constraining its global competitive performance. This means that these are the determinants that the industry should focus on more, referred to in this study as 'new focus area' and in this study more emphasis was put to them in terms of drawing up strategic approaches (step 5). These factors include administrative regulations, consumer education, and quality of both skilled and unskilled labour.

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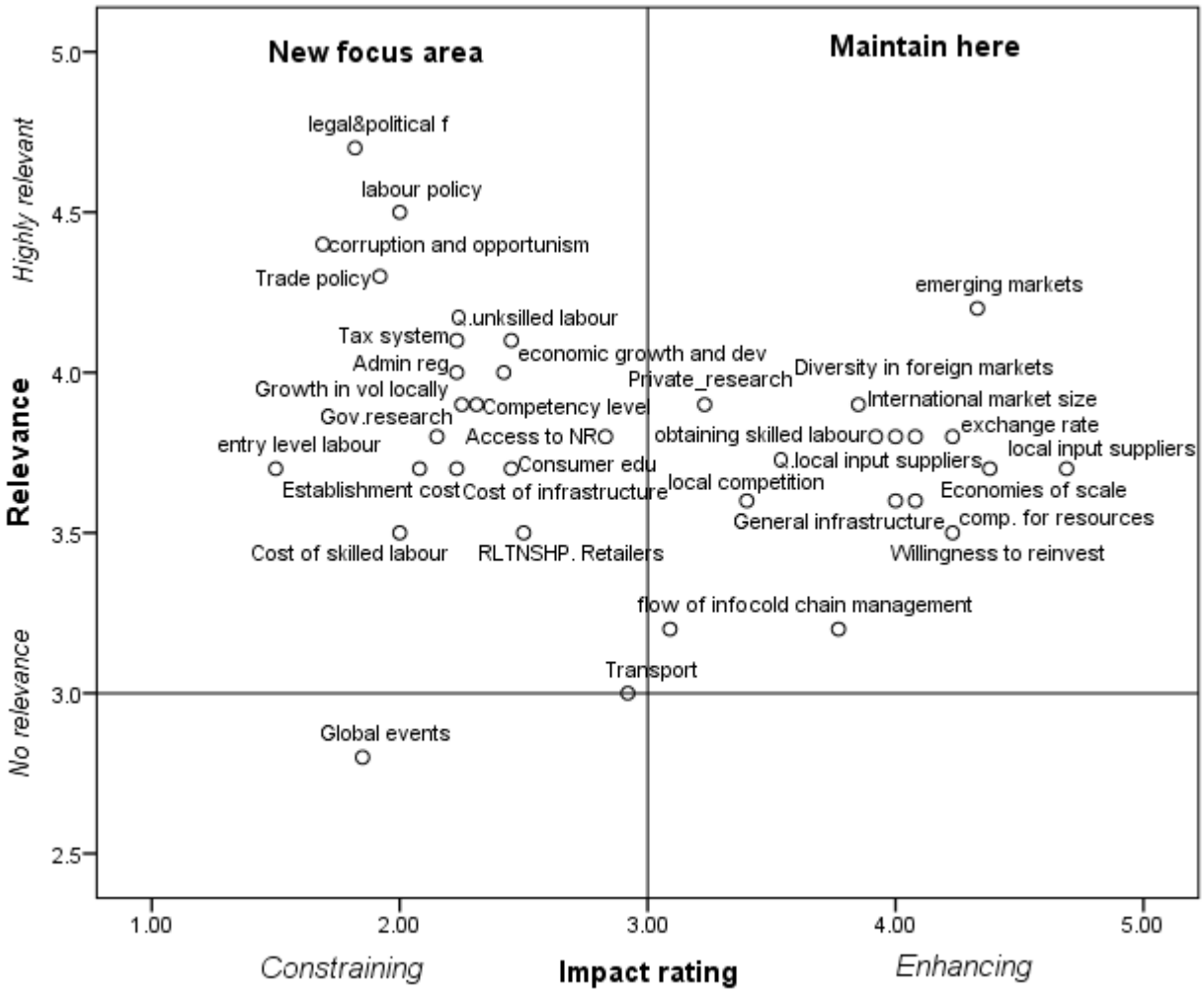

Figure 5.18: X -Y scatterplot of impact and relevance ratings
Source: Own calculations based on citrus experts survey

The top right quadrant highlights the determinants that are currently contributing positively to the competitive performance of the citrus industry, i.e. currently being enhancing and relevant and being in the 'keep up the good work zone'. These determinants need to be managed to maintain and expand them in that 'positive space', i.e. 'maintenance determinants'. These variables include the development of foreign markets, general infrastructure and quality of local input suppliers. . The variable "global events" (e.g. wars) was found to be constraining the industry, but had no current relevance in the competitive status of the industry. This can be associated with the stable economies in the industry's major export markets, particularly in the EU.

5.6. Conclusions

This chapter defined competitiveness in the context of the local citrus industry and assessed the competitive status of the industry in global markets using the Relative Trade Advantage of Vollrath (1991). In order to measure such competitive performance, this study made use of trade data obtained from two sources, namely the FAO and ITC. The results from ITC trade data of 2016 revealed that the industry, as a

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whole, is globally competitive and has maintained this status since 1961. When compared to its global competitors, SA—with RTA of 18.6, is outperformed by countries such as Egypt (RTA 30.2) and Morocco (RTA 18.8) in the Northern Hemisphere, even when counter-seasonal production is taken into account. When compared to Southern Hemisphere regions, SA is a global leader in terms of relative competitive performance and has maintained that position since 2012 when it overtook Uruguay.

In the analysis of individual citrus fruit, oranges (RTA 27.6) and grapefruit (26.8) had higher relative competitive advantage values when compared to soft citrus (RTA 9.6) and lemons &limes (RTA 16.3). There was an observable decline in competitive performance as one move down the value chain for citrus juice (RTA 2.38) and orange juice (RTA 3.9). On the other hand, an important observation made from the analysis of the grapefruit value chain is that, unlike other juices (i.e. citrus and orange juices), grapefruit juice(RTA 30.34) showed an increase in competitiveness when shifting from primary to processed commodities.

This chapter also determined the underlying factors that play a role in enhancing or constraining competitiveness in the citrus industry using Delphi analysis. Key enhancing factors with a high degree on internal consistency were identified as factors such as the availability of input suppliers, economies of scale, willingness to reinvest in citrus activities, general infrastructure and cold chain management. The constraining factors to the improved competitiveness of the sector were also identified, and most of these were identified as being beyond the sole control of the industry. These included availability and quality of skilled labour, growth in volume locally, consumer education, relationship with major retailers, trade policy and current tax system.

The second round of Delphi analysis confirmed that these factors were relevant to the competitive success of the industry, with the only exception being the determinant ‘global events’. The next chapter moves on to highlight the key findings of this study, make recommendations and begins the last objective of the study, which is proposing new strategies that can enhance the future competitiveness of the industry in global markets.

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Chapter 6: Summary, conclusions and recommendations

6.1. Introduction

This study focussed on evaluating the competitiveness status of the South African citrus industry. The previous chapter measured the competitive performance and compared such trends to its direct global competitors. The factors driving competitive trends were identified and analysed using a two-step Delphi technique. The purpose of this chapter is to provide a summary of the key research findings and conclude the last step of this study (step 5), which seeks to provide strategic approaches that can be useful in maintaining and increasing the industry's competitive position.

6.2. Revisiting the analysis and major findings

A five-step analytical framework was adapted from scholars such as Esterhuizen (2006), Van Rooyen, Esterhuizen and Stroebel (2011), Jafta (2014), Boonzaaier (2015), Angala (2015) and Boonzaaier and Van Rooyen (2017).

Definition: The first step established an appropriate definition of competitiveness as it applies to the South African citrus industry (see section 5.2).

Measurement: The second step requires an empirical measurement by applying the RTA of Vollrath (1991), to measure competitive trends over time. Although it is not the only measure of competitiveness, this method captures the universal essence of competitive performance in a relative free trade environment in which competitive advantage drives the growth and sometimes survival of an industry, and takes into account all trade -both imports and exports- in order to capture the competitive trends over time. The study made use of trade data obtained from the agriculture-based dataset, namely the FAO, for the period 1961 to 2013, and data obtained from the ITC (whole economy perspective) for the period 2001 to 2016. The value of the FAO data is that it provides a long-term time series- since 1961- but only include agricultural commodities in its relative formula. ITC date is shorter- since 2001- but include economy wide data; thus, a better inclusion of opportunity cost considerations as required by the selected definition for this study. Both data is however used to confirm trends and fluctuations.

The results from both datasets (i.e. FAO and ITC) showed that SA had positive figures throughout the studied years and has maintained such positive figures since the early 1960s, with competitiveness in the period from 2005 onward being comparatively greater than the other periods, and with a gradually increasing trend over recent years. The results also reveal that the industry is measured as marginally less competitive in the agriculture-based sector (e.g. FAO, RTA 12.6 in 2013) than in the multi-sectoral-based sector (e.g. ITC, RTA 14.8 in 2013), but both these lines follow similar movement and have a correlation factor of 0.81 when an analysis was done of similar periods, i.e. 2001 to 2013 (see Figure 5.1).

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From a global comparison perspective, SA - with RTA of 18.6 - is viewed as the country that is relatively more competitive in terms of citrus when compared to Southern Hemisphere-producing regions, which enjoy similar production seasons. When compared to the Northern Hemisphere producing regions, which enjoy counter-seasonal production, the industry is outperformed by Egypt (which is a global leader in competitive status with RTA figures reaching 30.2 in 2016) and Morocco (RTA figures of 18.8 in 2016) (see figure 5.3).

When individual citrus fruit were analysed, all showed positive values throughout the studied years, meaning that they performed competitively in global markets, albeit with some variations in the level of competitiveness as one moves across the different citrus varieties. In terms of oranges, SA (RTA of 27.6 in 2016) is a global leader when compared to Southern Hemisphere countries and when compared to the Northern nations is outperformed only by Egypt—with RTA of 76.1. In terms of grapefruit, SA (with RTA of 26.8) outperforms all other grapefruit-producing countries in both the Northern and Southern Hemispheres. With reference to the soft citrus industry, SA (with RTA of 9.6), is outperformed by Uruguay (RTA of 17.7) from the Southern Hemisphere, and by Morocco (RTA of 46.5) and Spain (RTA of 17.9) from the Northern Hemisphere. In terms of lemon and limes SA (RTA of 16.3) outperforms all countries from the Northern Hemisphere. In the Southern Hemisphere it faces a tough competition from Argentina (RTA of 22.7), which outranked SA in 2016 due to the poor harvest resulting from the drought.

In the analysis of the citrus value chain there was an observable decline in the competitive performance as one moves down the value chain for citrus juice (RTA 2.38) and orange juice (RTA 3.9). An important observation was made on the basis of the analysis of the grapefruit value chain, which, unlike other juices (i.e. citrus and orange juice); the grapefruit juice (RTA 30.34) showed a rise in worldwide competitiveness when shifting from primary to processed commodities.

Factor identification: The third step asked which factors determine the competitive performance of the industry. In order to answer this question, the study made use of a two-round Delphi technique to gather key information from selected experts in the citrus value chain. The introduction of this type of analysis represented the extension of the conventional framework used by ISMEA (1999), Esterhuizen (2006), Van Rooyen *et al*. (2011), Jafta (2014), Angala (2015), Boonzaaier (2015) and Boonzaaier and Van Rooyen (2017).

In the first round, this study selected experts based on their experience in their particular fields of expertise (viz. input provider, producer, packer, exporter, processor and/or marketer). After the selection process, an explanatory recruitment letter, accompanied by a questionnaire developed in the form of a Porter diamond model, were issued via email to the selected experts in order to collect their opinions and views regarding exogenous and endogenous factors affecting the competitive performance of the industry.

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The questionnaire was grouped into Porter Diamond six determinants, namely production factor conditions, demand conditions, related and supporting industries, firm strategy, structure and rivalry, government support and policies, and chance factors. A total of 101 factors were identified, listed and rated on the basis of their current impact on the industry's competitive performance. Factors such as economies of scale, current exchange rates and availability of local input suppliers were viewed as factors promoting the competitive position of the industry. On the other hand, factors such as availability of skilled labour, quality of unskilled labour and adverse weather conditions were viewed as factors having a negative impact towards improved competitive position of the industry.

In Step 4, the aim was to analyse the factors rated by the Citrus Experts Survey (CES) experts in order to obtain the major constrainers and enhancers of the competitive success of this industry. Of the total factors, 94 were found to be affecting the competitive success of the industry positively and/or negatively. Furthermore, a principle component analysis (PCA) was used on these factors in order to identify highly correlated variables, that is factor ratings in the dataset for which individual views were very similar, as well as uncorrelated variables, that is factors for which the respondents' ratings were more variable. Twenty-nine of the total factors were found to be highly correlated under the PCA analysis – that is ratings of these factors were very similar. These included factors such as burdensome administrative regulations, economies of scale, growth in volume locally, availability of local input suppliers and quality of unskilled labour, to mention a few. These 29 variables were further subjected to Cronbach's alpha analysis to assess the degree of internal reliability.

Employing this iterative process, the 29 correlated factors (consensus factors on PCA) were assessed and factors that would improve the reliability of the strategic framework (step 5) through their omission were deleted from the group of factors. Accordingly, a further five factors were rejected from the strategic framework to leave only 24 factors in the final strategic framework. In the final framework, the Cronbach's alpha coefficient was 0.761 across all factors, indicating a higher level of internal consistency.

These 24 factors were sent back to the citrus experts for the round two Delphi analysis. In this round, the experts were asked to rate the relevance of these factors as determinants of the competitiveness of the industry. This analysis makes it possible to identify the performance gap between 'what is' the status of performance now (current impact – round 1) and 'what ought' to be (relevance – round 2). This was also done to aid the process of developing strategies (step 5) that will enhance the industry's competitiveness going forward. Consequently, the determinants were rated on the basis of their relevance, and determinants that are relevant to the future success of the industry but are currently constraining were identified, see table 5.14.

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6.3. Hypotheses

In the first chapter (section 1.3.3), two main hypotheses driving the direction of this research were established. The intention of this section is to validate these stated hypotheses.

The first hypothesis assumed that "the South African citrus industry has performed competitively in the global markets over time, in a sustainable manner, with noticeable improvement after the deregulation period".

After quantitatively evaluating the competitive performance of the industry over time using the trade-based RTA approach, the results show that the industry has been consistently globally competitive since 1961, with the period post-deregulation being comparatively higher than other periods. This finding proves the stated hypothesis to be acceptable

The second hypothesis assumes that, a range of factors, such as cost of doing business, financial support systems, quality of technology, skilled labour, the international value of the Rand, government policies and supporting institutions, determine the competitive performance of the citrus industry, i.e. competitiveness is determined by a multiplicity of factors.

The findings from the CES, as analysed in section 5.5, reveals that all of these factors play a determining role in the competitiveness status of the industry in global markets. These findings reveal that a single factor does not influence competitiveness alone, but rather that a whole range of other factors affect competitiveness. These findings permit the acceptance of this second hypothesis.

6.4. Proposed strategies to enhance the industry's global competitive performance

The purpose of this section is to formulate industry wide strategies that can be used to maintain and improve the local industry's competitive position in global markets. These strategies are derived from the findings of this study, most of which were directed by the results obtained from the two-round Delphi analysis. As mentioned in Chapter 2, the existing strategic plans of the industry seem not to directly address competitive performance factors. As such, these proposals and recommendations derived from this study may thus provide new angles and contribute to a more competitive citrus industry. It must however be noted that these proposals were not tested through participative industry sessions where findings from this study and proposed strategies were discussed –a three type Delphi process. Thus, this section only provides strategic ideas and proposals derived from the findings of this study. These could be introduced to the industry as "business intelligence" for further interrogation and consideration.

The findings from round two of the Delphi analysis (see figure 5.18), using X-Y scatterplot of 'impacts ratings – based on first-round results' and 'relevance scores – based on the second round results',

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provided a visual identification of determinants that are critical to the industry based on their impact and their relevance to the industry's competitive performance.

From these findings, this study proposes industry-wide strategies for the factors that are currently constraining the industry and are relevant to its future competitive performance. It should be highlighted, however, that no direct or firm-level strategies will be proposed. For such proposals to be made, a much more detailed analysis, and scenario development specifically related to that firm, will have to be taken into consideration.

Production factors

- Development and testing of innovative yield increasing and cost saving technology (fruit handling systems, harvesting platforms, fertiliser application equipment, moisture management tools, storage, packaging materials etc.) throughout the value chain. This may require an audit to assess what is currently going on; a bench marking of global best practise technology; and implementation strategies.

- Continued training of labourers (in all parts of value chain) is recommended in order for the required skills to be obtained in the industry. Apart from the ongoing collaboration with government, such training could be held with participating farmers and other interested personnel's in the value chain. The risk of course is that qualified labourers might seek better fortune elsewhere, in order to avoid this, industries in the value chain could provide such labours with shares ownership in the business (determined by owners).

- The industry could adopt smart water technologies in irrigation techniques and water reuse to sustain the sector. Commercialize and develop new technologies in water management and promote implementation of new solutions.

- With regards to climate change, there should be collaboration with government, to support research institutions (such as the CRI, ARC etc.) and weather stations to continue developing new citrus varieties (specifically developed for local conditions) and making quality climate data accessible to all citrus farming regions. This will include continued tracking of climate variations and their impact on citrus fruits development (e.g. increasing heat temperatures, drought, role of insects, wind etc.).

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Demand factors

- Effectively market citrus in domestic markets in order to increase the consumption of both fresh citrus fruits and juices. A growth in consumer demand is required to facilitate volume and margin growth in the local market. The available literature points out both rational and brand image barriers to increasing citrus consumption. A study could be carried out that classifies citrus consumers into different market segments (based on their needs). The industry could also study the cost and benefits of using social media-apps as a way of marketing tool. These apps can be used to disseminate citrus related information (i.e. health benefits, history of citrus, their time of availability and form etc.) and they also provide a platform whereby consumers can engage directly with suppliers. Available literature points out that consumers are more engaged on mobile platforms than previous years, using mobile apps will not only educate them about citrus but also guide them in purchasing decisions.

- Growing domestic consumption of citrus fruits could also require participation in various initiatives, such as the "Healthy Food Options", which aim to reduce physical inactivity and promote healthy eating. The health benefits associated with consuming citrus, particularly 100% citrus juices, can be marketed in these initiatives. Supply citrus juices to selected schools to increase awareness.

- Citrus marketing, particularly in emerging markets and in markets like India and the Middle East, will play a greater role in the future. It is recommended to seek better foreign marketing environment and conditions and forms of marketing, and aim to increase the value exported by citrus companies and diversify the products and target markets.

Related and supporting industries

- More research and development should be undertaken to ensure that the local citrus industry's growth is consistently superior to that of its close competitors, particularly those with which it enjoys similar production seasons in the Southern Hemisphere. This can only be achieved by means of co-ordination and the establishment of public and private partnerships.

- There are still opportunities for investment to unlock future growth in the citrus value chain, but private and public sector investment, ranging from infrastructure, skills – particularly lowly skilled workers and support to link new black farmers (under the land reform programme) in to commercial value chains, training and better business advisory terms of accessing innovative technology, are critical to igniting this growth (BFAP, 2017).

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- Promote improved logistics and distribution infrastructure and constant maintenance and conservation of distribution infrastructure. The Fruit South Africa strategic initiative of getting 'fruit rail' back on track is a step in the right direction.

Firm structure, strategy and rivalry

- Enhance the capacity of the industry to make improved business decisions. This will include improving the 'business intelligence base' by adding competitiveness analysis, stream lining and increase participation in industry activities and evolve the industry structure and resource use to promote competitiveness.

- Continue to invest in leadership development and improvement of business expertise and capabilities across the industry in order to improve the industry's ability to prosper in relation to its increasingly sophisticated competitors, both in the Southern and Northern Hemisphere. This will include the expansion of the activities of the Citrus Academy, together with expanded collaboration with other relevant industries to tackle common issues, and would include identifying such critical issues – training, lobbying for positive government action, improved dissemination of industry intelligence, etc. The current industry structure is well developed and deployed; the issue here is the issue of "falling in a complacency trap". Increase strategic action with industry role players across the value chain with in a strong competitiveness agenda.

- Qualify and train the various human resources working in the citrus value chain to promote increased system productivity and conditions to attract human resources to work in the citrus industry. Strengthen specific existing education courses offered by the citrus academy.

- Perform benchmarking programme among producers seeking to achieve better cost controls and management techniques through the exchange of information between them.

- Improve channels of information between market actors and producers, allowing better knowledge of the market and appropriate planning.

Government support and policies

- Continue to persistently engage with government personnel on key industry issues as per industry development plan. This plan to provide a consistent message on competitiveness and related matters.

- Also, through this plan provide critical input to government policies, strategies and legislation. Participate in trade missions and business councils relevant to the fruit industry.

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- Engage government regularly to ensure that industry and government resources are focused on enhancing citrus industry development and in particular exports.
- Development of new markets is important, requiring strengthened capacity of government departments to negotiate improved access, reduction or removal of technical trade barriers, and to conclude beneficial trade agreements with receiving countries. Trade in global platforms is a government-to-government business.

6.5. Recommendations for future research

From the findings of this study, it was possible to propose a number of future research topics:

- A detailed competitive performance inquiry into the secondary/value adding domestic citrus fruit industry (orange juice and citrus juice) needs to be conducted to establish why those sectors are less competitive in value-added products. Similarly, an analysis will have to be made of the primary grapefruit sector to understand why this sector measures as being less competitive in relation to value-added grapefruit.
- This study also found that consumer education and growth in volume locally are factors currently having a negative effect on the industry and are relevant for its future competitive performance. Thus a study analysing citrus consumer needs will be required. Such a study will determine the fundamental reasons for the constrained local demand for citrus, identify consumers' citrus preferences (i.e. varieties, forms and time), classify consumers into different segments (based on their needs) and advise industry players to strive towards fulfilling the needs of the various market segments.
- This five-step analytical framework can also be applied in individual citrus fruit (e.g. oranges, soft citrus); this will allow an exploration of the performance of individual citrus fruit in greater detail. A stronger 'Intelligence system' focussed on interpreting industry level intelligence into firm level decision making will also be required.
- The Delphi approach can be used in in-depth detail to understand the factors that affect each individual industries (e.g. input provider, producer, exporter, etc.) in the citrus value chain. This study used a relatively small sample size. A further study can be conducted using a larger sample size in order to allow the classification of respondents into different clusters of the value chain and to analyse variance within these clusters together with improved representivity and participation in such activity.

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6.6. Concluding remarks

The major findings from this research were that, the South African citrus industry as a whole has been globally competitive over time and has maintained such competitive trend since the early 1960s and with the period of post deregulations being the highly competitive. From a global comparison perspective, SA could be viewed as a global leader in terms of relative competitive performance when compared to the Southern hemisphere citrus producing regions, which enjoy similar production seasons. Whereas, when placed against the Northern Hemisphere-producing regions, which enjoy counter-seasonal production, SA is outperformed by Egypt (which is a global leader in competitive status) and Morocco. In the analysis of individual citrus fruits, they all showed positive figures throughout the studied years, with oranges (RTA 27.6) being the most competitive citrus fruit type, followed by grapefruits (RTA 26.8), lemon & limes (RTA 16.3) and soft citrus RTA 9.6). From the analysis of factors affecting (positively or negatively) the competitive success of this industry, industry wide strategies were formulated. These industry wide strategic proposals are regarded to provide 'new' strategic intelligence to the industry to develop a plan of action to achieve a more sustainable competitive advantage.

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References

Abdi, H. & Williams, L.J. 2010. Principal component analysis. *Wiley Interdisciplinary Reviews: Computational Statistics*, 2(4):433-459.

Aloui, O. & Kenny, L. 2005. The cost of compliance with SPS standards for Moroccan exports: A case study. World Bank Agriculture and Rural Development Discussion Paper. Washington DC: World Bank.

Anderson, James E. 2008. "international trade theory." The New Palgrave Dictionary of Economics. Second Edition. Eds. Steven N. Durlauf and Lawrence E. Blume. Palgrave Macmillan. The New_Palgrave Dictionary of Economics Online. Palgrave Macmillan. 20 September 2017 <http://www.dictionaryofeconomics.com/article?id=pde2008_I000263> doi:10.1057/9780230226203.0839

Angala, A. 2015. An analysis of the competitive performance of the Namibian date industry - 2001 to 2013. Thesis, Master of Science in Agriculture (Agricultural Economics). Stellenbosch University.

Atma Global Inc. 2012. International trade and foreign direct investment. In Creative commons. *Challenges and opportunities in international business*. pp. 50 – 95.

Balassa, B. 1965. Trade liberalization and revealed comparative advantage. *The Manchester School*, 33:99-123.

Banterle, A. 2005. Competitiveness and agri-food trade: An empirical analysis in the European Union. In 11th Congress of the European Association of Agricultural Economists, Copenhagen.

Banterle, A. & Carraresl, L. 2007. Competitive performance analysis and European Union trade: The case of the prepared swine meat sector. *Acta Agriculturae Scandinavia, Section C – Food Economics*, 4(3):159-172.

Batha, S. & Jooste, A. 2004. The effect of internalization of the beef and maize sub-sectors: The revealed comparative advantage measures. University of Free State.

Batra, A. & Khan, Z. 2005. Revealed comparative advantage: An analysis for India and China. ICRIER Working Paper no. 168. New Delhi: ICRIER .

Bender, S. & Li, C. 2002. *The changing trade and revealed comparative advantages of Asian and Latin American manufacture exports*. Discussion paper no. 843.

Blignaut, C. 1999. Analysing competitive advantage in the South African dairy industry: An interated approach. *Agrekon*, 38(4):693-706.

Boonzaaier, J.D.T.L. 2015. An inquiry into the competitiveness of the South African stone fruit industry. Master's thesis, Stellenbosch University, Stellenbosch, South Africa.

Boonzaaier, J.T.D.L., & Van Rooyen C.J. 2017. Measuring the competitive performance of the South African stone fruit industry [Online]. Available: http://www.bfap.co.za/documents/Articles%20and%20Conference%20Papers/Boonzaaier_Competitive%20performance%20of%20the%20South%20African%20stone%20fruit%20value%20chain.pdf [accessed 08/ November 2017]

Buitenland A (2016). Egypt springboard for citrus export to middle East and Asia [online]. Available: http://www.freshplaza.com/article/159770/Egypt-springboard-for-citrus-export-to-Middle-East-and-Asia. Accessed 30 October 2017.

Bukhari, S., Ahmad, M., Alam, S. & Butt, M. 2005. An empirical analysis of the Linder theory of international trade for South Asian countries. *The Pakistan Development Review*, 3(Autumn):307-320.

Stellenbosch University https://scholar.sun.ac.za

Bureau for Food and Agricultural Policy (BFAP). 2015. Farm-worker sectoral determination: An analysis of agricultural wages in South Africa 2015 [Online]. Available: http://www.bfap.co.za/documents/research%20reports/2015%20Farm%20Sectoral%20Determination%20FINAL%2024%20September.pdf [Accessed 09 August 2017].

Bureau for Food and Agricultural Policy (BFAP). 2016. *BFAP baseline agricultural outlook 2016-2025*. Putting plans into action: agriculture and economic growth in South Africa. Available online: http://wwfw.bfap.co.za/documents/baselines/BFAP_Baseline_2016.pdf

Bureau for Food and Agricultural Policy (BFAP). 2017. *BFAP baseline agricultural outlook 2017-2026*. Managing agriculture's footprint in an uncertain environment. Available online: http://wwfw.bfap.co.za/documents/baselines/BFAP_Baseline_2016.pdf

Carpenter, M.. & Dunung, S.P. 2011. *Challenges and opportunities in international business*. Creative commons licensed edition, flat world education [Online]. Available: http://jsmith.cis.byuh.edu/pdfs/challenges-and-opportunities-in-international-business.pdf.

Centre for the Promotion of Imports (CBI), 2017. Exporting fruit juices to Europe [online]. Available: https://www.cbi.eu/node/2161/pdf/. Accessed 30 November 2017.

CGA. 2007. Annual report 2007 [Online]. Available: http://www.citrusresourcewarehouse.org.za/home/document-home/internal-citrus-industry-organisation-publications/annual-reports/cga-annual-reports/239-cga-citrus-growers-association-annual-report-2007/file Accessed 20/May/2017.

CGA. 2010. *Annual report 2010* [Online]. Available: http://3b5dca501ee1e6d8cd7b905f4e1bf723.cdn.ilink247.com/ClientFiles/cga/CitrusGowersAssociation/Company/Documents/CITRUS ANNUAL REPORT 2010 web.pdf

CGA. 2015. Key industry statistics 2015. [Online]. Available: http://www.crw.org.za/home/document-home/information/cga-key-industry-statistics/25-cga-key-industry-statistics-2015/file

CGA. 2016a. *Key industry statistics 2016* [Online]. Available: http://www.citrusresourcewarehouse.org.za/home/document-home/information/cga-key-industry-statistics/3610-cga-key-industry-statistics-2016/file

CGA. 2016b. *Annual report 2016* [Online]. Available: http://3b5dca501ee1e6d8cd7b905f4e1bf723.cdn.ilink247.com/ClientFiles/cga/CitrusGowersAssociation/Company/Documents/CGA AR 2016e(2).pdf

Chadwick, J. 2008. *Module 1 The South African Citrus Industry [online]*. Available: https://www.citrusresourcewarehouse.org.za/home/document-home/learning-aids-and-resources/ca-citrus-av-series-learning-material/citrus-post-harvest-series/1123-cphs-learning-material-module-01-south-african-citrus-industry/file. Accessed 05/ May/ 2017

Cho, D. & Moon, H. 2000. A dynamic approach to international competitiveness. *Journal of Far Eastern Business*, 1(1):17-36.

Citrus Resource Warehouse. 2017. *Province make sizeable contribution to SA citrus crop* [Online]. Available: http://www.citrusresourcewarehouse.org.za/home/document-home/news-articles/bizcommunity/4418-bizcommunity-province-makes-sizeable-contribution-to-sa-citrus-crop-14-03-17/file [2017, January 01].

Coughlan, M., Cronin, P. & Ryan, F. 2007. Step-by-step guide to critiquing research. Part 1: Quantitative research. *British Journal of Nursing*, 16(2):658-663.

Creamer, T. 2016. EU eases black-spot rules on South African citrus destined for juicing. *Engineering News*,

Stellenbosch University https://scholar.sun.ac.za

19 May [Online]. Available: http://www.engineeringnews.co.za/print-version/eu-eases-black-spot-rules-on-south-african-citrus-destined-for-juicing-2016-05-19 [2017, January 01].

DAFF (Department of agriculture, forestry and fisheries). 2012. A profile of the South African citrus market value chain [online]. Available: http://www.nda.agric.za/docs/AMCP/Cmvp2012.pdf. Accessed 20/August/2017.

DAFF (Department of agriculture, forestry and fisheries). 2016. A profile of the South African citrus market value chain [Online]. Available: http://www.nda.agric.za/doaDev/sideMenu/Marketing/Annual%20Publications/Commodity%20Profiles/field%20crops/Citrus%20market%20value%20chain%202016.pdf

Dakal, D., Pradhan, G. & Upadhyaya, K. 2009. *Another emperical look at the theory of overlapping demands*. Department of Economics and Finance, University of New Haven.

Dalkey, N.C. 1972. The Delphi method: An experimental study of group opinion, in N.C. Dalkey, D.L. Rourke, R. Lewis & D. Snyder (eds.). *Studies in the quality of life: Delphi and decisionmaking*. Lexington, MA: Lexington Books. 13-54.

Dalkey, N.C. & Helmer, O. 1963. An experimental application of the Delphi method to the use of experts. *Management Science*, 9(3):458-467.

Davids, T. & Meyer, F.H. 2017. Agricultural economics research, policy and practice in Southern Africa: Price formation and competitiveness of the South African broiler industry in the global context. *Agrekon*, 56(2):123–138.

Day, J. & Bobeva, M. 2005. A generic toolkit for the successful management of Delphi studies. *The Electronic Journal of Business Research Methodology*, 3(2):102-116.

De Lange W.J. & Kleynhans T.E. 2007. Towards more inclusive long-term bulk water resource management. *Agrekon*, 46(3):371-397. doi:10.1080/03031853.2007.9523777

De Vet, E., Brug, J., De Nooijer, J., Dijkstra, A. & De Vries, N.K. 2005. Determinants of forward stage transitions: A Delphi study. *Health Education Research*, 20(2):195-205.

Dlamini, B.P. 2012. Analysing the competitiveness of the agribusiness sector in Swaziland. Master's thesis, University of Pretoria, Pretoria, South Africa.

Du Toit, J.P. 2009. Factors influencing the long-term competitiveness of selected commercial milk producers in East Griqualand. University of KwaZulu Natal.

Edmonds, J. 2016. Key industry statistics for citrus growers 2016. Citrus Growers' Association of Southern Africa, KwaZulu-Natal, South Africa. 1–47.

Esterhuizen, D. 2006. An evaluation of the competitiveness of the South African agribusiness sector. University of Pretoria. Doctoral dissertation, University of Pretoria. Pretoria.

Esterhuizen, D. & Van Rooyen, C.J. 1999. How competitive is agribusiness in the South African food commodity chain? *Agrekon*, 38(4):744-754.

Esterhuizen, D. & Van Rooyen, C.J. 2006. An inquiry into factors impacting on the competitiveness of the South African wine industry. *Agrekon*. 45(4):467–485.

Esterhuizen, D. & Van Rooyen, C.J. 2008. How competitive is South African agribusiness? An analysis of the trends in competitive performance, 2004-2008. University of Pretoria.

Esterhuizen, D., Van Rooyen, C.J. & D'Haese, L. 2008. An evaluation of the competitiveness of the agribusiness sector in South Africa. *Journal of Competitiveness Studies*, 16(1/2):31.

Stellenbosch University https://scholar.sun.ac.za

Esterhuizen, D., Van Rooyen, C.J. & Van Zyl, J. 2001. The competitiveness of the agricultural input industry in South Africa. *Agrekon*, 40(4):678-687 [Online]. Available: http://www.tandfonline.com/doi/pdf/10.1080/03031853.2001.9524983 [date].

European Commission. 2011. An analysis and development of inclusive value chains to support small-scale producers to access agricultural markets [Online]. Available: https://ec.europa.eu/europeaid/sites/devco/files/study-inclusive-value-chains-201111_en_5.pdf. Accessed 20/06/2017

Food and Agricultural Organization 2015. Citrus Fruit Statistics 2015 [Online]. Available: http://www.fao.org/3/a-i5558e.pdf [accessed 20/04/2017].

Food and Agricultural organization of United Nations, 2016. Citrus fruit fresh and processed statistical bulletin [online]. Available at: http://www.fao.org/3/a-i8092e.pdf. Accessed 02/December 2017.

Ferto, I., & Hubbard, L. J. 2002. *Revealed Comparative Advantage and Competitiveness in Hungarian Agri-Food Sectors Technology Foresight in Hungary* (No. MT-DP-2002/8). IEHAS Discussion Papers.

Freebairn, J. 1986. Implications of wages and industrial policies on competitiveness of agricultural export industries. Paper presented at the Australian Agricultural Economics Society Policy Forum, Canberra, Australia.

Frohberg, K., & Hartmann, M. 1997. *Comparing measures of competitiveness* (No. 2). Discussion paper, Institute of Agricultural Development in Central and Eastern Europe.

Fruit SA, 2016. Fruit South Africa makes inroads in China [Online]. Available: http://www.fruitsa.co.za/wp-content/uploads/2016/11/Fruit-South-Africa-Press-Statement-2.pdf [2017, June 20].

Furmarn, G. 2015. *The introduction of oranges into South Africa* [Online]. Available: http://www.turtlesa.com/oranges.html [2016, October 10].

Gaspar, M. 2016. IAEA impact: How a nuclear technique helped save the Western Cape's orange industry. International Atomic Energy Agency [Online]. Available: https://www.iaea.org/newscenter/news/how-a-nuclear-technique-helped-save-the-western-capes-orange-industry. Public information. Accessed 27 July 2017..

Gliem, J.A. & Gliem, R.R. 2003. Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education.

Haankuku, C. & Kirsten, J.F. 2012. Improving agricultural competitiveness by setting priorities for investments in crop research: Lessons From Zambia. *Agrekon*, 51(4):63-80.

Hallat, J. 2005. *Relative competitiveness of the South African oilseed industry* (No. 28063). University of the Free State, Department of Agricultural Economics.

Havrila, I. & Gunawardana, P. 2003. Analysing comparative advantage and competitiveness: An application to Australia's textile and clothing industries. *Australian Economic Papers*, 42(1):103-117.

Henderson, B.D., 1979. *Henderson on corporate strategy.* Boston: ABT Books.

Hill, C.W.. 2009. *International business*. New York: McGraw-Hill Companies Inc.

Hough, J., Neuland, E. & Bothma, N. 2003. *Global business: Environments and strategies*. 2nd ed. Cape Town: Oxford University Press South Africa.

Hsu, C.-C. & Standford, B.A. 2007. The Delphi technique: Making sense of consensus. *Practical Assessment, Research & Evaluation*, 12(10):1-8.

Stellenbosch University https://scholar.sun.ac.za

International Trade Centre (ITC), 2017. Trademap. available online: http://www.trademap.org/Index.aspx. [accessed June/ 2017]

ISMEA. 1999. *The European Agro-Food System and the Challenge of Global Competition*. Institut de sciences mathématiques et économiques appliquées (ISMEA). Rome: ISMEA.

Jafta, A. 2014. Analysing the competitiveness performance of the South African apple industry. Master's thesis, Stellenbosch University, Stellenbosch, South Africa.

Jones, P.J., McFarlane, I.D., Park, J.R. & Tranter, R.B., 2017. Assessing the potential economic benefits to farmers from various GM crops becoming available in the European Union by 2025: Results from an expert survey. *Agricultural Systems*, 155:158-167.

Jooste, A. & Van Schalkwyk, H. 2001. Comparative advantage of the primary oilseeds industry in South Africa. *Agrekon*, 40(1):35-44.

Kalaba, M. & Henneberry, S.R. 2001. The effects of a free trade agreement on South African agriculture: Competitiveness of fruits in the EU market. *Agrekon*, 4:794-809 [Online]. Available: http://www.tandfonline.com/doi/pdf/10.1080/03031853.2001.9524993. Accessed 02/ August/ 2017.

Kannapiran, C.A. & Fleming, M.E. 2000. Competitiveness and comparative advantage of tree crop smallholding in Papua New Guinea. University of New England, Australia.

Karkkainen, R. 2008. Clustering and international competitiveness of information technology industry in the Saint Petersburg Area. Lappeenranta. Reference not complete

Kenyon, W., Hill, G. & Shannon, P. 2008. Scoping the role of agriculture in sustainable flood management. Land *Use Policy*, 25:351-360.

Kirsten, J.F., Van Zyl, J. & Van Rooyen, J. 1994. South African agriculture in the 1980s. *South African Journal of Economic History*, 9(2):19-48.

Kirsten, J.F. 1999. The agricultural input industry and the competitiveness of South African agriculture. *Agrekon*, 38(4):487-515.

Krugman, P.R. 1979. Increasing returns, monopolistic competition and international trade. Journal of international Economics, 9:469-479.

Langdana, F. & Murphy, P. 2014. *International trade and global macro-policy*. Springers eBooks

Liesner, H. 1958. The European Common market and British industry. *Economic Journal*, 68:302-316.

Lim, K. 1997. Analysis of North Korea ' s Foreign Trade by Revealed Comparative Advantages. *Journal of Economic Development*. 22(2):97–117.

Lipsey, R.G., Courant, P.N., Purvis, D.D. & Steiner, P.O. 1993. *Economics*. New York: Harper Collins College Publishers.

Ludwig, B. 1997. Predicting the future: Have you considered using the Delphi methodology? *Journal of Extension*, 35(5):1-4.

Madima, T.M. 2009. Competitiveness of the South African deciduous fruit canning industry. Master's thesis, University of Pretoria, Pretoria, South Africa [Online]. Available: http://www.repository.up.ac.za/dspace/bitstream/handle/2263/27362/dissertation.pdf?sequence=1. Accessed 30 July 2017.

Mahlanza, B., Mendes, E. & Vink, N. 2003. Comparative advantage of organic wheat production in the Western Cape. *Agrekon*, 42(2):37-41.

Stellenbosch University https://scholar.sun.ac.za

Malhotra, N.K. 1996. Multidimensional scaling and conjoint analysis. In: Marketing research, an applied orientation. 2nd edition. Upper Saddle River, NJ: Prentice Hall. 671-683, 709-710.

Mamaqi, X., Miguel, J. & Olave, P. 2010. The e-DELPHI method to test the importance competence and skills: Case of the lifelong learning Spanish trainers. *World Academy of Science, Engineering and Technology*, 4:1204-1212.

Market access map. 2017. ITC tool (trademap). [Online]. Available: http://www.macmap.org/. Accessed August 2017.

Mashabela, T. 2007. Measuring the relative competitiveness of global deciduous fruit supply chains: South Africa versus Chile. MScAgric thesis, Stellenbosch University, Stellenbosch, South Africa [Online]. Available: http://ir1.sun.ac.za/handle/10019.1/18221.[03/March/2017]

Mashabela, T.E. & Vink, N. 2008. Competitive performance of global deciduous fruit supply chains: South Africa versus Chile. *Agrekon*, 47(2):240-257.

Masters, W.A. & Winter-Nelson, A. 1995. Measuring the comparative advantage of agricultural activities: Domestic resource costs and the social cost-benefit ratio. *American Agricultural Economics Association*, 77:243-250.

Mendes, D. M. "EU-27 Citrus Annual Report 2011." GAIN Report SP1128, U.S. Department of Agriculture, Foreign Agricultural Service, Washington, DC, 2011. Available online at http://gain.fas.usda.gov. Accessed (17 December 2017).

Min, H. & Zhou, G. 2002. Supply chain modelling: Past, present and future. *Computer and Industrial Engineering*, 43:231-249.

Miller, L.E. 2006. Determining what could/should be: The Delphi technique and its application. Paper presented at the meeting of the 2006 annual meeting of the Mid-Western Educational Research Association., Columbus, Ohio.

Mkhabela T. 2013. Exploring pricing policy options to stimulate healthy eating in South Africa: Seeking consensus using the Delphi technique approach. *Agrekon*, 52(sup1):101-117. doi:10.1080/03031853.2013.770955

Mosoma, K. 2004. Agricultural competitiveness and supply chain integration: South Africa, Argentina and Australia. *Agrekon*, 43(1):132-144.

National Agricultural Marketing Council (NAMC). 2016. Markets and economic research centre: *South African fruit trade flow [online]*. http://www.namc.co.za/upload/South-African-Fruit-flow-report--March--2017-Issue-25-Final.pdf. Accessed 30 April 2017.

Ndlovu, S. & Strydom, M. 2016. *The Thabo Mbeki I know*. Johannesburg: Pan Macmillan South Africa.

Ndou, P. 2012. The competitiveness of the South African citrus industry in the face of the changing global health and environmental standards. PhD dissertation, University of Fort Hare, Alice, South Africa.

Ndou, P. and Obi, A., 2011, June. The business environment and international competitiveness of the South African citrus industry. In *International Food and Agribusiness Association (IFAMA) Ls 21st World Annual Forum and Symposium. June* (pp. 20-23).

Nehme, N. & Nehme, E. 2014. Competitive advantage of nations and multilateral trade systems: How can Lebanon benefit from trade liberalization without enhancing its strategic industries? *Open Journal of Social Sciences*, (2):217-231 [Online]. Available: http://dx.doi.org/10.4236/jss.2014.24023. Accessed 04/ March/ 2017.

Nkurunziza, B. 2015. Determining Rwanda's comparative advantage in rice : Eastern Province case study.

Stellenbosch University https://scholar.sun.ac.za

MScAgric thesis, Stellenbosch University, Stellenbosch, South Africa.

Nyhodo, B. 2009. The impact of the Doha round of WTO agricultural negotiations on the South African economy. MScAgric thesis, Stellenbosch University, Stellenbosch, South Africa.

Nyhodo, B and Burger. (2015). AEASA in practicia: The role of practicing agricultural economists in South Africa. Published by Agricultural Economics Association of South Africa. ISBN: 978-0-9922409-5-0.

O'Rourke, D. 2011. *The world apple review*. This reference is not complete.

OECD (Organisation for Economic Cooperation and Development). 1992. Programme on Technology and the Economy [Online]. Available: http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/3cr/competitiveness.pdf. Accessed (20/ July/ 2017)

OECD (Organisation for Economic Cooperation and Development) 2016. *Agricultural policy monitoring and evaluation 2016* [Online]. Available: http://dx.doi.org/10.1787/agr_pol-2016-en[Accessed 13 September 2017].

Ortmann G.F. 2005. Promoting the competitiveness of South African agriculture in a dynamic economic and political environment. Agrekon, 44(3):286-320. doi:10.1080/03031853.2005.9523714

Partida, V. 2011. Analysis of the export citrus industry in South Africa: Profitability & land reform fears [Online]. Available: http://agrilife.org/borlaug/files/2011/03/Vicente_Partida_SA_Citrus.pdf

Pitts, E., Viaene, J., TRAILL, B. and Gellynck, X., 1995. Measuring Food Industry Competitiveness. Discussion Paper n° 7. In *Structural Change in the European Food Industries-A Concerted Action project within the EU AAIR Programme, University of Reading, UK* (pp. 1-16).

Porter, M. E. 1990. *The competitive advantage of nations*. London: Macmillan.

Porter, M. E. 1998. Competitive advantage: Creating and sustaining superior performance - with a new introduction. Free Press New York.

Porter, M. E. (2007). Creating a Competitive South Africa. *Institute for Strategy and Competitiveness, Harvard Business School. Johannesburg, South Africa*, *3*.

Pugel, T.A. 2007. *International economics*. 13th ed. Boston: McGraw-Hill Companies.

Qiang, M., Yong-Sheng, L. & Xiao-Yuan, W. 2011. Empirical research on influencing factors of trade competitiveness of China's agricultural products. *Asian Agricultural Research*, 3(4):120-124.

Rangasamy, J. 2003. Conventional theories' assumptions challenged by new trade theories. *Trade theory and its implications for competitiveness*. University of Pretoria.

Sandrey, R. & Vink, N. 2006. How can South Africa exploit new opportunities in agricicultural export markets? Lessons from the New Zealand experience. Working paper no 19. Stellenbosch: SU Printers.

Sandrey, R. & Vink, N. 2008. Trade and innovation project. Case study 4: Deregulation, trade reform and innovation in the South African agricultural sector. Working paper no. 76. Organisation for Economic Cooperation Development.

Serin, V. & Civan, A. 2008. Revealed Comparative Advantage and Competitiveness: A Case Study for Turkey towards the EU. *Journal of Economic and Social Research*. 10(2):25–41.

Siggel, E. 2006. International competitiveness and comparative advantage: A survey and proposal for measurement. Journal of Industry, Competition and Trade, 6:137-159.

Stellenbosch University https://scholar.sun.ac.za

Sihlobo, W. 2016. An evaluation of competitiveness of South African maize exports. MScAgric thesis Stellenbosch University, Stellenbosch, South Africa.

Smith, A. 1776. An inquiry into the nature and cause of the wealth of nations. New York: The Modern Library.

Sinngu, T., 2014. *Competitiveness of the South African citrus fruit industry relative to its Southern Hemisphere competitors* (Master's dissertation).

Sishuba, S. 2016. CBS-infected citrus to be allowed into the EU for juicing. *Farmers Weekly*. 20 May 2017: 24.

Smit, A.. 2010. The competitive advantage of nations: Is Porter's diamond framework a new theory that explains the international competitiveness of countries? *South African Business Review*, 14(1):105-130.

Tavakol, M. & Dennick, R., 2011. Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2:53.

Tuna, E., Georgiev, N. & Nacka, M. 2013. Competitiveness analysis of the tobacco sub-sector in the Republic of Macedonia. *Agroeconomia Croatica*, 3(1), 53-60.

USDA. 2016. *Citrus: World markets and trade* [Online]. Available: http://usda.mannlib.cornell.edu/usda/fas/citruswm//2010s/2016/citruswm-07-20-2016.pdf

Uys, D. 2016. Growing South Africa's fruit exports. *Farmers Weekly*, 6 June [Online]. Available: http://www.farmersweekly.co.za/opinion/by-invitation/growing-south-africas-global-fruit-exports/ [Accessed 30 August 2017].

US International Trade Commission. (2012). Brazil: Competitive Factors in Brazil affecting US and Brazilian Agricultural Sales in Selected Third Country Markets. *USITC, Washington DC*.

Valenciano, J.d.P., Uriarte, M.M.C. & Battistuzzi, M.A.G. (2017). South Africa's competitiveness against its main competitors in the market of pears imported by the EU28. *Agrekon*, 56(2):191-204.

Valentine, N. & Krasnik, G. 2000. SADC trade with the rest of the world: winning export sectors and revealed comparative advantage ratios. *South African journal of economics*, 68(2):266-285.

Van Aardt, T. 2017. Disaster strikes citrus industry. *Herald Live*, 28 April [Online]. Available: http://www.heraldlive.co.za/news/2017/04/28/disaster-strikes-citrus-industry/ [Accessed 30 April/ 2017].

Van der Merwe, J.D., Cloete, P.C. & Van Schalkwyk, H.D. 2016. Factors influencing the competitiveness of the South African wheat industry: A hedonic price model. *Agrekon*, 55(4):411-435.

Van Rooyen, C.J., Esterhuizen, D. & Doyer, O.T. 1999. How competitive is agribusiness in the South African food commodity chain? *Agrekon*, 38(4):744-754.

Van Rooyen, C.J., Esterhuizen, D. & Doyer, O.T. 2000. How competitive is agribusiness in the South African food commodity chain? in J.H. Trienekens & P.J.P. Zuurbier (eds), Chain management in agribusiness and the food industry. Wageningen, Wageningen Press, The Netherlands.

Van Rooyen, J., Esterhuizen, D. & Stroebel, L. 2011. Analyzing the competitive performance of the South African wine industry. *International Food and Agribusiness Management Review*, 14(4):179–200.

Van Rooyen, I.M., Kirsten, J.F., Van Rooyen, C.J. and Collins, R., 2001, January. The competitiveness of the South African and Australian flower industries: an application of three methodologies. In *45th Annual Conference of the Australian Agricultural and Resource Economics Society, January* (Vol. 23).

Stellenbosch University https://scholar.sun.ac.za

Van Rooyen, C.J. & Esterhuizen, D. 2012. Measurement and analysis of the trends in competitive performance: South African agribusiness during the 2000's. *Journal of Applied Management and Investments*, 1(4):426-434.

Venter, R. & Horsthemke, O. 1999. Analysis of the competitive nature of the Southern African sheep meat value chain. *Agrekon*, 38(4):716-725.

Vernon, R. 1966. International investment and international trade in the product cycle. *Quartely Journal of Economics*, 80(2):190-207.

Viljoen, W. 2016. South Africa's competitiveness and the role of declining international trade. Tralac [Online]. Available: https://www.tralac.org/discussions/article/9808-south-africa-s-competitiveness-and-the-role-of-declining-international-trade.html [Accessed 06/June/ 2017].

Vink, N. 2004. The influence of policy on the roles of agriculture in South Africa. *Development Southern Africa*, 21():155–177.

Vink, N. & Van Rooyen, J. 2009. *The economic performance of agriculture in South Africa since 1994: Implications for food security*. Development Planning Division, Development Bank of Southern Africa.

Vink, N., Kleynhans, T.E. & Street, K. 1998. The competitiveness of Western Cape wheat production: An international comparison/Die mededingendheid van koringproduksie in die Wes-Kaap: 'n Internasionale vergelyking. *Agrekon*, 37(3):255-268.

Vollrath, T. 1991. A theoretical evaluation of alternative trade intensity measures of revealed comparative advantage. Welwirthschaftliches Archiv, 127(2):265–280.

Vyas, S. & Kumaramayake, L. 2006. Constructing socio-economic status indices: How to use principal components analysis. *Health Policy and Planning*, 21(6):459-468.

Webber, C. M & Labaste, P. 2010, Building competitiveness in Africa's agriculture: a guide to value chain concepts and applications, World Bank Publications.

Witkin, B.R. & Altschuld, J.W. 1995. *Planning and conducting needs assessment: A practical guide*. Thousand Oaks, CA: Sage Publications, Inc.

World Economic Forum. 2017. The global competitiveness report 2016-2017 [Online]. Available: http://www3.weforum.org/docs/GCR20162017/05FullReport/TheGlobalCompetitivenessReport2016-2017_FINAL.pdf [Accessed 11/September 2017].

WTO. 2016. *World trade statistical review 2016* [Online]. Available: https://www.wto.org/english/res_e/statis_e/wts2016_e/wts2016_e.pdf [Accessed 04 July 2017].

World Wide Fund for Nature (WWF-SA). 2017. *Scenarios for the future of water in South Africa*. Cape Town: WWF-SA.

Worley, T. 1996. PNW agricultural trade: Comparative advantage and competitiveness are fundamental [Online]. Available at: http://ag.arizona.edu/AREC/WEMC/papers/PNWAgTrade.html. Accessed 20 June 2017.

Yelland, C. 2015. How much electricity costs in South Africa's biggest cities [online]. Businesstech 26 May 2015. Available online: https://businesstech.co.za/news/energy/88524/how-much-electricity-costs-in-south-africas-biggest-cities/. Accessed 20 November 2017.

Yercan, M. & Isikli, E. 2009. Domestic resource cost approach for international competitiveness of Turkish horticultural products. *African Journal of Agricultural Research*, 4(9):864-869.

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Appendix A

RESPONDENT INFORMATION

Name of Respondent:

Contact number:

E-mail address:

Geographical Area: (District/Municipality)

Citrus Fruit Types produced (Mark with "x" where applicable) based on FAO and ITC database	Oranges	Grapefruit	Lemons & limes	Soft citrus

Fruit Type: Product Distribution (Mark with "x" where applicable) based on FAO and ITC database	Fresh	Dried	Processed

Processed products type (if applicable mark with "x") based on FAO and ITC database	Orange juice	Grapefruit Juice	Citrus juice

Position in the value chain: Mark with "x" where applicable * More than one position if possible	Input or Service Provider	Producer	Pack house or Processor	Exporter or Marketer

Please mark only one block: 1 = Negative; 3 = Neutral; 5 = Positive
Any additional comments would be welcomed in the comment space provided

PRODUCTION FACTOR CONDITIONS

1) The general infrastructure used by the industry is:

Poorly developed and insufficient	1	2	3	4	5	Well developed and sufficient

Comment: _____

2) The cost of industry infrastructure is:

Extremely high	1	2	3	4	5	Very affordable

Comment: _____

3) The cost of doing business in your industry is: (i.e. transaction costs).

Extremely high	1	2	3	4	5	Very affordable

Comment: _____

4) The quality of research available to your industry:

Generally lags behind other industries	1	2	3	4	5	s outstanding

Comment: _____

5) The quality of technology available to your industry:

Generally lags behind other industries	1	2	3	4	5	s outstanding

Comment: _____

6) Access to quality technology for your industry is:

Difficult to obtain	1	2	3	4	5	Easy to obtain

Comment: _____

7) The cost of technology is:

Extremely high	1	2	3	4	5	Very affordable

Comment: _____

8) Would technology advancement impact on the competitiveness of your business

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Marginally improve	1	2	3	4	5	Enhance bussiness' competitiveness

Comment; Specify the technology _____

9) Does the changing structure of citrus (Concentration, regulations, new markets):

Negative influence	1	2	3	4	5	Positive influence

Comment _____

10) Obtaining long-term finance for your business is: (e.g. loan)

Extremely difficult and too costly	1	2	3	4	5	Easy and very affordable

Comment: _____

11) Obtaining short-term finance of your industry is:

Extremely difficult and too costly	1	2	3	4	5	Easy and very affordable

Comment: _____

12) Skilled labour is:

Difficult to obtain	1	2	3	4	5	Easliy accessible

Comment: _____

13) Competency level amongst skilled labour is:

Not very high	1	2	3	4	5	Is outstanding

Comment: _____

12) Cost of hiring skilled labour is:

Too costly	1	2	3	4	5	Very affordable

Comment: _____

14) Obtaining unskilled/Entry-level labour is:

Difficult	1	2	3	4	5	Easy

Comment: _____

15) The Quality of Unskilled/Entry-level labour is:

Not very high	1	2	3	4	5	very high quality

Comment: _____

16) Cost of hiring unskilled/Entry-level labour is:

Too costly	1	2	3	4	5	Very affordable

Comment: _____

17) Extent of using labour saving machinery

Currently used	1	2	3	4	5	Will be used in the future

18) Access to natural resources (land and water) is:

Limited	1	2	3	4	5	Readily available

Comment: _____

19) Your location's suitability for Citrus Fruit production is:

Not suitable	1	2	3	4	5	Suitable

Comment: _____

20) Establishment-and production costs are:

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Too costly	1	2	3	4	5	Very affordable

Comment: _____

21) The impact of local climate/weather variation (unpredicted conditions) affects your business:

Negatively	1	2	3	4	5	Positively

Comment: _____

22) The productivity level of your industry is:

Very low	1	2	3	4	5	Very high

Comment: _____

23) The effectivity (successful in achieving a desired result) level of your business is:

Very low	1	2	3	4	5	Very high

Comment: _____

24) The efficiency (input : output relation) level of your business is:

Very low	1	2	3	4	5	Very high

Comment: _____

25) The transportation to export your products:

Constraints your company's competitiveness	1	2	3	4	5	Enhances your company's competitiveness

Comment _____

26) The storage (containers) used to export your products:

Constraints your company's competitiveness	1	2	3	4	5	Enhances your company's competitiveness

Comment _____

DEMAND/MARKET FACTORS

1) Local (SA) market size is:

Unable to handle large volumes (of your produce)	1	2	3	4	5	Large enough and growing in demand

Comment: _____

2) Local consumers preference of Citrus Fruit are:

Slow to adopt new products and processes	1	2	3	4	5	Actively seeking out new products and processes

Comment: _____

3) The growth in volume of the local market is: (Capacity to handle increasing volumes)

Too slow	1	2	3	4	5	Large enough and show increasing trends

Comment: _____

4). The growth in value of the local market is:

too slow with decreasing trends	1	2	3	4	5	Large enough and show increasing trends

Comment _____

5) Consumer education and availability of information, to base marketing decisions on, is:

Insufficient	1	2	3	4	5	Adequate

Comment: _____

6) The international Citrus Fruit export market is:

Too small	1	2	3	4	5	Large enough

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Comment: _____

7) The diversity (based on volume and variety) of new (more lucrative) international markets are:

Similar	1	2	3	4	5	Varied

Comment: _____

8) The influence of adverse weather conditions on buying patterns of in export markets:

Dependent/has impact	1	2	3	4	5	Sovereign/Independent/no impact

Comment: _____

9) Seasonality and availability of the SA Citrus Fruit impacts the industry's competitiveness:

Negatively	1	2	3	4	5	Positively

Comment: _____

10) The availability and characteristics (profile and product) of the SA Citrus Fruit on offer, in line with market demand:

Insufficient	1	2	3	4	5	Sufficient

Comment: _____

11) The South African Citrus Fruit Industry's relationship with mega retailers is (Pick n Pay, Shoprite etc).

Very Poor	1	2	3	4	5	Very good

Comment: _____

12) The chance of expansion in the existing markets is:

Less likely	1	2	3	4	5	Very likely

Comment _____

13) The likelihood of emerging markets increasing your firm's level of competitiveness:

Less likely	1	2	3	4	5	Very likely

Comment _____

14) Changing composition of food demand (food preference);

Constrains competitiveness	1	2	3	4	5	Enhance competitiveness

Comment _____

15) How will the proposed "Brexit" trade negotiations influence your company's competitiveness

Big impact	1	2	3	4	5	Less impact

Comment _____

16) The potential impact of the USA "closed economic model" (Trump's America first) in your industry's competitiveness:

will constraint your business competitiveness	1	2	3	4	5	will enhance your business competitiveness

Comment _____

17) Being in the market at the same time with Northern Hemisphere competitors' affects your business' level of competitiveness:

Negatively	**1**	**2**	**3**	**4**	**5**	**Positively**

Comment _____

RELATED AND SUPPORTING INDUSTRIES

1) Financial service providers generally:

Constrains your business' competitiveness	1	2	3	4	5	Enhances your business' competitiveness

Comment: _____

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2) Privately funded scientific research institutions are:

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

Comment: _____

3) Government-funded scientific research institutions are (NRF, ARC etc):

Doing poor job	1	2	3	4	5	The best in their fields

Comment: _____

4) Evaluation and testing of new varieties according to industry's best practices:

Improper	1	2	3	4	5	Properly evaluated and tested

Comment: _____

5) Access to grower-club varieties:

Access to no programs	1	2	3	4	5	Access to all the programs

Comment: _____

6) Citrus industry`s expenditure on Research & Development is:

Insufficient	1	2	3	4	5	Sufficient

Comment: _____

7) Collaboration with scientific research institutions is:

Non-existent	1	2	3	4	5	Intensive and continuing

Comment: _____

8) Electricity supply (including renewable energy and fossil fuels):

Constrains competitiveness	1	2	3	4	5	Enhances competitiveness

Comment: _____

9) Telecommunication services:

Constrains competitiveness	1	2	3	4	5	Enhance competitiveness

Comment: _____

10) Specialised technology services are: (E.g. computerised irrigation systems/services, smart fresh, consultants etc.)

Not available	1	2	3	4	5	Available from outstanding local institutions/firms

Comment: _____

11) The cost of specialised or hired technology services is:

Too expensive	1	2	3	4	5	Very affordable

Comment: _____

12) Availability of local suppliers of primary inputs (Fertilisers, pestiicides etc):

Largely non-existing and limited supply	1	2	3	4	5	Numerous and provides all necessary input components
					x	

Comment: _____

13) The quality of local suppliers for your industry's primary inputs is:

Inefficient and have little technological capability	1	2	3	4	5	Internationally competitive, innovative and reliable

Comment: _____

14) The sustainability of local suppliers of your industry's primary inputs:

Problematic	1	2	3	4	5	No problem at all

Comment _____

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15) Availability of storage and packing/product handling facilities:

Not available	1	2	3	4	5	Readily available

Comment: _____

16) The cost of storage and packing/product handling facilities:

Extremely high	1	2	3	4	5	Affordable

Comment: _____

17) Availability and reliability of transport:

Unavailable and unreliable	1	2	3	4	5	Readily available and trustworthy

Comment: _____

18) Effective management of cold-chain:

Ineffective and inefficient	1	2	3	4	5	Effective and efficient

Comment: _____

19) Necessary infrastructure requirements for export purposes: (E.g. facilities at Port Elizabeth, Durban harbour)

Insufficient and hinders competitiveness	1	2	3	4	5	Sufficient and improves competitiveness

Comment:

FIRM STRATEGY, STRUCTURE AND RIVALRY

1) The management of information flow from primary suppliers to your company is:

Inadequate	1	2	3	4	5	Excellent

Comment: _____

2) The flow and use of information from customers to your company to inform strategy is:

Inadequate	1	2	3	4	5	Excellent

Comment: _____

3) The management of market intelligence for the Citrus Fruit industry is:

Inadequate	1	2	3	4	5	Excellent

Comment: _____

4) Competition in the local market is:

Very limited	1	2	3	4	5	Very intense

Comment: _____

5) Treath of new entrants locally (new citrus farmers) is:

Less likely	1	2	3	4	5	Highly likey

Comment: _____

6) Competition in international market is:

Very limited	1	2	3	4	5	Very intense

Comment: _____

7) Treaths of new entrants internationally is:

Less likely	1	2	3	4	5	Very likely

Comment _____

8) To what extent does economies of scale (i.e. extra savings in costs gained by increased production) influence your competitiveness?

Minor influence	1	2	3	4	5	Major influence

Comment: _____

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9) Your willingness to reinvest in Citrus fruit operations:

Reluctant	1	2	3	4	5	Keen

Comment: _____

10) Your willingness to take risk:

Risk arverse	1	2	3	4	5	Risk taker

Comment _____

11) Does your current resource base (in terms of land, human and capital) support future citrus fruit operations?

Insufficient	1	2	3	4	5	Sufficient

Comment: _____

12) Competition for resources (land, information, human and capital) used by the industry vs other agricultural related activities:

Not competitive at all	1	2	3	4	5	Very competitive

Comment: _____

GOVERNMENT SUPPORT AND POLICIES

1) South Africa's trade policy:

Constrains your company's competitiveness	1	2	3	4	5	Enhances your company's competitiveness

Comment: _____

2) South Africa's land reform policy:

Constraints your company's competitiveness	1	2	3	4	5	Enhances your company's competitiveness

Comment: _____

3) South Africa's labour policy (e.g. minimum wage):

Constraints your company's competitiveness	1	2	3	4	5	Enhances your company's competitiveness

Comment: _____

4) South Africa's macro-economic policy:

Constraints your company's competitiveness	1	2	3	4	5	Enhances your company's competitiveness

Comment: _____

5) South Africa's Competitions Act:

Constraints your company's competitiveness	1	2	3	4	5	Enhances your company's competitiveness

Comment: _____

6) South Africa's BEE (transformation) policy:

Constraints your company's competitiveness	1	2	3	4	5	Is an opportunity to increase your firm's competitiveness

Comment: _____

7) The credibility and reliability of the current political system is (i.e. constitutional action, elections, accountabilities, etc):

Very low	1	2	3	4	5	Very high

Comment: _____

8) The credibility and reliability of politicians are:

Very low	1	2	3	4	5	Very high

Comment: _____

9) Regulatory standards (e.g. Products standards, energy, safety, and environment) in your opinion are:

Lax or non-existent	1	2	3	4	5	Among the world's most stringent

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Comment: _____

10) Complying with regulatory standards:

Obstructs competitiveness	1	2	3	4	5	Increases competitiveness by promoting improvement

Comment: _____

11) Administrative regulations are:

Burdensome	1	2	3	4	5	Routine with minor effort

Comment: Explain your views _____

12) The taxation system:

Impedes business investment	1	2	3	4	5	Promotes business investment

Comment: _____

13) Have legal or political factors over the past five years undermined your company's strategic positioning?

Have severely undermined strategic planning	1	2	3	4	5	Have had no effect on strategic planning

Comment: _____

14) The effect of corruption and opportunism on business' competitiveness:

Impedes business investment	1	2	3	4	5	Promotes business investment

Comment: _____

15) The water legulations Act;

Hinges level of competitiveness	1	2	3	4	5	Does not have an impact

Comment

16) The call for land expropriation without compensation will:

Constraint your company's competitiveness	1	2	3	4	5	Enhance your company's competitiveness

Comment _____

Chance factors (factors over which your firm has no control and are external in nature)

1) The current exchange rate:

Constraints your company's competitiveness	1	2	3	4	5	Enhances your company's competitiveness

mment: Exp _____

2) The exchange rate fluctuations:

Constraints your company's competitiveness	1	2	3	4	5	Enhances your company's competitiveness

Comment: _____

3) The ability of the citrus fruit industry to fully utilise the effect of unfavourable weather conditions on competitors:

Incapable	1	2	3	4	5	Capable

Comment: _____

4) Social unrest (such as politically motivated land grabs, labour strikes, xenophobia etc)

Imposes significant threath to your company	1	2	3	4	5	Does not impose significant threath to your company

Comment: _____

5) The South African political system in general:

Hinders competitiveness	1	2	3	4	5	Promotes competitiveness

Comment: _____

6) Crime in general

Imposes significant threath	1	2	3	4	5	Does not impose significant

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to your company						threath to your company

Comment: _____

7) Health -HIV/AIDS, TB, etc.:

Imposes significant costs to your company	1	2	3	4	5	Does not impose significant costs to your company

Comment: _____

8) Economic development and growth in South Africa:

Constraints your company's competitiveness	1	2	3	4	5	Is an opportunity to increase your firm's competitiveness

Comment: _____

9) To what extent do international/world events impact on your competitiveness? (E.g. warfare/conflicts, international strikes etc.)

Big impact	1	2	3	4	5	No impact

Comment: _____

10) Global recession will have:

Big negative impact on your company	1	2	3	4	5	No impact on your company

Comment _____

GENERAL QUESTIONS - In your opinion:

1) What are the main factors that influence your decision making? a

b c d

2). Do you think the current strength of the industry (citrus) is sufficient to cope with competition? If not, what could be done?

Yes		No

Comment

3). Do you think govenrment is investing enough in the citrus sector in order to increase its competetiveness status?

Yes		No

4). Who are the most threatening competitors (both international and local)

International _____

Local _____

Thank you very much for taking your valuable time to complete this survey. Your response is highly appreciated. God bless you!

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Appendix B

PCA RESULTS FOR DEMAND FACTORS (B1)

Total variance explained

Component	Initial Eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	5.771	33.949	33.949	5.771	33.949	33.949	5.128	30.162	30.162
2	3.787	22.279	56.228	3.787	22.279	56.228	3.570	20.998	51.160
3	2.500	14.706	70.934	2.500	14.706	70.934	2.907	17.098	68.258
4	1.930	11.351	82.285	1.930	11.351	82.285	2.220	13.056	81.314
5	1.333	7.843	90.128	1.333	7.843	90.128	1.498	8.814	90.128
6	.982	5.774	95.903						
7	.457	2.686	98.589						
8	.240	1.411	100.000						
9	1.215E-15	7.145E-15	100.000						
10	6.859E-16	4.035E-15	100.000						
11	3.439E-16	2.023E-15	100.000						
12	2.033E-16	1.196E-15	100.000						
13	3.927E-18	2.310E-17	100.000						
14	-1.466E-16	-8.622E-16	100.000						
15	-4.764E-16	-2.802E-15	100.000						
16	-5.423E-16	-3.190E-15	100.000						
17	-6.550E-16	-3.853E-15	100.000						

Extraction Method: Principal Component Analysis.

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Rotated component matric for demand factors (B2)

Rotated component matrix[a]

	Component				
	1	2	3	4	5
Q4	.946	.145	.152	.147	.037
Q12	.866	-.137	.112	.070	.168
Q16	.782	.035	-.021	.252	.393
Q3	.766	.522	-.001	.003	.129
Q14	.734	-.297	.260	-.460	.238
Q5	.705	.305	-.430	.397	.070
Q11	.690	-.145	.646	.260	-.089
Q9	.167	.924	.055	-.020	.095
Q2	.251	-.908	-.147	-.093	.224
Q15	-.168	.868	-.104	.240	-.021
Q10	.117	.655	.201	-.520	-.384
Q13	-.075	.064	.881	.278	-.212
Q6	.250	.243	.861	.040	.102
Q7	.370	-.217	.693	-.144	-.064
Q8	-.213	-.045	-.319	-.875	.277
Q17	-.618	.270	-.135	.681	.035
Q1	.080	-.100	-.067	-.159	.940

All other Porter diamond determinants were analysed using the same analysis under the PCA.

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